

Running Head: SOUTHEAST SASKATCHEWAN FLOODING IN 2014

Southeast Saskatchewan Flooding in 2014:
Rural Resilience and Disaster Risk Reduction

by

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Abstract

This qualitative study focused on rural Saskatchewan residents directly and indirectly impacted by a flooding event that occurred in the summer of 2014 in their region. This study used interview data to investigate how residents' understanding of the risk of future disaster events in the area and actions to prepare for future events were influenced by the flooding event in the region in 2014. Using semi-structured interviews, the research focused on how residents' perception of risk changed after the 2014 flooding event, what actions they took to prepare for future events, and what factors contributed to these activities. The two main themes were rural resilience and disaster risk reduction actions. Rural resilience was evidenced through volunteerism, connections and networks, and resource knowledge. Disaster risk reduction actions were influenced by sentimentality and apathy.

Keywords: disaster, resilience, vulnerability, rural, sentimentality, apathy, capacity, community, volunteerism, Saskatchewan

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Chapter One – Introduction

The number of extreme weather events in Canada is increasing, due in part to global climate change and in part to changes in land-use in the prairie region. These changes have forced Canadian prairie communities to consider and prepare for an increased threat from flooding, wildfires, tornadoes, storms, and extreme cold and heat. As these events continue to impact communities there are small, rural, communities that will struggle to prepare for, mitigate against, and respond to these events. Small communities often have limited access to resources, healthcare, and supplies, and with an increasing number of extreme weather events these communities are being challenged to cope with intensifying conditions. There are instances of small, rural, communities and regions overcoming these challenges, demonstrating resilience, and improved capacity and coordination. The flooding event that occurred in southeast Saskatchewan in the summer of 2014 is an example of communities facing these challenges and a demonstration of their coping capacities.

In late June and early July 2014, over 60 communities in southeast Saskatchewan declared states of emergency to cope with flooding (CBC Saskatchewan, 2014) (see *Appendix A*). Communities were affected in different ways. Some communities had more severe impacts such as the loss of homes, sewer services, and electricity, while others suffered only minor damage and were thus able to provide support for the response effort within the region. This research study examined how residents of Carnduff, Saskatchewan carried out disaster risk reduction activities during and following the flooding event. The community of Carnduff, after dealing with minor flooding and averting a large-scale impact, quickly, and voluntarily turned itself and its resources into a hub of support to help the surrounding affected communities.

Carnduff provided emergency shelter for other nearby communities and served as the site for the Command Centre for the emergency response throughout the region. While the residents of Carnduff were not significantly impacted by flooding, they were directly involved with the response effort. Their experiences contribute to an understanding of how rural residents are impacted by disasters. This research contributes to the existing body of disaster management research by examining the rural context of vulnerability and resilience. Additionally, it seeks to add to the understanding of how those who respond, volunteer, and contribute to a response are impacted. It also intends to make clear how the level of disaster risk reduction activities completed in the years following the event changed. The flooding event of 2014 introduced many residents of Carnduff and the region to the reality of the flooding hazards in the area.

2014 Flooding Event

During the weekend of June 30, 2014, 200 millimetres of rain fell on southeast Saskatchewan throughout one weekend and overwhelmed drainage systems and existing infrastructure (CBC Saskatchewan, 2014). The record-breaking amount of precipitation in the Upper Assiniboine Watershed forced over sixty communities to declare states of emergency, over 300 people evacuated their homes, and an estimated 40,000 hectares of crop were affected (CBC Saskatchewan, 2014). This precipitation drained into the Assiniboine River and caused millions of dollars in damage to homes, infrastructure, and agriculture (Ahmari, Blais, & Greshuk, 2016). SaskPower, the provincial Crown Corporation responsible for power in Saskatchewan, indicated that an estimated 8,000 people in southeast Saskatchewan experienced power outages (Global News, 2014). This was not the first time that SaskPower had to deal with large scale outages due to flooding in Saskatchewan.

Before the flooding of 2014 there was extensive flooding in 2011 that saturated the land and reservoirs in the region (Ahmari et al., 2016). Due to these saturated conditions from 2011, the precipitation that occurred in 2014 drained into basins and rivers already at their anticipated annual average level (Ahmari et al., 2016). The 2014 flooding raised levels beyond banks and caused overland flooding throughout southeast Saskatchewan. The origin of the floodwater as precipitation instead of spring run-off made the flooding of 2014 unique and not something that had occurred in the “130 years of observations of the Assiniboine River flows” (Ahmari et al., 2016, p. 85). Further, Ahmari et al. (2016) noted that “changing the land use and extending the drainage network, undoubtedly has played a significant role in altering prairie hydrology and potentially increasing the magnitude of flood events” (p. 85). This study considered a small portion of the region located in the Lower Souris Watershed, which feeds directly into the Assiniboine River.

This study focused on the experiences of residents in Carnduff, Saskatchewan. Carnduff is located eighteen kilometres north of the international border between Canada and the United States of America and thirty kilometres west of the provincial border between Saskatchewan and Manitoba as seen in Figure 1. The community has a population of 1,099 residents with 465 private homes (Statistics Canada, 2017a). Carnduff is in the Lower Souris Watershed, Figure 2, that feeds directly into the Assiniboine River. The flood impacts in Carnduff, Saskatchewan were limited due to two factors. The first factor was the community of Carnduff’s decision to cut through roads to help avert the rising water outside the town limits. Secondly, Carnduff is not located in the near vicinity of any major water bodies or courses. While some basement flooding occurred in Carnduff, there was no major loss of property. However, the neighbouring

communities Carievale and Gainsborough were significantly impacted by the

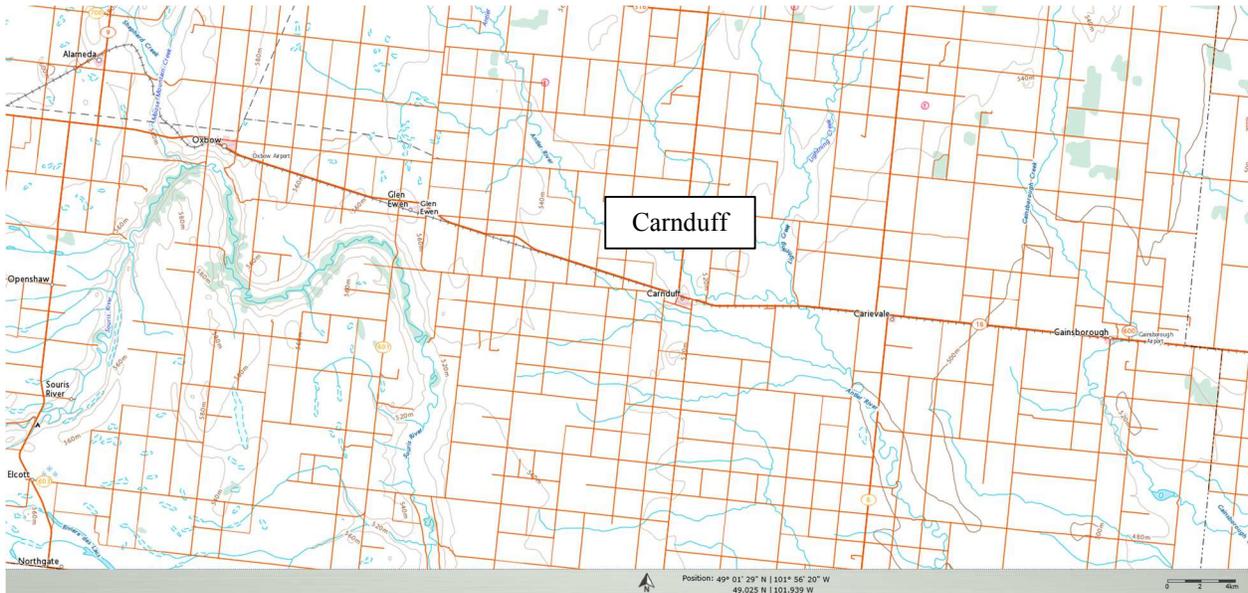


Figure 1. Map of southeast Saskatchewan that highlights the communities and physical characteristics of the region. (Natural Resources Canada, n.d.).

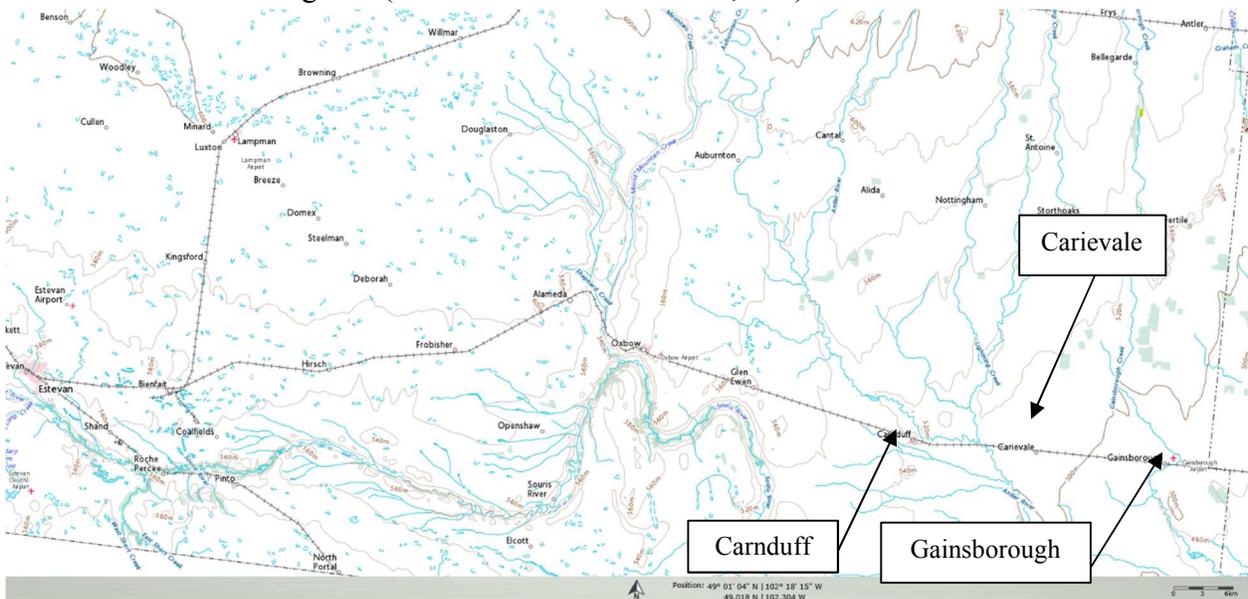


Figure 2. Map of southeast Saskatchewan that highlights the roads and communities in the region. (Natural Resources Canada, n.d.).

flood. Carievale is located 12.5 kilometres directly east of Carnduff and Gainsborough is located 25.5 kilometres directly east of Carnduff. The community of Gainsborough lost several homes and was without a functioning sewer system for months following the event (CBC Saskatchewan, 2014). In the community of Carievale, several homes had substantial flooding in basements and the town was completely cut off from all surrounding communities as the rainfall or precipitation had washed out roads making them impassable. These two communities accessed resources from the command centre in Carnduff. Carnduff made a remarkable transformation from initially being a flood-affected community to a disaster command centre that met the immediate needs of the region. I lived in this community when I was younger and was present in the community during this event. My history in the community allowed me insight into what took place and the advantage of my existing networks to assist with my research. For these reasons Carnduff was selected for this study to explore the relationship between past disaster experience and risk reduction efforts.

Problem Statement

The purpose of this qualitative research study was to explore how one flooding event in 2014 impacted Carnduff residents' understanding of risk and what disaster risk reduction activities they completed to prepare for future events. The study explored how residents understood their own risks during this time. Many factors influence risk perception, including types of hazard, levels of social and physical vulnerability, and intensity of hazard exposure (Egbinola, Olaniran, & Amanambu, 2017). This research aimed to increase the number of studies of disaster experiences in rural Canada and increase the studies available that focus on

indirectly impacted individuals. Additionally, it sought to understand how likely those who respond to disaster events in their region will complete disaster risk reduction activities.

Understanding and recognizing risk is vital to people investing in and completing disaster risk reduction activities. Perception of risk is driven by recognition of vulnerability.

Vulnerability theory acknowledges that vulnerable groups are active agents in solving problems but there is no clear evidence to suggest what strategies or processes are useful to foster and enhance self-efficacy (Coppola, 2015). Practitioners and policy developers often do not appreciate and understand how vulnerable groups cope with adversity. Improving our ability to understand how vulnerable groups cope with adversity and the ways in which they manage the situations they face can help practitioners and policy developers to understand how these influences affect behaviours for future risks and disasters (Coppola, 2015). The community of Carnduff was vulnerable due to their limited resources, dependency on surrounding communities for healthcare, limited access to emergency management expertise, and aging infrastructure. Researching and understanding what took place in Carnduff can give insight into the experience of rural communities affected by disasters in Canada.

Rationale for Research Approach

This research was completed to gain practical knowledge and understand the experiences of those both actively and not actively involved in the response to the flooding event. This case study research was completed using qualitative research methods to gather data and information in greater detail than a quantitative method would have allowed (Creswell & Creswell, 2018). The qualitative method enabled participants to share their experiences and stories, thus improving the data and information available. This information was garnered through interviews

where follow up and probing questions could be asked. Questions and dialogue created a research environment where opinions and thoughts could be explored to better understand the experiences of the participants and to appreciate how they impacted their future actions (Creswell & Creswell, 2018). The interviews were shaped by a series of questions based on the main research question and the subset of questions.

Research Questions

The main research question for this study was:

How did the flooding event near Carnduff in southeast Saskatchewan in the summer of 2014 contribute to Carnduff and residents' disaster risk reduction activities?

Addressing the research question required that the following subset of questions be focused on:

1. How did the residents' perception of disaster risk change after the 2014 flooding event?
2. Since the flooding event what actions have citizens taken to prepare for or mitigate against future floods and other events?
3. What factors contributed to disaster risk reduction activities being carried out?

Study Outline

This thesis is organized into six chapters. This first chapter introduced the study and provided an overview of the 2014 flooding event in southeastern Saskatchewan. Chapter Two draws on existing literature to outline the conceptual framework for the study. Chapter Three discusses the research methodology and outlines the overall design of the research. Chapter Four presents the findings from the data collection and Chapter Five discusses the findings in relation

to the literature. Chapter Six provides recommendations suggesting potential improvements to existing emergency management approaches for rural communities and concludes the thesis.

Chapter Two: Literature Review

The following is an outline and review of existing knowledge and literature concerning how individuals and communities cope with disasters. This is done through the context of the following topics:

- rural communities,
- Saskatchewan,
- disaster risk reduction activities,
- social vulnerability, and
- resilience for disaster risk reduction.

The chapter will begin with an outline of the research related to rural communities and Saskatchewan and continue with an overview of information on the concepts related to disaster risk reduction, vulnerability, and resilience.

Rural Communities

The term “rural” is not a static concept; rather, definitions have been fluctuating for decades. Historically, the concept of rural was associated with living in the country, farming, and being isolated (Deavers, 1992). This historical tradition of rural often focused on agricultural activities (Deavers, 1992). The percentage of agricultural land use differs across the country. The agricultural sector in Canada accounts for only 7.2% of the total land use nationally (Statistics Canada, 2011). However, 42% of Saskatchewan’s land continues to be used for farming (Statistics Canada, 2011). Thus, the inclusion of agriculture in the concept of rural remains very applicable in Saskatchewan. However, as Deavers (1992) stated, “the consolidation and mechanization of farming, rural electrification, modernization of

transportation and communications infrastructure” (p. 184) have shifted the concept dramatically over the last several decades. Even as definitions of rural shift and these regions experience modern advances, rural areas still experience isolation which can increase vulnerability.

The vulnerability for rural areas in Canada and Saskatchewan includes limited access to healthcare, transportation, economic influence, resources, and urban centres (Arcury, Preisser, Gesler, & Powers, 2005). Carnduff reflects these vulnerabilities as residents are:

- twenty-minute driving distance from the nearest acute care centre;
- three hours away from the closest urban hospital for specialized care;
- impacted by the elimination of the Saskatchewan Transportation Company by the Government of Saskatchewan that provided affordable transportation to and from Carnduff regularly;
- negatively impacted by the decline in the oil and gas economy as well as railway inconsistencies and international trade disruptions (impacting agricultural products)
- struggling to get resources shipped and delivered in a timely manner; and
- not the focus of government policies and programs, which are primarily urban focused and do not consider the changing rural demographic.

These vulnerabilities impact emergency management in rural communities and create a level of vulnerability specific to rural communities.

Emergency management in rural communities and regions suffer from a lack of resources in both administration systems, staffing, and physical resources (Coppola, 2015). Administration systems and staffing are dependent upon volunteers, human resources, and capital. With limited access to these resources as well as to training, emergency management is hindered in rural

communities and regions (Coppola, 2015). However, Haski-Leventhal et al. (2017) and Hodgson (2004) noted that those with high levels of vulnerabilities and limited capacities can overcome such obstacles if volunteers are actively involved (Haski-Leventhal, Meijs, Lockstone-Binney, Holmes, & Oppenheimer, 2017). Their research highlighted that with the right programs and resources, impacted populations can not only survive better in the event of a disaster but can also minimize their vulnerability, increase their capacity, and contribute to the betterment of the communities around them (Haski-Leventhal et al., 2017). This was further touched on by Ride & Bretherton (2011) whose research focused on how local capacities influence more positive responses and Laycock & Caldwell (2018) who discussed the importance of local knowledge.

Additional deficiencies in emergency management in rural regions include the limited number and quality of studies completed, and information available. Grimes, Goos, Little & Shannon (2007); Liu, Mooney, Szeto, Theriault, Kochtubajda, Stewart, Boodoo, Goodson, Li, & Pomeroy (2016); and Fulton & Drolet (2018) are among the researchers that have focused on flooding in Alberta. The flooding in Alberta has directly impacted large communities that include but are not limited to Calgary, High River, and Okotoks. Due to these flooding events happening in more urban areas and impacting more people they were studied extensively whereas floods that impact more rural areas are not studied as extensively. In Manitoba there has been extensive flooding of the Portage la Prairie and Winnipeg regions, with research being completed by Simonovic & Carson (2003); Rashida, Haider, & McNeil (2011); and Lemarquand (2006) among others. Minot is a city that is the closest location and a popular destination for southeast Saskatchewan residents as it offers goods and services that rural southeast communities

depend on. Minot has previous flooding experience however these experiences and events are in context of the United States of America and their emergency response, infrastructure, and overall culture. The topography and environment that caused Minot to flood are not similar to those of Gainsborough and Carievale. These geographic differences include the decreased elevation of Minot compared to the upstream bodies of water as well as the city's close proximity to the riverway. The focus of research on flooding in the prairie provinces has been on those events that impacted and could potentially impact urban centres and not those that threaten rural regions. Overall, these studies do not focus on the rural and prairie context. This study focused on a rural prairie region and thus can contribute to understanding of how rural regions are impacted by flood events.

Saskatchewan

The disaster risks in Saskatchewan are primarily related to the threats of forest fires, grass fires, droughts, and severe windstorms. These types of hazards are the primary focus of the Government of Saskatchewan and researchers. These types of disaster events, although not unimportant, are not the only threats that government officials and residents need to be aware of and understand. The available information on flooding in rural regions and regions specific to Saskatchewan is limited. The limited number of studies completed with a Saskatchewan context are not applicable to Southeast Saskatchewan and the 2014 flooding event for a number of reasons. Hurlbert's (2018) case study of Saskatchewan flooding focused on the south west region of Saskatchewan whose topography and geography is unique to that region due to the South Saskatchewan River basin, the largest dryland watershed in Canada.

McMartin, Sammel, and Arbuthnott's (2018) research is the most reflective of the flooding that occurred in Gainsborough and Carievale in 2014. The 2011 flooding and 2014 occurred in southeast Saskatchewan; however, they occurred in different regions of southeast Saskatchewan. The 2011 flooding impacted more urban populations such as Estevan, Minot, Winnipeg, and required international and interprovincial cooperation and communication, whereas the 2014 flooding in Gainsborough and Carievale, which did have impact interprovincially due to the close proximity to the Manitoba border, did not include the international portion and any urban centres. Massie's (2013) chapter about civic engagement and water protection in Saskatchewan did not provide information on the social aspects of preparedness and mitigation of a large-scale flooding event, but rather focused on structural mitigation. More specifically it focused on protection of source water and the arguments made for all sides of source water protection. It appears that information on flooding in rural regions and regions specific to Saskatchewan is not available and thus this research provides some context for those experiences and underrepresented voices in disaster management. The lack of studies on social aspects of these events in Saskatchewan highlight that due to the small population size and small scale of the flooding events they were not of primary importance for public interest and research.

Disaster Risk Reduction

Disaster risk reduction is the overarching objective of disaster management and "involves reducing or eliminating the likelihood or the consequences of a hazard, or both...and seeks to 'treat' the hazard such that it impacts society to a lesser degree" (Coppola, 2015, p. 12). Disaster risk reduction can include activities that mitigate and prepare communities to proactively ensure

hazards impact society to a lesser degree (Coppola, 2015). Positive and negative experiences of individuals impact these activities (Coppola, 2015). Disaster risk reduction activities can take place after something has been learned from an event that has already occurred or through the process of proactive risk assessment (Coppola, 2015). Disaster risk reduction can also include preventative processes. The United Nations Office of Disaster Risk Reduction defines disaster risk reduction as being “aimed at preventing new and reducing existing disaster risk and managing residual risk.” Examples of disaster risk reduction activities include relocation programs, insurance programs, building code amendments, retention systems, detection systems, education programs, and behavioural modifications (Coppola, 2015).

Haque and Etkin (2012) discussed how systems and communities are able to adjust and learn from their own experiences as well as from other systems and communities surrounding them. This idea is further discussed by Berkes, Murphy, Bhatt, and Reynolds (2012) who highlighted the importance of recognizing those opportunities for development and advancement. It is important to appreciate the community and its central role in disaster and emergency management, as well as networks and social connections that can lead to an increased appreciation of risks and levels of vulnerability (Murphy, 2012). This research on community networks and systems contributes to understanding how communities impacted by disasters are supported by their neighbouring communities, and how those neighbours are impacted by the disaster system, established networks, and the regional community. Disaster risk reduction is an essential part of disaster management and appreciating its role in disaster management in all aspects of communities is crucial. For successful risk reduction, communities must prioritize their plans and actions within their local knowledge and resources. The following two sections

examine the existing literature to understand what conditions and factors influence the process of such prioritizations.

Individual preparedness. Approaches for disaster risk reduction take a number of different forms. Preparedness is one component of the four phases of disaster management that contributes to the reduction of risk. Preparedness “involves equipping people who may be impacted by a disaster or who may be able to help those impacted with the tools to increase their chances of survival and to minimize their financial and other losses” (Coppola, 2015, p. 12). Preparedness is the act or activity undertaken prior to an event. Activities are undertaken so that individuals impacted when an event occurs are not forced into situations they are not comfortable with and know nothing about (Coppola, 2015). Examples of preparedness activities include training, equipment acquisition, assigning authority, public education, and policy creation (Coppola, 2015). Completing preparedness activities and allocating budget amounts for preparedness activities gradually stops being a priority. This lack of prioritization lends itself to a number of consequences including expanding responsibility of emergency management offices, as well as the political nature of disasters and the offices responsible for disaster management (Krueger, Jennings, & Kendra, 2009; Coppola, 2015). These preparedness activities are dependent on the involvement of individuals, governments, and persons in positions of power.

As people’s experiences with disasters diminishes over time, their willingness to allocate resources, both financial and time, also reduces, which leads to apathy and the overall minimization of sustained preparedness activities. This theory is discussed by Mileti & O’Brien (1992) as the “normalization bias”. The “normalization bias” is when an individual or

community did not experience loss or experienced little loss and is less likely to listen to and follow directions in subsequent situations as they are recalling that in the former event they were not impacted and they feel this time will be the same. The “normalization bias” contributed to the lack of or reluctance to prepare for disasters when previous personal experiences with an event were not largely disruptive. Without sustained programming and resources for preparedness and a willingness to contribute regularly to advancing preparedness programs vulnerability increases and an individual’s risk and the overall risk of the region will increase. This concept and the interrelated nature of sustained preparedness activities, apathy, or “normalization bias” in a rural context is not widely understood in the literature even though these factors seem to have a strong influence on individual behaviours towards risk reduction and will be explored in this research.

Disaster events can create an opportunity to increase resilience, although this outcome may not always be pursued or realized. Birkmann et al. (2010) emphasized that although disasters can be the catalyst for change this appetite will eventually fade, and societal pressure for change will reduce and eventually disappear. One of the common approaches for risk reduction, especially for recurrent events is to decide to “do nothing” (Montz, Tobin, & Hagelman, 2017, p 206). Communities often see this as the best approach for them because mitigation activities require more planning and management than they have resources to undertake (Montz et al., 2017). People avoiding these processes and adjustments may make sense to the people and communities in the context of disaster management even though the risks remain for their properties and belongings. There appears to be various transitional processes and options that are possible for disaster affected communities to promote social change. This

window for change has the capability to improve the future resiliency of individuals, families, and communities; however, there is still research required to better appreciate how to maximize this policy change window (Birkmann et al., 2010).

Intangible considerations. When disaster management, and specifically mitigation, is discussed it is often in the context of the tangible losses of individuals and communities (Joseph, Proverbs, Lamond, & Wassell, 2011). However, in all disasters there are intangible considerations. Often, intangible losses are felt following tangible losses due to the emotional attachment that individuals have not only to their home, but also to smaller items that carry strong emotional value (Joseph et al., 2011). Supporting individuals by creating awareness and strategies to keep their possessions secure can reduce the physical, emotional, and mental impacts that an event has on an individual, thereby contributing to a greater ability to respond to an event as an individual but also as a larger community (O'Neill, Evans, Bussman, & Strandberg, 1999). Using the concepts outlined by O'Neill et al. (1999) this research sought to understand how personal loss and emotional attachments can strengthen mitigation measures in disaster management. This is supported by Joseph et al. (2011) who found underestimation of these intangibles in the post-flood period and appraisals requires a greater focus in disaster management research.

Social Vulnerability

Personal attributes and social considerations have not always been a priority for disaster management practitioners and policy developers. However, in recent decades it has become increasingly understood that a comprehensive emphasis on social vulnerabilities and attributes has a positive impact on minimizing overall risks and vulnerabilities for individuals (Kasdan,

2016). Vulnerability is weaknesses or gaps with the potential to be harmful if an event occurs, and risk is the potential for loss or damage should an event exploit a vulnerability (Struik, 2015). Wisner, Blaikie, Cannon, & Davis (2004) define vulnerability as “the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard” (p. 11). These characteristics include but are not limited to age, gender, race/ethnicity, socioeconomic status, physical and mental ability, education level, and religion. To reduce vulnerability, root causes of vulnerability represented by these characteristics must be addressed and improved. Vulnerability scholars also state that vulnerable individuals are not helpless victims; rather, they are active agents who can participate in their own vulnerability reduction (Cannon, 2000; Hewitt, 1997). Achieving decreased vulnerability as part of disaster risk management can result in more opportunities to better allocate human, social, political, and financial resources for future events once devoted to vulnerability reduction. Decreasing vulnerability will also minimize the overall risk levels of individuals and, therefore, the broader communities to which they belong. Additionally, this decrease in the level of vulnerability will increase and improve the level of resilience for community and individuals. While the literature suggests that vulnerability and resilience are correlated, there is limited understanding of how they interact with each other to reduce risk (Bergstrand, Mayer, Brumback, & Zhang, 2015; Manyena, O’Brien, O’Keefe, & Rose, 2011). Instead of focusing solely on the reduction of vulnerability, integrating the enhancement of resilience simultaneously might improve the effectiveness of risk reduction approaches.

Resilience for Disaster Risk Reduction

Resilience in the context of disaster and emergency management is “both inherent strength and the ability to be flexible and adaptable after environmental shocks and disruptive events” (Tierney & Bruneau, 2007, p. 14); thus, resilience is dependent not only on the built environment but also social context. Additionally, Public Safety Canada (2017) noted that to be resilient an individual, community, or larger system must be able and open to change, preserve, engage, and share resources and responsibilities. The United Nations’ Office for Disaster Risk Reduction’s campaign for “Making Cities Resilient” (United Nations Office for Disaster Risk Reduction, 2015) emphasized that sustainability, education, organization, monitoring, leadership, innovation, and collaboration have been the keys to continued advancement of resiliency throughout the globe (United Nations Office for Disaster Risk Reduction, 2015). Richert, Erdlenbruch, & Figuières (2017) reported that participants who had already completed mitigation measures felt a greater sense of resilience compared to those who were planning on completing activities in the future. Mitigation actions do not always increase resilience and in some instances no actions are warranted.

It is important to understand that lived experiences “are multidimensional, multileveled, and rarely shaped by one factor” and this impacts and complicates sustained drive for change, overall individual impact, and stages of resilience (Atallah et al., 2019, p.14). There is a growing body of research on resilience indicators as they are becoming a requirement to monitor success and justify the investments made in programming (Sturgess, 2016). Resilience can be measured through several different frameworks that range from access to food, assets, health and nutrition, social capability, adaptive capacity, and the natural environment (Sturgess, 2016). The

intersectionality of social attributes can both increase and decrease an individual, family, or community's resilience depending on the attributes present. If social attributes come together to create an increased resilience, the risk remains minimized; however, attributes can come together and lead to a decrease in resiliency, and that increases the risk of adverse impacts from a hazard event. These disaster experiences shape and impact a person and their future development, decisions, and direction. Ensuring that direction is positive remains vital; however, capitalizing on the period in which real change is possible should also be a consideration for future research. A greater appreciation of resilience will lead to greater strides in disaster risk reduction.

Conclusion

The terms, theories, and research presented and discussed in this chapter are relevant to rural communities in Saskatchewan and their unique situation and environment. Following the introduction to rural communities and Saskatchewan this chapter introduced and explored disaster risk reduction, individual preparedness, intangible consideration for mitigation, social vulnerability, and resilience for disaster risk reduction. Resilience as it relates to vulnerability and preparedness activities and inactivity can provide greater insight into the rural context and disaster risk reduction activities. The existing literature gaps surrounding flooding events in rural regions, how vulnerability and resilience interact with each other to reduce risk, impact of intangibles in the post-flood period, and how to maximize the policy change window will all be impacted by this research. This chapter forms the basis for this research and the role it will play in disaster management and rural practice.

Chapter Three – Research Methodology

The flooding event that occurred in southeast Saskatchewan in the summer of 2014 directly impacted the residents of Carievale and Gainsborough; however, the residents of Carnduff were also impacted and influenced by this event. Residents of Carnduff had minimal direct impacts from the rising waters, but nonetheless they participated in the response and recovery in the region in a variety of ways. The flooding event was a time when flood hazards were a major concern and priority for individuals. This is the time when disaster risk reduction practices and beliefs had the highest likelihood to be changed. The overall influence of this event on Carnduff residents' actions to prepare for future events was examined by answering the following main research question and subset of questions:

How did the flooding event near Carnduff in southeast Saskatchewan in the summer of 2014 contribute to this community and residents' disaster risk reduction activities?

1. How did the residents' perception of risk change after the 2014 flooding event?
2. Since the flooding event, what actions have citizens taken to prepare for or mitigate against future floods and other events?
3. What factors contributed to disaster risk reduction activities being carried out?

In this qualitative study, interviews were used as the method for answering the research questions.

Methodological Framework

Qualitative research is primarily used for “exploring and understanding the meaning individuals or groups ascribe to a social or human problem” (Creswell & Creswell, 2018, p. 4) and it is used in this study to further understand and appreciate how specific events and

experiences impacted people. Hewitt-Taylor (2011) shared how gaining an understanding into people's experiences as well as an appreciation for the subjective factors that can impact these experiences is a valuable aspect of qualitative research. This appreciation of experiences creates space to view a situation from the perspective of others and begin to appreciate how shared experiences vary from person to person. There are challenges to qualitative research for researchers and for those involved in adopting and appreciating the outcomes of the research (Caelli et al., 2003). One of the limitations of qualitative research is that it is not generalizable (Hewitt-Taylor, 2011). This means that it may not inform all other situations that are similar but it does not mean that the information garnered through qualitative research is not important to the world of research. A qualitative approach allows for information and studies to address and contribute to the overall understanding of the area of research and canon of knowledge around the topic. Additional limitations of qualitative research are that it is time-consuming, impacted by biases, and often difficult to replicate (Hewitt-Taylor, 2011). These challenges can be addressed by remaining cognizant about being open and honest about the researcher's position, assumptions, and epistemology; being clear about the methods employed in analyzing the data; being clear about the steps implemented to ensure rigor and validity; and understanding the shortcomings and drawbacks that general qualitative research carries with it (Caelli et al, 2003; Cooper & Endacott, 2007; Kahlke, 2014). These factors can be limiting if they are not respected, understood, and addressed clearly and honestly by the researcher (Cooper & Endacott, 2007).

Data Collection Tools & Types of Data

Interview transcripts provided the data was used to investigate residents' understanding of the risk of future disaster events in the area and how undertaking actions to prepare for future

events were influenced by the flooding event in the region in 2014. The research used semi-structured interviews completed over three weeks (between June 25, 2019, and July 18, 2019) in the small rural community of Carnduff, located in southeast Saskatchewan. Participants were recruited through a one-page mailer sent to mailboxes through Canada Post in Carnduff for residents who resided in the postal code S0C 0S0, which covers Carnduff, Saskatchewan, and surrounding rural regions. There were approximately 425 flyers distributed to mailboxes in Carnduff. Interested individuals were asked to reach out via email to the researcher. All individuals who indicated interest in participating in the research after receiving the flyer in the mail were accepted into the study. Semi-structured interviews were completed with twenty Carnduff residents. These interviews were held primarily in municipal government buildings in Carnduff; however, some of the interviews were completed at participants' place of employment per their request.

The focus at the beginning of each interview was understanding the various sociological factors that may have influenced each participant's experiences, beliefs, and overall perceptions. Questions asked of each participant included if they grew up in town/city or on a farm, education level, occupation, average volunteer hours, gender, age, race/ethnicity, marital status, language, and religious affiliations. The remainder of the interview followed an interview guide (see Appendix B) to ensure consistency with questions and that interviews were no more than an hour in length. All interviews were recorded following written permission by the participant. The interviews were transcribed using the online program *Temi* and were reviewed further by the researcher to ensure accuracy. The completed transcriptions were printed for analysis. The survey, the recording of interviews, transcribing of interviews, retention of

documents, the recruitment flyer, and initial correspondence among the researcher and potential participants were reviewed and approved by the Royal Roads University Research Ethics Board (Appendix C).

Data Analysis

Thematic analysis of the interview data was completed through deductive and inductive coding. Fereday & Muir-Cochrane (2006) outlined a six-step process that identified how themes could be “generated from the raw data to uncover meanings” for participants using both inductive and deductive coding. The six steps Fereday & Muir-Cochrane (2006) outlined were:

1. Developing the code manual
2. Testing the reliability of the code
3. Summarizing data and identifying initial themes
4. Applying template of codes and additional coding
5. Connecting the codes and identifying themes
6. Corroborating and legitimating coded themes

The development of the code manual included pre-established codes from the research questions and sub-questions. The code manual was used to review and summarize the data, which resulted in the recognition of new patterns and trends. These patterns and trends were added to the code manual to continue to identify and understand the themes from the data. It was this rigor and analysis that identified codes from the interview data that revealed patterns and trends that translated into overarching themes to appropriately and adequately understand the social phenomenon that occurred and continued to occur in the community of Carnduff following the flooding event of 2014.

Deductive coding uses codes and keywords selected prior to analysis of the data (Hewitt-Taylor, 2011). Deductive coding used risk, risk perception, vulnerability, resilience, mitigation, preparedness, and participant's role. These pre-established codes were derived from the main research question and subset of research questions. Inductive coding involves the use of codes developed after data analysis has begun and after themes were discovered throughout the data (Hewitt-Taylor, 2011). An example of inductive coding in this research is the codes used to account for preparedness. Preparedness was an original code stemming from the main and sub research questions; however, the codes of training, resources, building, insurance, and sump pump are all inductive codes directly related to preparedness and were used to establish the codes discussed in the findings. The text was highlighted as it related to the codes without the use of coding software throughout the printed transcripts. Additionally, participant's race, age, gender, occupation, sexuality, where they grew up, their religious affiliations, if they had children, if they volunteered during the event, if they owned a home, and their level of education were outlined in a document along with their responses to various interview questions on participation, mitigation, and preparedness activities. All the data is examined in the rural prairie context. These findings are outlined in Chapter 4 and further discussed in Chapter 5. The two main themes generated from the findings are rural resilience and disaster risk reduction activities.

Study Limitations

This study has several crucial limitations. Carnduff has a population of approximately 1,100 people. The sample size compared to the total populations of Carnduff is small and is not completely reflective of the population's make-up, according to the Canadian Census data on

Carnduff. This limited sample size minimizes the varied perspectives, opinions, and experiences of the community and is not a fully comprehensive picture of the community's citizens. Carnduff has a relatively monocultural demographic composition that limited the study's ability to determine if there were any race/ethnicity, income, or cultural disparities in the data. Participants in the study either resided in or owned businesses in Carnduff. No participants from neighbouring communities were included in the study due to the desire to understand the risk perceptions and changes in behaviour of a community that played a role in assisting surrounding communities with severe impacts. I grew up in the community, which limited some individuals who could participate due to their close relationship to me. This background can be found in more detail in the section below on Researcher Background.

Validity and Reliability

Ensuring the research is valid and the results reliable is crucial in any research study (Hewitt-Taylor, 2011). Validity ensures that the qualitative data is accurate and based on sound research practices (Creswell & Creswell, 2018). Validity can have both internal and external factors (Hewitt-Taylor, 2011). The make-up or framework of the study and inquiry is part of the internal validity whereas the external validity is about how likely the results are to be the same if the study was to be carried out with different participants in the same environment or with different participants in a different environment (Hewitt-Taylor, 2011). Validity was ensured in this research by adhering to qualitative research practices, faithfully representing the data, and identifying and clarifying biases (Hewitt-Taylor, 2011). Identifying and clarifying the researcher's biases is a crucial step to ensuring the validity of the study (Creswell & Creswell, 2018).

The biases associated with this research include my having lived in Carnduff, Saskatchewan for 27 years, having been in the community when the flooding event occurred, and knowing in some capacity all the participants involved in the research. There were no participants in the research related to me; however, after living in the same community of 1,100 people for over 27 years I have knowledge of almost everyone in the community. These relationships and networks allowed the participants to trust in the interviews and allowed me as the researcher a greater appreciation of the background information that went into the event. This information allowed me to dig deeper into the topics and questions. The biases outlined in this section were shared with my thesis supervisor and the ethics committee during the ethics approval process. The transparency of the bias was also shared with the participants throughout their engagement in the interview. It was mentioned in the communication leading up to the interviews as well as at the beginning of the interviews to ensure that all participants were involved not because they felt pressured to but because they wanted to be active participants in the research process.

Reliability defines how consistent a research approach is throughout the research project. (Creswell & Creswell, 2018). Reliability relates to how a researcher could take the information provided and duplicate the research in another environment (Creswell & Creswell, 2018). The practice of keeping detailed notes and records on procedures and practices is a big part of ensuring reliability (Creswell & Creswell, 2018). Detailed notes as well as transcript accuracy and consistent codes were ways that reliability was maintained throughout this research. The validity and reliability throughout this process and in the results of this study will enable other

rural regions and communities to use these findings to better understand and appreciate their own communities and activities.

Researcher Background

As the researcher of this study I was responsible for designing the study, getting the correct approvals for the study, communication, interviews, reviewing and analyzing the data, as well as interpreting and writing up the final report on findings. All these steps were influenced and impacted by my own world views, biases, values, and beliefs (Creswell & Creswell, 2018). This section will outline my background and how it impacted and shaped this research.

I grew up in Carnduff, Saskatchewan, on the same street and in the same house my whole life. I lived in Carnduff for 27 years only leaving for post-secondary education and returning each summer for summer work experience before moving to another small community in southeast Saskatchewan, and then to a large city in Saskatchewan. Growing up in Saskatchewan compelled me to complete research in the province. Additionally, thanks to the established networks and connections I had in the community Carnduff offered a space to complete the research where there was limited time and energy required to establish trust and connections. When the flooding event in 2014 occurred, I was living in Carnduff and working in Redvers, Saskatchewan, which is 45 minutes north of Carnduff and I was personally minimally impacted by the flooding event. Being a part of this event allowed me firsthand experience and knowledge about the event and spurred me to want to better understand its impacts. Although my knowledge of and experiences with the community of Carnduff were extensive this study allowed me to more deeply understand the community I grew up in and to work on giving back to the community. After completion of this study, I intend to share my results with the municipal

government of Carnduff, participants, and residents of Carnduff. Providing the results will contribute to the community's ability to review and improve their current disaster preparedness. The findings of the interviews that follow will highlight the commonalities and differences of participants and their experiences, perhaps establishing a line of inquiry for any level of government that will use this study.

Chapter Four – Findings

The findings from the interviews are presented in this chapter. It begins with a full description of the participants and describes the demographics of the participants in relation to the community. The following subsections of this chapter present findings for each of the sub-research questions that help to answer the main research question: How did the flooding event near Carnduff in southeast Saskatchewan in the summer of 2014 contribute to this community and residents' disaster risk reduction activities?

Participant Profiles

There were twenty individual participants taking part in the research. Each participant lived, worked, or owned a business in the community of Carnduff, Saskatchewan. The participants in this survey were all Caucasian. Among the participants seventeen (85%) were homeowners, two (10%) owned a farm, two (10%) owned a condo, and one (5%) was not an owner. Seventeen (85%) of respondents had children; Figure 3 below shows the number of children participants had at the time of the research interview. Fourteen (70%) of the participants were raised in a town setting and six (30%) of the participants were raised in a farm setting. Fifteen (75%) of the participants were married with the remaining five (25%) being either single (two; 10%), divorced (one; 5%), or widowed (two; 10%) at the time of the research. The age of participants at the time of the research ranged from 29 to 61+ and is broken down in Figure 4. There were 13 female participants and 7 male participants. Participant occupation at the time of the research is presented in Figure 5 and Figure 6 shows the previous occupations of the eight (40%) who indicated they were currently retired. The religious affiliations of participants ranged between undeclared (three; 15%), religious (following a specific organized

religion – six; 30%), spiritual (belief in a higher being but not associated with a specific organized religion – nine; 45%), and not religious (not believing in a religion or higher power two; 10%). The education levels of the participants ranged from high school (2; 10%), certificate (7; 35%), diploma (6; 30%), to a masters (one; 5%), while five (25%) did not declare their education level.

Of the research participants, fifteen (75%) stated they volunteered in some way at the time of the flooding event but not necessarily for the flooding response; rather, they were involved in local organizations and committees. A total of twelve (60%) of the participants said they were active in some type of non-disaster related community leadership role at the time of the flooding. The difference of three (15%) between participants who volunteered and those who were community leaders indicates that some of the participants were active in the community but not at the level of leadership. Figure 7 outlines the number of volunteer hours per week completed by participants at the time of the study but not directly towards the flooding event response. When considering the flooding response, sixteen (80%) of the participants volunteered during the flood response and four (20%) did not volunteer during the event.

All participants were able to carry out daily activities in the community with no assistance or assistive devices at the time of the flooding, many had pets (although the exact number is unknown), and there were no new parents among the participants. Participants were actively involved in their local religious organizations, animal care, health care, schools, libraries, and various other community institutions that directly impacted their experiences, actions, and vulnerabilities.

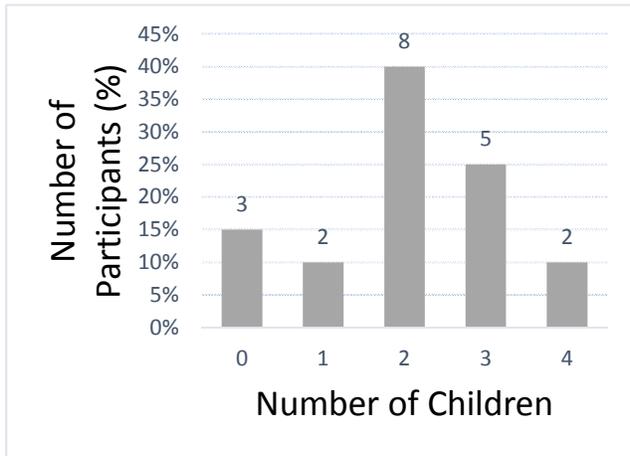


Figure 3: Number of children participants parented.

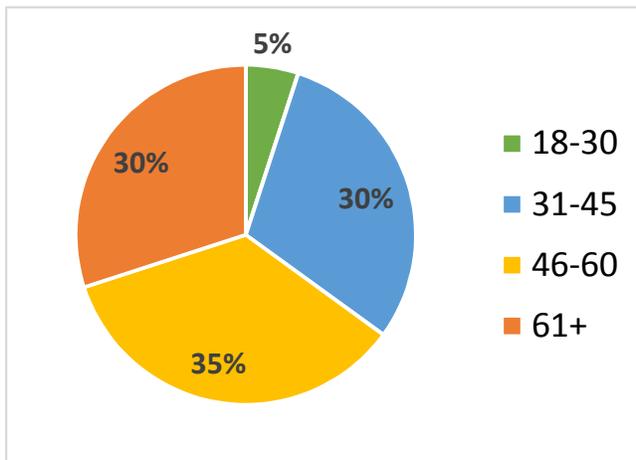
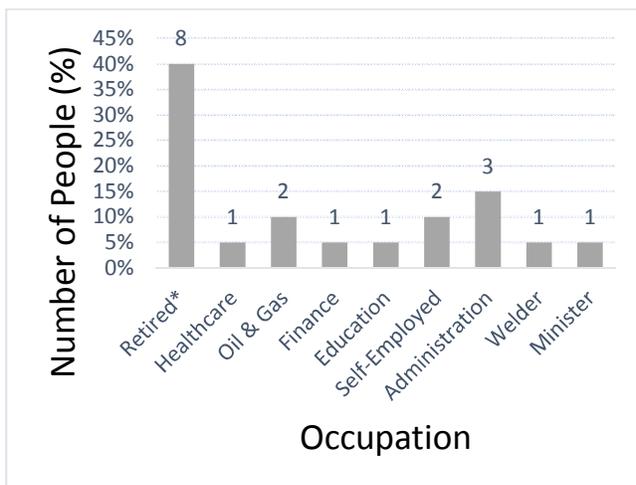


Figure 4: Age of participants.



*see Figure 6 for more detailed information about employment prior to retirement

Figure 5: Occupation of participants.

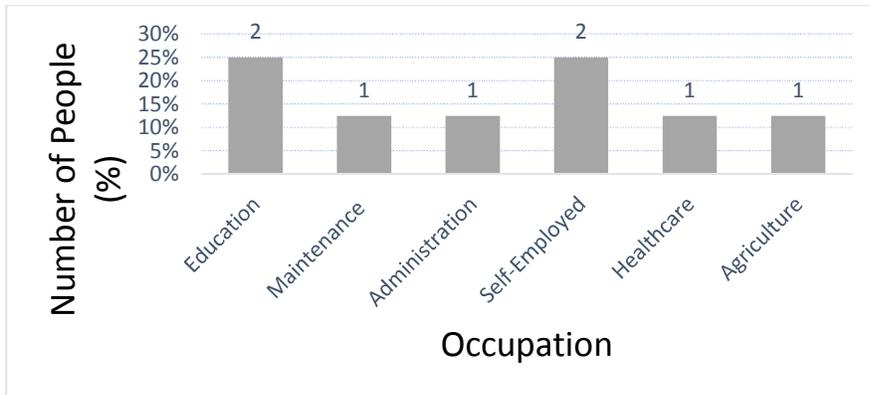


Figure 6: Former occupation of retired participants.

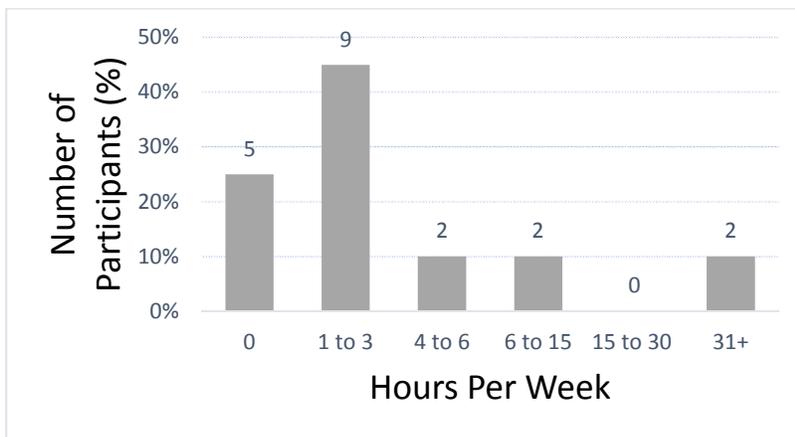


Figure 7: Volunteer hours per week completed by participants at time of study.

Changing Perceptions

How did the residents' perception of disaster risk change after the 2014 flooding event?

The research sought to understand if the flooding event changed participant's perceptions of risk. Fourteen (70%) of participants stated they now had a greater concern about their overall risk. Four (20%) participants indicated they believed their overall level of risk remained the same. The remaining two (10%) participants said they did not feel they had a greater level of

risk; rather, they felt they did not have to worry about anything impacting their home or immediate family.

One participant indicated indifference or apathy with their comment of “out of sight, out of mind” was their approach to risk and only hazards they could see and understand were strongly considered and addressed. Another participant said they “never would have thought flooding was going to be an issue” given the fact that the community had not experienced a flood causing serious structural damage in the last 130 years. That being the case, “it likely won’t happen to me again,” was the response by one participant. Tornadoes, fires, and storms were the hazard types participants were concerned about prior to the flooding event and the events that impacted their overall approach to minimizing risk.

Of the fourteen (70%) participants who indicated they had a greater concern about their overall risk, three (15%) stated that the types of hazards they were concerned about remained the same. The group who indicated greater concern also noted they were taking preparation activities more seriously and actively taking steps to mitigate some of the risks, whereas previously they were not very worried about the risk. For example, one participant stated they now have “extra water on hand, batteries, a non-electric can opener, and stocks of food that don’t require electricity to cook and... since the [flooding event] I’ve been a little more aware of the limitations.”

The participants who indicated they believed their overall level of risk remained the same said they felt this could change in coming years if infrastructure concerns were not addressed by the community. These participants expressed concern that as the infrastructure in the community of Carnduff continues to age and no steps are taken to improve or replace aging infrastructure,

their level of worry increases because they feel their risk increases. For example, one participant stated, “what I would be concerned about for the community is that our infrastructure becoming aging, our sewer system and...storm drain system.” A different participant voiced concerns about the aging lift station for sewer waste; however, they were pleased to see that the community of Carnduff “currently has a new lagoon system and sometime this year they’re building a new lift station...and a booster station.” One participant said that prior to the flood they had never considered the current infrastructure would fail or not be adequate to handle an event; however, the flooding event shed light onto the impact the community’s vulnerable infrastructure would have on their safety. The infrastructure concerns mentioned included the sewer lift stations, lagoons, electrical capacities, railways, and fire department resources.

The remaining two (10%) participants who said they did not feel they had a greater level of risk but instead felt they did not have to worry about potential impacts to their home or immediate family expressed these views because they believed the flooding event in 2014 was evidence of the increased capacity of the community to respond to an event and because they believed the geographical location of the community was ideal to mitigate against potential risks. As an example, one participant stated that the response showed that “Carnduff would be safe and protected” if something were to happen. Another participant spoke about the geographical location of Carnduff being a safe distance from large bodies of water and that the home they live in “sits on a hill and isn’t close to anything” and “by the time anything got close to my house it would be dealt with”; hence, the participant expressed no concerns. The participants in this research had varying experiences that led to either an increased perception of risk, the same perception of risk, or a decreased idea of risk for themselves and their families.

Mitigation and Preparedness Strategies and Activities

Since the flooding event what actions have citizens taken to prepare for or mitigate against future floods and other events?

Participants expressed a willingness and desire to participate in mitigative measures for future flood risks. Various mitigation and preparedness strategies were undertaken by households after the 2014 flooding. The following sections are organized based on the participants' different risk reduction activities which include safeguarding homes and families, safeguarding irreplaceable items, and community response.

Safeguarding homes and families. The data from the research indicated that seventeen (85%) participants owned their own home and/or farm. This is 17.2% higher than the national average but only 9% higher than the overall percentage of homeownership in Carnduff according to the 2016 Canadian Census (Statistics Canada, 2017b). Following the flooding in the region, eleven (55%) participants said they revisited their insurance policies to better understand how they are covered and what gaps they may have in their coverage. For example, one participant stated, "after seeing everything they [residents of neighbouring communities] were dealing with and... losing I wanted to make sure that our insurance was good." Nine (45%) participants said that the event did not drive them to revisit their insurance. Of this group, four (20%) indicated they did not revisit their coverage and do not have knowledge or a solid understanding of what their insurance covers. For example, one participant stated, "I'm not sure what my insurance covers but I'm sure it's fine." The remaining five (25%) participants indicated they did not revisit their insurance plans; however, they believed they have a strong understanding of their insurance. As one participant shared "I have insurance, but I also know that I won't be left high

and dry if something happens.” These participants felt they would have some support from their insurance and what was not covered by their insurance would be covered by assistance offered from government programs, although they could not identify exactly which programs were available and what would be offered. When asked about the supplemental support from the government one participant stated, “I would get something I’m sure but I’m not sure what.” Despite their limited understanding of insurance and assurance of government support, one participant stated, “I’m sure I’m fine.”

Generators and sump pumps were additional structural mitigation activities mentioned by participants as being important investments following the 2014 flooding event. Although only one participant indicated that a generator had been installed in their home, other participants mentioned that a generator is a key component to preparedness and should be considered by individuals as well as the community. For example, one participant stated, “I won’t feel completely comfortable until I know I will have power all the time.” Another participant commented about the need to ensure the community’s access to power, suggesting “Carnduff needs to get something figured out for everyone.”

Sump pumps were key components in mitigating the impacts of the flooding event in 2014 and many were left unprepared. Eight (40%) participants who used a sump pump said they wished they had an extra sump pump available in their home in case the one they were using failed. As one participant said, “having a backup would be sweet” and another participant said, “I would like to be able to share a backup with my other family in town.” The costs associated with an additional sump pump were mentioned as a limitation, and there was a belief extras would be available in the community if needed.

Safeguarding irreplaceable possessions. While flooding in Carnduff was limited to basement flooding, there were still losses. Fourteen (70%) participants referred to an experience or a story that dealt with loss of photo albums, wedding dresses, Halloween costumes, or some other sentimental attachment. As one male community leader shared, “it was hard to see so much sadness about photos and I didn’t want to have to deal with that.” Three out of seven of the male participants mentioned emotional distress due to personal losses as affecting them, while four out of seven did not express concern about loss of personal belongings. As one male said “it was stuff and I have stuff, but it can all be replaced.” All but one of the female participants made mention of some level of emotional concern or distress about losses. The protection of possessions was a common topic among the participants and resulted in a number of mitigation activities.

Activities were carried out in people’s homes to ensure photographs, records, and priceless items were safe if a flooding event or any event were to impact them. For example, one participant shared that “I have nothing sitting on my floor anymore in my basement it’s all up on shelves or you know in plastic tubs in the garage.” All the participants who spoke about an experience with objects of sentimental attachment reported these experiences impacted their own risk perception and activities at home. One participant commented “I was like, holy crap like this is all a lot of memories and just, I mean a lot of its insured but obviously a lot of it’s not right, so the irreplaceable stuff.” This same participant followed up by sharing that since the experience with the 2014 flood, “our keepsakes are all in Rubbermaid bins and stored more securely.” Several participants recalled stories of their involvement in cleaning up people’s homes or listening to the stories being shared about the loss of items that were smaller in size but

larger in emotional value and how they turned those direct or indirect experiences around to better protect their own emotionally valuable items. As one participant said: “I was doing a lot of clean up in people’s houses and like basically people were worried about pictures, family photos and that is now my biggest thing is my family photos and my documents that are now stored upstairs in a safe.” Individuals revealed they prioritized photographs, baby books, marriage licenses, home videos, children’s artwork, wedding dresses, and other sentimental belongings in their homes and have created spaces and places to store these items safely and securely.

Community response. One of the questions asked of participants in the interviews was “can you share with me what you remember about the community of Carnduff as a whole during this time?” This question led to responses and conversations highlighting community components with gaps or, conversely, ones seen as successes during the event. These conversations about gaps and successes led to further conversations about how the various components were addressed following the event through mitigation and preparedness activities. The topics of community response were leadership and coordination, communication, and preparedness planning.

Leadership and coordination. Both males and females held leadership roles and volunteered during the flood event. There were seven male participants in the research. Three (43%) of the men were in positions of leadership at the time of the event, with half of the remainder (two; 28.5%) volunteering and the other half (two; 28.5%) not volunteering. The female participants were split with eight (61.5%) volunteering, two (15.4%) being in a leadership position, and three (23.1%) not volunteering nor being in a leadership position at the time of the

event. These volunteers and leaders were the foundation for the leadership, coordination and collaboration that took place during the response to the flooding event.

Participants commented on contributions, noting things such as “the young people really stepped up and were great,” “the outpour of support was overwhelming,” and “the level of competence in the community was encouraging.” Further, they commented on the style of leadership as being “incredibly diplomatic.” As the interviews continued, community leaders during the time of the event and the Emergency Management Organization (EMO) participants in Carnduff were more open to discussing gaps they had recognized in their approaches. With reference to mental health resources, one participant noted that “probably it would be something that, you know, as a [EMO] Committee we should probably consider but never have.” Additional reflections included, “the communication between the command centre and the evacuation centre wasn’t great all the time” and “communication on just Facebook was all we had.” These gaps were in part due to the EMO system being established on paper prior to the event but needing to grow as the event escalated. This created an unclear reporting and communication structure among those outside the core EMO group – including those at the recovery and evacuation centre. One participant stated “it was hard to get information that we needed” but also noted that “the talks we had after the event allowed us to share those frustrations.” Another gap noted in the leadership and coordination during the event was the limited knowledge of individuals in the community. For example, one participant stated, “I didn’t know what I should do but it worked out.” The structure and reporting framework of the system was touched on as a gap. As an example, one participant said that during the event elected municipal members “used to come every day for updates...and then stay for coffee” which highlighted the issues with the reporting

structure. Overall, the leadership of the event was referenced as positive and such optimism stimulated discussion of experiences and lessons learned in preparation for future events.

The flooding in the region created an environment where disasters were openly discussed and dialogue among families, community members, and other communities begun. One participant said “we as an area don’t work well together but during crisis we figured it out,” which is an indication that the event was a catalyst for open dialogue born out of necessity but with potential to be fostered and developed in the post disaster period. The participant continued by stating that since the flooding event in 2014 the community now regularly has dialogue “one-on-one with our government that we’ve never had before and for me to walk in and say hi to Duane McKay (Vice-President of Operations and Fire Commissioner for the Saskatchewan Public Safety Agency at the time of the interview) we never had that before...the province is doing a better job.” Although collaboration and communication between the community and province has improved, collaboration and communication with other community partners is still lacking. “I sometimes wonder what they are going to need from me and my group,” said one participant, and continued to explain that although valuable resources are available for emergencies, they do not get a lot of communication. She indicated “it’s gotten better but I’m worried because I don’t want to be caught off guard.” This uneasiness underscores the fact that although coordination is better there is still work to be done.

Tools for communication. The community of Carnduff is a small community and people often know each other; however, there were gaps in the ability to communicate and reach out to certain community residents. The issues with communication impacted not only communication between potential community partners but also residents who did not have access to the social

media platform the EMO was using. There were residents who were wanting to be involved but were unaware of their options. Seven (35%) participants indicated they were unaware of how they could contribute or what was occurring in the region because they were not active on Facebook. As one participant commented “one of the problems that I had was that I’m not on Facebook and everything there was on Facebook,” while another participant recalled that “my wife saw something on Facebook about a friend needing help while I was in the shower and when I came out I had no idea what was happening and where she was because I don’t have Facebook and didn’t know what was going on but when she came home and told me what was happening it just ballooned from there.” Elected officials and those involved in the EMO indicated that without Facebook and social media they would not have been as successful as they were. One participant shared “we’d be nowhere without social media...that was how we connected with so many young people.” However as one participant who works with vulnerable sectors of the population shared “I didn’t understand the severity of it until I got a phone call saying that evacuations were taking place in Gainsborough...I couldn’t fathom it and was worried about the people I work with... there was no way I could know if they were getting the information.”

This gap in communication was addressed following the flooding event by the community of Carnduff with adoption of EverBridge, which is a tool that the community can use to mass delineate information by phone calls, text message, and emails to all those who are registered in their program. One participant reported that a key lesson learned was that they needed a new way to communicate and they

learned through that [flood], that we needed to have a way to communicate directly with residents and part of the reason...we realized that was when we went to help down in Gainsborough...it made us think about our situation and how would we account for everyone if there was an evacuation and so we did some looking and purchased an annual subscription to EverBridge Notifications.

EverBridge provides a valuable avenue to connect larger numbers of the community and ensure messaging has been received. The conversation surrounding communication, social media, and EverBridge made clear the need to consider the more vulnerable populations in the community and other future considerations to advance the preparedness of the community. One example as outlined by a participant was “I just worry about the older people who rely on their home phones during a power outage.” Participants shared that these areas include pets, elderly persons, individuals who may need some assistance, and residents who require assistance due to their current situation but do not always need assistance.

Preparedness planning. Community leaders who participated in the study said they were working on getting community residents to be “more self-sufficient and to stop relying on the community as much.” A supporting comment was outlined by one participant who shared information about the equipment purchased and training hours completed by volunteer fire fighting personnel in the year following the flood event. The community and the fire department bought resources and equipment, updated infrastructure, and launched educational campaigns. The participant noted these practices were not sustained at the same level in the years following the flood.

The EMO in Carnduff who is responsible for disaster or hazard event management is also responsible for preparedness education. The organization hosted a session on 72-hour kits within six months of the flooding event and one participant noted this session as the primary reason for acquiring a 72-hour kit for home. The preparedness event was widely mentioned by participants as a key source of knowledge to help with continued advancement of their preparations for future events. One participant stated, “our EMO put on a uh, deal at the school and it was just about preparedness because the flood opened a lot of eyes and if they wanted us to participate I felt like I should and that it was important for me.” Since that initial preparedness event there have been no more educational events hosted and according to the participants the development of their personal preparation activities has also stalled. One respondent shared that “since the session at the library I haven’t done anything else.” Without a driving force behind the knowledge transfer community members and families do not appear to sustain their appreciation of the hazards in the region and need to prepare. As shared by a participant “there is only so much our volunteer group can do” and this limited capacity and resources of the EMO directly contributes to what they can provide and accomplish proactively in the community. This in turn appears to influence the level of preparedness of residents.

Contributing Factors

What factors contributed to disaster risk reduction activities being carried out?

Multiple factors were reviewed to understand if they did or did not play a part in disaster risk reduction activities carried out following the 2014 flooding event. The following sections are organized based on the contributing factors which include participation in the event,

sustained disaster risk reduction activities, and other social factors, including where participants were raised.

Participation in the event. There did not appear to be a relationship between an individual's participation in the event and the level of mitigation efforts undertaken following the event. Additionally, there did not appear to be a relationship between an individual's participation and the longevity of their commitment to continued mitigation efforts. There were some individuals who took part in mitigation practices immediately following the event who were involved full-time in the response to the event but there were also participants who were not involved in the response who also participated in the same mitigation practices. Further, there were participants involved full-time in organizing and decision making during the event who, following the event, did not participate in any mitigation activities and still do not foresee that they have any risks to their home or their person. These findings suggest that proximity to an event and level of engagement with the community response to an event does not influence uptake in mitigation activities.

Long-term aspects. All participants in the research, no matter their participation level, identified that no sustained disaster risk reduction activities towards preparing for a disaster or large-scale event occurred in the years following the flooding. A participant stated "there was nothing we could do but wait" for future events. There was an upswing in mitigation and preparedness activities following the event; however, the focus on these diminished as time went on and the event became further removed from present activities. Individuals indicated they did perceive risk; however, their activities were not substantially maintained and sustained. Participants indicated that they are still protecting their irreplaceable possessions but they are not

completing larger preparedness and mitigation activities, such as maintaining sump pumps and updating 24-hour kits. This attitude was expressed by individuals and their families as well as elected officials, community leaders, and the EMO. One EMO official stated, “we just don’t make time right now” and an elected official for the community shared “there are now more important things to consider for our resources.” A participant in the research who is a community volunteer leader said, “you just forget about the bad pieces...and move onto brighter things” and another participant stated, “my money now goes into other activities.” These attitudes contribute to few emergency management activities being carried out in the community.

Social factors. Distinctive social factors appeared to influence participants’ mitigation activities. These factors included family connections, where they grew up, and gender. Strong family connections contributed to a substantial support system, which appeared to contribute to actions. Additionally, whether an individual grew up on a farm or in town appeared to contribute to their comfort and perspective on activities to prepare and mitigate against future events.

There were gendered differences in the experiences of participants. One participant stated “I have family in Carnduff and the area, so we have a place to go and people to help.” The participants who self-identified as female who had children and indicated strong familial support said that although they felt supported, they were still concerned about their children; as one female participant shared “I was always worried about my kids, like I knew my mom [was taking care of them] but I was still worried.” This same participant stated that because childcare worked out during the flooding event in 2014 it “doesn’t worry me...my kids are only getting older and my family isn’t going anywhere.” The participants who self-identified as male who indicated strong familial support and had children indicated they did not worry about their

families as much. For example, one male participant said, “my home life was nothing to manage, it was all dealt with, they dealt with [the home and family].” He shared his belief that preparing for a future event for his family meant “making sure that they continue to be awesome like last time.” This gendered response contributed to different experiences of participants.

Another factor that appeared to be an influence on people’s response and activities post flood was where they grew up. There were six participants who indicated they were raised on farms. Four of them self-declared as female and two of them as male. Five out of the six were current volunteers in the community and volunteered in the community during the flooding event. Participants who grew up on farms overwhelmingly felt that although the event was challenging, they felt able to respond and participate effectively. As indicated by one participant “it was work that I was used to from growing up on a farm.” Another participant shared “I think I’ve got most things covered when they happen...I have dealt with a lot over the years already.” Dealing with years of struggles and challenges created and built their resilience that almost anything can be dealt with when it happens so why would a lot of preparation activities be required. Those who were raised on farms had knowledge and experience readily available from years of contributing to their home environment. A participant who grew up on a farm shared that “there were people that we had to teach things to and like you just got a little nervous because you weren’t sure if they knew what the hell they were doing because they weren’t used to the equipment and work.” The participants with farming backgrounds expressed their competence, and at the same time concerns, about other members of the community who lack the skills and knowledge. These opinions on competence by those raised on farms indicate that they

have acquired knowledge and skills about preparedness activities to manage their vulnerability to a greater degree than those raised in town because of their lived experiences.

Those who grew up in rural towns or more urban areas, on the other hand, did not say they did not feel prepared or able to assist, but they were more apprehensive about how they could contribute and positively impact the outcome of the event. For example, one participant stated, “I wasn’t sure what was needed and if there was anything, I was capable of doing.” Another participant raised in town stated, “I wouldn’t even know where to begin if something bad happened to me...I would hope that I prepared myself.” People who grew up in towns seemed to be less confident in their capabilities. These factors contribute to the overall effectiveness and comfort that individuals have in situations and that includes large scale emergency events.

Themes from the Findings

The data analysis process outlined by Fereday & Muir-Cochrane (2006) and used in this research employed inductive and deductive coding to identify patterns and trends that emerged from the data that included:

- Safeguarding homes and families
- Safeguarding irreplaceable items
- Community response
- Leadership and coordination
- Communication
- Preparedness planning
- Participation in the event,

- Long-term aspects, and
- Social factors

These patterns and trends were used to connect to identifiable themes that are best understood through the overarching themes of

- rural resilience and
- disaster risk reduction activities.

The first theme is rural resilience and, in turn, increased community capacity. Rural resilience and community capacity are discussed specifically through the trends and patterns that are induced through volunteerism, connections and networks, and resource knowledge. The second theme involves disaster risk reduction. Disaster risk reduction will be presented through the patterns and trends of sentimentality (safeguarding of homes, families, and irreplaceable items with emotional value) and apathy or the acceptance of the risk and the lack of sustained disaster risk reduction activities in the years following the flooding event. Table 1 on the next page highlights some of the key interview extracts to support the theme of rural resilience.

	Interview Extract
Volunteerism	“spent two weeks at the reception centre” “I just grabbed a trailer and went” “proud of the young kids that did go and do sandbagging and that” “can’t say enough about the support” “I made a lot of muffins” “I think we pretty much did everything we could” “we went to sandbag or I went sandbagging and then the next day or a couple days later went to Gainsborough and emptied out basements”

Connections/Networks	<p>“we just called someone when we heard the alarm... we were the unofficial alert system for the town”</p> <p>“my buddy called me and told me to grab a trailer and sand and get out to his farm”</p> <p>“I do have a lot of access to people just from my experience through where I work”</p> <p>“there are a lot of businesses that were eager to help”</p>
Resource Knowledge	<p>“we were at my uncle’s helping with his basement”</p> <p>“it was work that I was used to from growing up on a farm”</p> <p>“I think I’ve got most things covered when they happen...I have dealt with a lot over the years already”</p> <p>“there were people that we had to teach things to and like you just got a little nervous because you weren’t sure if they knew what the hell they were doing because they weren’t used to the equipment and work”</p>

Table 1. Interview extracts to support the rural resilience and community capacities theme.

The findings indicate certain aspects of disaster risk reduction actions completed following the flooding event in 2014 were influenced by sentimentality and apathy. Table 2 on the next page highlights some of the key interview extracts to support the theme of disaster risk reduction actions.

	Interview Extract
Sentimentality	<p>“the small things they matter you know”</p> <p>“my photos are extremely important”</p> <p>“you don’t realize the Halloween costumes mean something”</p> <p>“spent a lot on tubs after the flood”</p> <p>“basically people were worried about pictures, family photos. And that is my biggest thing is my family photos and my documents”</p> <p>“they’re all upstairs in a safe”</p>

	“I have nothing sitting on my floor anymore in my basement”
Apathy	“out of sight, out of mind” “we’ve got to encourage, you know, that we keep on top of this and right now we have not” “we are at five years now and you know how many new people we have in town and how many old people we’ve lost” “I just don’t have time for that anymore” “for a while we did a good job but now we aren’t” “it likely won’t happen to me again”

Table 2. Interview extracts to support the disaster risk reduction activity theme.

Summary

This chapter provided the findings from analysis of the interview data and presented the key themes in response to the research questions. The main research question sought to understand how the flooding event near Carnduff in 2014 contributed to the local community and residents’ disaster risk reduction activities. Most participants believed their risk had increased and had taken appropriate actions in their homes and the community to mitigate these risks. The 2014 flooding event influenced the Carnduff community members’ understanding of risk in various ways closely tied to the vulnerable rural context of the community of Carnduff. Following the 2014 flooding event fifteen (75%) participants stated that they now had a greater concern about their overall risk after seeing what could occur and impact their lives. The witnessing and firsthand experiences made them understand how vulnerable they were to flood risk. This awareness led to mitigative measures that focused on safeguarding homes and families and irreplaceable possessions. The community took actions to manage their physical and social vulnerability as part of the community response. The community needed to allocate their

resources by using the areas of leadership and coordination, communication, and preparedness planning. This study suggests that proximity and level of engagement to the response did not influence an uptake in mitigation activities and, over time, all participants expressed apathy towards activities and potential hazardous events. There were some social factors that contributed to a differentiation in responses and they included gender and whether the participants grew up on a farm or in town. The findings of this study generated two overarching themes to best understand the data, results, and themes: 1) rural resilience and 2) disaster risk reduction activities. In the next chapter, these themes will be discussed their meanings in the context of the study as well as in relation to the literature, and the findings will be further examined to discuss the implications of this research.

Chapter Five – Discussion

In this chapter, findings and themes will be discussed within two overarching themes to provide a comprehensive understanding of how disaster risk reduction activities were influenced following the flooding event near Carnduff in the summer of 2014. The first theme is rural resilience. Rural resilience is discussed with reference to volunteerism, connections and networks, and resource knowledge. The idea and appreciation of rural resilience affected how residents' perceptions of disaster were changed to mitigate against future events. The second theme is disaster risk reduction and how external factors influence disaster risk reduction activities. Disaster risk reduction will be discussed with reference to sentimentality and apathy. The research questions about what actions citizens have taken and what factors contributed to these actions are answered specifically through this theme as the actions relate back to either sentimentality or apathy. The main themes are presented and discussed in relation to the existing literature to gain a stronger understanding of the findings.

Rural Resilience

Understanding how rural vulnerabilities and resilience impacted the experiences of Carnduff residents was not the main focus of the research; however, throughout the interviews, participants were eager to talk about their community. This inclination suggests that the rural context influenced the response actions, which were built upon rural assets. The literature states that rural areas and communities are more vulnerable than their urban counterparts due to limited access to healthcare, transportation, economic influence, resources, and urban centres (Arcury et al., 2005). These characteristics accurately reflect the vulnerabilities that Carnduff residents faced during the 2014 flooding event. The built and social environment, which Tierney and

Bruneau (2007) highlighted as being a large influence on resiliency, supported the community and participants during an event that was unexpected and uncontrollable. Resilience is dependent not only on the built environment, but also social context. This research and the participants' experiences of the event contribute to the understanding and knowledge as the event was sudden and unmanageable. Participants spoke about how their volunteer experiences, personal actions and the actions of those systems around them created an emergency management system able to act and provide the necessary knowledge, resources, tools, and leadership during a time of turmoil for many. These characteristics and actions align with the literature on resilience and highlight how and why actions throughout the event and immediately following were so successful in increasing capacity and resilience and minimizing the overall risk to participants and the community. This minimization of vulnerability is further supported in the literature by Haski-Leventhal et al. (2017) who discussed how an impacted population can not only survive but thrive, which was true in this research of those who were secondarily, rather than directly impacted by the event. During the response to the 2014 flooding event surrounding Carnduff there were strengths and assets enhanced through leveraging the local network and pre-existing community connections, which supports the existing literature's assertion that vulnerable groups are not helpless individuals, but active agents of their own actions and decision-making (Cannon, 2000; Hewitt, 1997). The three factors that supported the response to the event were level of volunteerism, connections and networks, and resource knowledge.

Level of volunteerism. The limited number of people in rural regions creates circumstances where citizens are forced to and, in some instances, expected to fill numerous different volunteer roles in various community organizations. Volunteerism becomes a large

piece of many rural residents' lives as they contribute to their community and the rural region. These contributions play a role in increasing the services in the community but can also cause difficulties when volunteers who are in various roles are unable to dedicate time to each role and organization.

Participants in the research shared stories of windstorms that caused them to be without power for extended periods of time or broken fence lines and power lines or water wells that dried up. Due to these events they were forced to look out for themselves and others and voluntarily contributed to clean up activities following the events. These uniquely rural vulnerabilities, however impactful at the time of their upbringing, contributed to their strengths and willingness to help others because they know how it feels to be faced with obstacles. Additionally, they are aware that persevering and meeting the challenges requires assistance from those around them. This rural tenacity extended to community members' increased resilience and tolerance in the face of the flooding event. Additionally, rural tenacity influences enhanced willingness to actively participate as a volunteer at the time of the flooding event, currently in the community, and as former and future community leaders. This drive to assist and contribute together with knowledge and expertise about farms and infrastructure, makes rural citizens invaluable volunteers. The literature suggests that incorporating local volunteers into a response will improve effectiveness of the activities, as well as increase the overall level of rural resilience and capacities. Hodgson (2004) and Haski-Leventhal et al. (2017) discuss the importance of structuring and planning for local volunteers into a response and how in doing so will improve the overall capacity of the community. Additionally, the incorporation of local volunteers into a response allows for local connections and networks to be used most effectively.

Connections and networks. The connections and networks that residents were able to leverage during the flood created a level of resilience important to the safety and security of property and person. One participant mentioned that “as an area [we] don’t work well together”; however, during the flood when there was a common goal and large-scale risk neighbours and neighbouring communities came together. With a rural community that had a population less than 1,200 persons many of the residents knew each other and what resources were available. This created an informal network of resource procurement and sharing that strengthened the overall response and capacity of individuals, families, and the community. Limited access to resources is a rural vulnerability; however, when residents are able to access the resources from 1,200 individuals and 200 businesses then their personal access to limited resources is outdone by their extensive connections and networks. Akama, Chaplin, and Fairbrother (2014) present data showing individuals with extensive social networks and more social connection have a higher likelihood to recover than others who are not so well connected. Akama, Chaplin, and Fairbrother (2014) support the finding that the connections and social networks in a small rural community increase the overall resilience and capacity of individuals. The existing literature by Deavers (1992) and Arcury et al. (2005) points out that despite the higher vulnerability of rural communities, a small rural community can also provide advantages in terms of its ability to enhance resilience and capacity.

Resource knowledge. The connections and networks further support the ability of individuals, families, and the community to access knowledge of and access to resources. The ability to access a social connection or a network for a needed resource was discussed extensively. One participant shared an experience at the beginning of the flooding event when a

friend called him and said “I need you to grab a trailer and sand and get out here” to help with the rising waters surrounding property. Experiences like this were shared by fourteen (70%) participants. Being able to find and access resources or knowing who to call to help them find resources was a common comment among participants when they spoke about the rural community coming together during that period. Ride & Bretherton (2011) put forward that local capacities influenced and impacted greater responses and increased capacities than the disaster management and government staff and officials. The local knowledge that Laycock & Caldwell (2018) outlined was better able to support and identify needs and gaps, as well as provide higher levels of background information about the community and the region that supported the response and activities.

Disaster Risk Reduction

Reducing the impacts of disasters on the community was the objective of this research. It sought to understand and appreciate how different activities and actions could be capitalized on to minimize the negative impacts of events on small rural communities. The literature states that disaster risk reduction can be impacted by both positive and negative experiences and usually have occurred after learning something from an event (Coppola, 2015). The event being studied did not directly impact this community and these participants; however, they were volunteers, community leaders, and witnesses to the event impacting friends, family, and their community neighbours. This builds on Haque and Etkin (2012) research on how systems and communities can adjust and learn from their own experiences as well as those surrounding them. Building on this will fill in the research and knowledge gap regarding how these experiences impact rural Saskatchewan and communities. The actions taken to adjust behaviours, activities, and actions

were primarily done to minimize the emotional loss following an event. O'Neill et al. (1999) sought to understand how personal loss and emotional attachments can strengthen mitigation measures and this research found that personal and emotional disaster experience is an important factor to understand how individuals and communities decide to take actions for risk reduction. The priority of sentimental pieces influenced the inclusion of sentimentality as a piece of disaster risk reduction. Additionally, the lack of sustained disaster risk reduction activities and actions as theorized by Mileti & O'Brien (1992) meant that apathy, as a result of elapsed time from the event, is the second piece to disaster risk reduction. The overarching theme of disaster risk reduction will use sentimentality and apathy to understand how disaster risk reduction activities are planned, carried out, and prioritized.

Sentimentality. Sentimentality is defined in this research as an emotional state that evokes sorrow or grief from people due to the loss of personal valuable items or memories (Eyre & Easthope, 2006). Building on that definition, sentimentality for this research was related to the desire to keep intact memories and items that were of some personal value: sentimentality being the driving force behind disaster risk reduction activities and the desire to safeguard emotionally valuable items and property. Although some residents did not feel they would be impacted by flooding, their mitigation activities following the flood were carried out after seeing the damage to other people, those who also did not think it would happen to them. Protection of these sentimental assets was a key concern following the event due to the intangible considerations that Joseph et al. (2011) discussed. The research by O'Neill et al. (1999) and Joseph et al. (2011) supports the underestimation of intangible losses by disaster managers; this

study will provide information and data on the significance of intangible loss in the context of the small rural community.

A common pattern among participants when they were asked about how they were feeling at the time of the event or what surprised them about the event was that of sentimentality. Many participants discovered they might lose irreplaceable items in a flood. They learned of these experiences and stories from assisting in the cleanup of someone else's home, from their own home (either during the 2014 flooding event or at another time), or from stories told at the evacuation centre. Stories introduced in the previous chapter were common among the participants and led to greater conversations about sentimentality and the impact that it had on their actions and beliefs.

The crossroads of gender, community leader, and volunteer had the greatest impact with sentimentality on the participants. All participants who self-identified as male and were community leaders mentioned something in relation to sentimentality impacting their decision making and actions. One-third of participants who self-identified as male and were volunteers and not community leaders made reference to sentimentality. The participants who self-identified as male, did not participate as a volunteer, and were not community leaders at the time of the flooding event did not refer to sentimentality playing a part in their actions in the post disaster period. Reviewing the responses of participants who self-identified as female community leaders and volunteers garnered different results compared to the participants who self-identified as male. The female community leaders did not discuss sentimentality in their discussion about mitigation activities whereas the female volunteers mentioned it 37.5% of the time. These distinctions highlight that proximity to the direct experiences of others and a

“hands-on” approach to the devastation appear to have increased the likelihood of female volunteers perceiving potential negative impacts from the flooding. The volunteer positions are each valuable to the response and recovery of any event; however, in this event with these participants there is clear evidence that volunteer work created a space where the importance of sentimentality was fostered and translated to an individual’s actions at home and in organizations. Disaster management often makes no effort to understand how influential sentimentality is to actions both in the present and the future.

Apathy. The concept of apathy is defined in this research as a value or approach of detachment or indifference that individuals experience after a disaster, or witnessing someone undergo a disaster, and making a decision to take a passive or withdrawn approach to future risks (Birkmann et al., 2010). In the context of this research, and the data from this research, apathy applies to the continued reduction in preparedness and mitigation efforts as they relate to disaster management and disaster risk reduction activities. Raaijmakers et al. (2008) highlighted eight different event characteristics that influenced how an event is perceived and impacts the overall level of accepted and understood risk on an individual. The key characteristics as discussed by Raaijmakers et al. (2008) that related to the flooding event of 2014 increasing the perceptions of risk for the community and participants were “known to be exposed and not known to be exposed”, “not controllable and controllable” and “old and new” (p. 308). A participant referenced that they “never would have thought flooding was going to be an issue,” which highlights that flooding is a new risk they need to incorporate into their overall understanding of local risk. Another participant indicated that “there was nothing we could do but wait,” which relates back to something being controllable versus uncontrollable. While individuals were able

to participate in response activities, they were unable to control precipitation amounts. They were able to control, in some ways, the water and where it travelled; however, given the volume of flood water they could only direct the flow with the destruction of infrastructure such as roads and culverts because there was not any flooding mitigation infrastructure in place to address what was happening. As the flooding event was unfolding, participants and the community were attempting to reduce their risk level of the flood waters impacting them. However, now that the flood event is past, there appears to be overall apathy towards flooding as participants in the study indicated that they have chosen to accept the level of risk. These two different approaches, the reduction of risk and the acceptance of risk, were presented by Sharlin (1989).

As the flooding event receded from memory, the actions of residents and the community became fewer and apathy took hold with the belief that “it likely won’t happen to me again,” as was characterized by one participant. Birkmann et al. (2010) outlined that disasters can cause important changes to occur; however, there is a limited period for those changes to be accepted and followed through by policy makers and those in positions of authority. Apathy and the societal push for the changes will fall away over time and there will be no appetite for sweeping changes to occur. There is still much to be understood about this process, the impacts of the events, and the best way to approach the policy change window (Birkmann et al, 2010). The participants did not feel a greater risk and had no overall worry about impacts to themselves or their families. This was due to the geographical location of their home and they viewed what occurred in 2014 as evidence of the increased capacity of the community to respond to an event in a timely manner. This response capacity would help them remain safe and protected.

Although this zero-risk perception is limited among participants it is an interesting post-event perspective that can occur among community members.

The elected officials in the Town of Carnduff, the RM of Mount Pleasant #2, and local emergency management organizations spent large amounts of human and financial capital on addressing preparedness and emergency management in the first year following the 2014 flood. One participant mentioned equipment purchased and training hours completed by volunteer fire fighting personnel in the year following the event. The municipality of Carnduff and the Emergency Management Organization bought resources and equipment, created infrastructure, and developed education campaigns; however, participants noted that these practices were not sustained at the same level in the years following the flood event. There was no apparent relationship in this study between different demographic profiles and apathy, which suggests apathy over time was a common experience among all participants in the research as the existing study suggests (Montz et al., 2017). Those that indicated they felt sentimental about the material losses of others had the same sense of apathy take over their perceptions of risk and actions in the same way those who were not impacted by the material losses of others. Apathy did not occur simultaneously for all twenty participants; however, it occurred for everyone within the first two years following the event.

Conclusion

This chapter discussed the two main themes from the research findings. These themes are rural resilience and disaster risk reduction. Carnduff's residents' ability to leverage rural vulnerabilities into strengths and assets during the flooding event in 2014 highlighted that rural assets are built on these vulnerabilities to support and enhance rural capacity and resilience. This

included volunteerism, connections and networks, and resource knowledge. These were strengths and assets enhanced through leveraging the local network and pre-existing community connections.

Prior to the 2014 flooding event, the community was not aware of the flooding risk due partially to its geographic characteristics and its apathetic view that flooding risk was not the community's pressing priority. However, after witnessing and participating in the response of the flooding event for other communities, the residents of Carnduff learned that personal valuables were not recoverable, and the loss of them would cause emotional sorrow that would be difficult to bear. Recognizing this sentimentality, many interview participants expressed that they took immediate actions to protect possessions they cared about. Their actions further extended to reduce overall vulnerability of the community to future floods. The families and community shared their practical knowledge and started conversations to explore mitigation strategies, but it did not last long. Apathy towards perceived risk has resurfaced again casting an uncertain future for their risk management. This research discovered the prevalence of apathy in the community after the 2014 flood response. The apathy was an indication of lack of support from the local government and the inherent social and physical conditions associated with rural vulnerability.

This chapter explained the research results in relation to existing literature and the interpretation of the findings. The study identified patterns, trends, and themes that confirmed the presence of rural resilience displayed by volunteerism, networking, and resource knowledge; however, the study also revealed that the community's risk reduction activities were short-lived, which confirms the existing literature that claims the complex factors of individuals' experiences

minimize sustained preparedness activities. While sentimentality was evidenced as a promoting factor for improving risk reduction, the study also discovered that apathy was a negative contributor to weakening the urgency for risk reduction actions. This finding imply that enhancement of rural resilience and sustainability of risk reduction are possible but they require long-term commitment to be effective in rural communities, which are not addressed in the existing literature or the practical knowledge of the community.

Chapter Six – Recommendations and Conclusion

This research examined how the flooding event near Carnduff in southeast Saskatchewan in the summer of 2014 contributed to this community and residents' disaster risk reduction activities. Using interviews to collect qualitative data, this research focused on providing information on what actions citizens took to prepare for or mitigate against future floods and other events, and what factors contributed to disaster risk reduction activities being carried out. There were two themes that emerged from the findings, patterns, and trends. The first of these themes was rural resilience which is discussed specifically with reference to volunteerism, connections and networks, and resource knowledge. The second theme of disaster risk reduction actions was discussed with reference to sentimentality and apathy.

Recommendations

The research helped to inform potential recommendations for Town of Carnduff, Emergency Management Organizations, and for future research. The Town of Carnduff includes the municipal government of the Town of Carnduff. The Emergency Management Organizations are the local small emergency management organizations in the southeast Saskatchewan region, as well as the provincial emergency management organizations that support these small emergency management organizations. Future research can include but is not limited to smaller feedback exercises in the community, academic research, and large-scale research to inform best practices and programs in the region.

Town of Carnduff. The incorporation of EverBridge into Carnduff's toolbox was a step towards a consistent and effective communication strategy. A system such as EverBridge is only as effective as long as it is maintained and sustained. Since its incorporation five years ago there

has been no relaunch and follow up campaign to update information and improve its penetration into the community. This research recommends the incorporation of an effective and large-scale communication system for communities as well as the continued resource allocation to maintain up-to-date information on residents and businesses to ensure that the system is as efficient as possible when it is required.

Concerns were expressed about its use for more mundane communications, which may in turn minimize the urgency of messages as they come through. These needs must be balanced with the cost of the program to ensure that it remains an effective tool for disaster and emergency management in the community. It is recommended that the Town of Carnduff allocate resources and time to updating the contact information in the EverBridge system on an annual or bi-annual basis. This allocation of resources could involve the creation of a summer student position to focus on the EverBridge system and emergency management for the community; it could be carried out by volunteers or a local organization willing to canvas the community or the community of Carnduff could partner with the school and provide this opportunity to a high school student for credit and work experience.

Emergency Management Organizations. The research helped show that the knowledge, progression, and work of the EMO appeared to relate to the advancement of individuals' appreciation of their own risks and undertaking of mitigation activities. This means it is recommended and crucial that the EMO and its volunteers continue to provide education opportunities, resources, and an environment of knowledge transfer among community members. Without the championing of the EMO and elected officials regarding the importance of disaster preparedness, apathy shrinks the space in which individuals and families participate in their own

safety and security. Improving cost sharing and resource development for the local EMO could be achieved through development of a regional disaster and emergency management program that encompasses a geographical area that has multiple municipal governments and varying resources.

A clear understanding of the roles that each community group plays in an event in the community and the region would contribute to a clearer and more concise reporting structure. Accomplishing this will require an understanding of the differentiation of powers among elected officials, the community's EMO, volunteers, and provincial powers. All groups are required to work together to accomplish a successful outcome for the community and the region; however, they must allow each group their own space to accomplish the work expected of them and feel empowered to carry out that work and make appropriate decisions. It is recommended that the EMO in Carnduff and the region create and outline the work of all community groups, elected officials, volunteers, and provincial powers. Additionally, the EMO in Carnduff should complete periodic disaster exercises as a tool that would help build a shared understanding and experience. This knowledge sharing about limitations, roles, and powers would further contribute to success in responses and recovery.

Emergency management professionals should be encouraging local volunteers to be involved and not just relying on professionals to be involved. This inclusion will not only encourage more human capital to respond and recover but it will also actively generate change in families and communities and foster the sustained development of a better community for everyone. Specific actions to facilitate and foster this inclusion could include having open emergency management meetings for the community, hosting community training, identifying

and supporting vulnerable persons, and creating subgroups of people who are interested in certain aspects of emergency management to increase involvement as well as capacity.

Citizens. This research recommends incorporation of volunteers in local responses. This is an important aspect not only for their unique knowledge, local networks, and history of volunteerism but also for their education and advancement. This research highlighted that if people are able to volunteer in local disaster events, they are more likely to be impacted by the event, take home learnings, and be spurred to take action in their own homes and for their own families. The lessons that volunteers and community leaders learned from the experiences of others and their role in those experiences helped them to be more acutely aware of their own risk and actions. The participation of the community responders assisted in the response efforts but also created volunteers and responders who were deeply invested in the work.

This investment of volunteers and responders further increased the impact of their experiences and their mitigative actions. Mitigative actions that all citizens should take part in include:

- creating and maintaining a 72-hour kit;
- maintaining sump pumps;
- acquiring appropriate insurance;
- understanding the difference between insurance and government assistance;
- understanding safeguarding emotionally valuable items; and
- being civically engaged.

Future research. A limited number of disaster related research studies have taken place in rural Canada and rural Saskatchewan in particular. The research opportunities involving these

demographics and locations are plentiful and should be considered by anyone wishing to contribute to knowledge about experience with disasters in Canada. Improving the understanding of rural vulnerabilities in disaster management, the role that a disaster imposes on those secondarily impacted, and the window of time in which important decisions and changes are made are all key areas for potential future research. The research on those who grew up on a farm compared to those who grew up in a town or more urban environment should be continued by future researchers with regard to disaster management. Performing further research on how rural vulnerabilities are leveraged to create capacity and decrease vulnerabilities will be crucial to minimizing the overall vulnerabilities associated with residing in rural areas of Canada. Additional research could be conducted on the community of Carnduff using a quantitative survey of the entire community to better appreciate how the data from this research compares to the larger sample group. This larger survey could also include trying to understand how the actions, experiences, and approaches of participants affected their friends and family.

Limitations

There were limitations to the research, as previously discussed. These limitations provide areas for continued consideration and future research. The participants in this survey were not as diverse as the demographic information of Carnduff indicates on the Canadian Census. Future research should be carried out that more accurately reflects the demographic framework of the community to better appreciate the growing diversity in some rural communities. Additionally, this study focused on risk reduction activities and was not designed to measure the level of vulnerability. This research found people take risk reduction activities the study was unable to speak to if these activities did reduce their overall vulnerability. This study can be adapted to

include or focus on a variety of different communities, industries, or subsections of the population including but not limited to government, police, fire, new Canadians, public health, volunteers, etcetera. All these iterations will provide more insight into intersections and mitigative actions carried out and completed.

Conclusion

The purpose of this research study was to understand how the events in the summer of 2014 contributed to the community and residents' perception of risk and subsequent disaster risk reduction activities. The community of Carnduff was not impacted significantly by the event; however, there was a risk of flooding to the community. Despite this, the community of Carnduff assisted neighbouring communities more harshly affected. Contributing to and supporting others in a rural region is a requirement to combat rural vulnerabilities. The research done on this event highlighted that volunteerism, connections and networks, and resource knowledge were the key aspects that transitioned rural vulnerabilities to a strong rural resilience and increased community capacity. The research showed that participants were motivated to carry out disaster risk reduction activities through sentimentality and the desire to minimize emotional loss. Although minimizing emotional loss was a driving force, there was a sense of inaction in the years following the event. This apathy or inaction created an environment where sustained disaster risk reduction activities are not maintained and promoted as rural vulnerability persists. It concluded that to prevent apathy towards disaster risk reduction actions and to sustain the perception of risk that may impact the community local governments and emergency management organizations need to continue to develop, offer, and champion emergency management programs and education specific to their risks, residents, and region. Additionally,

there was not sufficient capacity for the community to build and preserve local and practical knowledge without accessibility of resources on a long-term and on-going basis. The local community and emergency management organizations need to formalize the local knowledge they have to ensure consistent access to networks and resources when events occur. These programs, education, and the formalization of information will contribute to the overall reduction in vulnerability, reduction in apathetic approaches to disaster risk reduction, and improve the overall perception of risk. This research contributes to the body of disaster management research by focusing on the rural context of vulnerability and resilience. A greater understanding of rural vulnerability and resilience contributes to disaster risk reduction and the continued efficiency and effectiveness of activities to better support rural regions when large scale events and disasters strike.

References

- Ahmari, H., Blais, E.L., & Greshuk, J. (2016). The 2014 flood event in the Assiniboine River Basin: Causes, assessment and damage. *Canadian Water Resources Journal/Revue Canadienne des ressources hydriques*, 41(1-2), 85-93. doi: 10.1080/07011784.2015.1070695.
- Akama, Y., Chaplin, S., & Fairbrother, P. (2014). Role of social networks in community preparedness for bushfire. *International Journal of Disaster Resilience in the Built Environment*, 5(3), 277-291. doi: 10.1108/IJDRBE-01-2014-0010.
- Arcury, T., Preisser, J., Gesler, W., Powers, J. (2005). Access to Transportation and Health Care Utilization in a Rural Region. *The Journal of Rural Health*, (21)1, 31-38. Retrieved from <https://onlinelibrary-wiley-com.ezproxy.royalroads.ca/doi/epdf/10.1111/j.1748-0361.2005.tb00059.x>.
- Atallah, D. G., Bacigalupe, G., & Repetto, P. (2019). Centering at the Margins: Critical Community Resilience Praxis. *Journal of Humanistic Psychology*, 1-31. doi: <https://doi.org/10.1177/0022167818825305>.
- Bergstrand, K., Mayer, B., Brumback, B., & Zhang, Y. (2015). Assessing the Relationship Between Social Vulnerability and Community Resilience to Hazards. *Social Indicators Research*, 122(2), 391-409.
- Birkmann, J., Buckle, P., Jaeger, J., Pelling, M., Setiadi, N., Garschagen, M., Fernando, N., Kropp, J. (2010). Extreme events and disasters: a window of opportunity for change? Analysis of organizational, institutional and political changes, formal and informal

- responses after mega-disasters. *Natural Disasters*, 55(3), 637-655. doi:
<https://doi.org/10.1007/s11069-008-9319-2>.
- Caelli, K., Ray, L., & Mill, J. (2003). 'Clear as Mud': Toward Greater Clarity in Generic Qualitative Research. *International Journal of Qualitative Methods*, 2(2), 1-24. Retrieved from https://sites.ualberta.ca/~iiqm/backissues/2_2/pdf/caellietal.pdf.
- Cannon, T. (2000). Vulnerability analysis and disasters. In D. J. Parker, *Floods* (45-55). New York: Routledge.
- CBC Saskatchewan. (2014, June 30). Saskatchewan flooding: 37 communities declare state of emergency. Regina, Saskatchewan. Retrieved from <https://www.cbc.ca/news/canada/saskatchewan/saskatchewan-flooding-37-communities-declare-state-of-emergency-1.2692213>.
- Cooper, S., & Endacott, R. (2007). Generic qualitative research: a design for qualitative research in emergency care? *Emergency Medicine Journal*, 24(12), 816-819. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2658349/pdf/816.pdf>.
- Coppola, D. (2015). *Introduction to International Disaster Management*. Waltham: Elsevier.
- Creswell, J. W. & Creswell, J. D. (2018). *Research Design: qualitative, quantitative, and mixed methods approaches*. Los Angeles: SAGE.
- Deavers, K. (1992). What is Rural? *Policy Studies Journal*, 20(2), 184-189. Retrieved from <https://search.proquest.com/openview/2f7779f7bf760ae235084e1bd167c618/1?pq-origsite=gscholar&cbl=1821520>.
- Egbinola, C. N., Olaniran, H. D., Amanambu, A. C. (2017). Flood management in cities of developing countries: the example of Ibadan, Nigeria. *Journal of Flood Risk*

- Management*, 10(4), 546-554. doi: <https://doi-org.ezproxy.royalroads.ca/10.1111/jfr3.12157>
- Eyre, A. & Easthope, L. (2006). Property rights: returning personal possessions after disasters. *Australian Journal of Emergency Management*, 21(2), 35-39. Retrieved from http://eprints.lincoln.ac.uk/id/eprint/17650/1/AJEM_May2006_EyrePayne.pdf.
- Fereday, J. & Muir-Cochrane, E. (2006). Demonstrating Rigor Using Thematic Analysis: A Hybrid Approach of Inductive and Deductive Coding and Theme Development. *International Journal of Qualitative Methods*, 80-92. doi: <https://doi.org/10.1177/160940690600500107>.
- Fulton, A.E. & Drolet, J. (2018). Responding to Disaster-Related Loss and Grief: Recovering from the 2013 Flood in Southern Alberta, Canada. *Journal of Loss and Trauma*, 23(2), 140-158. doi: 10.1080/15325024.2018.1423873.
- Global News. (2014, June 29). Heavy rainfall causes flash flooding for communities in southeast Saskatchewan. Retrieved from <https://globalnews.ca/news/1423084/heavy-rainfall-causes-flash-flooding-for-communities-in-southeast-saskatchewan/>.
- Grimes, D., Goos, T., Little, M., & Shannon, B. (2007). Lessons learned during the 2005 Alberta floods. *Journal of Business Continuity & Emergency Planning*, 1(4), 415-425.
- Haque, C.E. & Etkin, D. (2012). Dealing with Disaster Risk and Vulnerability: People, Community, and Resilience Perspectives. In Haque, C.E. & Etkin, D., *Disaster Risk and Vulnerability: Mitigation Through Mobilizing Communities and Partnerships* (3-23). Location: McGill-Queen's University Press.

- Haski-Leventhal, D., Meijjs, L. C., Lockstone-Binney, L., Holmes, K., & Oppenheimer, M. (2017). Measuring Volunteerability and the Capacity to Volunteer Among Non-Volunteers: Implications for Social Policy. *Social Policy & Administration*, 52(5), 1139-1167. Retrieved from <https://doi-org.ezproxy.royalroads.ca/10.1111/spol.12342>.
- Hewitt, K. (1997). *Regions of risk: A geographical introduction to disasters*. Essex, England: Addison Wesley Longman Limited.
- Hewitt-Taylor, J. (2011). *Using Research in Practice*. London: Palgrave Macmillan.
- Hodgson, R. (2004). Rebuilding communities: the role of volunteers after disasters. In *Proceedings of the Institution of Civil Engineers - Civil Engineering* (p. 16-26).
- Hurlbert, M.A. (2018). Case Study Saskatchewan, Canada. In Hurlbert, M.A., *Adaptive Governance of Disaster, Water Governance – Concepts, Methods, and Practice*. Springer International Publishing. doi: 10.1007/978-3-319-57801-9_5.
- Joseph, Rotimi & Proverbs, David & Lamond, Jessica & Wassell, P.. (2011). A critical synthesis of the indirect tangible impacts of flooding on households. Association of Researchers in Construction Management, ARCOM 2011 - Proceedings of the 27th Annual Conference. 2. 1045-1053.
- Kahlke, R. M. (2014). Generic Qualitative Approaches: Pitfalls and Benefits of Methodological Mixology. *International Journal of Qualitative Methods*, 13(1), 37-52. doi:10.1177/160940691401300119.
- Kasdan, D. O. (2016). Considering socio-cultural factors of disaster risk management. *Disaster Prevention and Management*, 25(4), 464-477. doi: <https://doi.org/10.1108/DPM-03-2016-0055>.

- Krueger, S., Jennings, E., & Kendra, J. (2009). Local Emergency Management Funding: An Evaluation of County Budgets. *Journal of Homeland Security and Emergency Management*, 6(1). doi: <https://doi.org/10.2202/1547-7355.1434>.
- Laycock, K. & Caldwell, E. (2018). Exploring Community Cohesion in Rural Canada Post-Extreme Weather: Planning Ahead for Unknown Stresses. *Social Indicators Research*, 139(1), 77-97.
- Lemarquand, D., (2006). Red River Flooding: Mitigation Planning in an International River Basin. In Schanze, J., Zeman, E., Marsalek, J. (eds). *Flood Risk Management: Hazards, Vulnerability, and Mitigation Measures. NATO Science Series*, 67. Springer, Dordrecht. doi: https://doi.org/10.1007/978-1-4020-4598-1_17.
- Liu, A.Q., Mooney, C., Szeto, K., Theriault, J.M., Kochtubajda, B., Stewart, R.E., Boodoo, S., Goodson, Y. Li., Pomeroy, J. (2016). The June 2013 Alberta Catastrophic Flooding Event: Part 1 – Climatological aspects and hydrometeorological features. *Hydrological Process*, 30(26), 4899-4916. doi: <https://doi.org/10.1002/hyp.10906>.
- Manyena, B., O'Brien, G., O'Keefe, P., & Rose, J. (2011). Disaster resilience: a bounce back or bounce forward ability? *Local Environment: Resilience and Disaster*, 16(5), 417-424. doi: 10-1080/13549839.2011.583019.
- Massie M. (2013). Chapter 8: Flooding and the Carrot River Watershed Source Water Protection Plan, Saskatchewan: civic engagement and causal stories. In Keskitalo, E.C (eds). *Climate Change and Flood Risk Management*. 222-257. doi: <https://doi.org/10.4337/9781781006672.00013>.

- McMartin, D., Sammel, A., & Arbuthnott, K. (2018). Community Response and Engagement During Extreme Water Events in Saskatchewan, Canada and Queensland, Australia. *Environmental Management*, 61, 34-45. doi: <https://doi.org/10.1007/s00267-017-0944-y>.
- Mileti, D. & O'Brien, P. (1992). Warnings During Disaster: Normalizing Communicated Risk. *Social Problems*, 39(1), 40-57. doi: <https://doi.org/10.2307/3096912>.
- Montz, B.E., Tobin, G.A., & Hagelman, R.R., III. (2017). Behavioural Studies: Community Attitudes and Adjustment. *Natural hazards: explanation and integration (Second ed.)*, (185-215). New York, NY: The Guilford Press.
- Murphy, B. (2012). Community-Level Emergency Management: Placing Social Capital. In Haque, C.E. & Etkin, D., *Disaster Risk and Vulnerability: Mitigation Through Mobilizing Communities and Partnerships* (3-23). Location: McGill-Queen's University Press.
- Natural Resources Canada. (n.d.). The Atlas of Canada: Explore our maps: List of map collections: Toporama - mapping tool. Retrieved from <https://atlas.gc.ca/toporama/en/index.html>.
- O'Neill, H.K, Evans, B., Bussman, M., Strangberg, D.K. (1999). Psychological distress during the Red River flood: Predictive utility of the Conservation of Resources model. *Applied Behavioral Science Review*, 7(2), 159-169. doi: [https://doi.org/10.1016/S1068-8595\(00\)80016-1](https://doi.org/10.1016/S1068-8595(00)80016-1).
- Public Safety Canada. (2017). *Emergency Management Framework for Canada. Third Ed.* Ottawa: Government of Canada. Retrieved from

<https://www.publicsafety.gc.ca/cnt/rsrscs/pblctns/2017-mrgnc-mngmnt-frmwrk/index-en.aspx>.

Raaijmakers, R., Krywkow, J., & van der Veen, A. (2008). Flood risk perceptions and spatial multi-criteria analysis: an exploratory research for hazard mitigation. *Natural Hazards*, 46(3), 307-322. doi: <https://doi.org/10.1007/s11069-007-9189-z>.

Rashida, H., Haider, W., & McNeil, D. (2007). Urban riverbank residents' evaluation of flood evacuation policies in Winnipeg, Manitoba, Canada, *Environmental Hazards*, 7:4, 372-382, DOI: [10.1016/j.envhaz.2007.09.006](https://doi.org/10.1016/j.envhaz.2007.09.006).

Richert, C., Erdlenbruch, K., & Figuières, C. (2017). The determinants of households' flood mitigation decisions in France – on the possibility of feedback effects from past investments. *Ecological Economics*, 131, 342-352. doi: <https://doi.org/10.1016/j.ecolecon.2016.09.014>.

Ride, A. & Bretherton, D. (2011). Conclusion: Community Resilience in Natural Disasters. In *Community Resilience in Natural Disasters* (pp. 169-193). doi: <https://doi-org.ezproxy.royalroads.ca/10.1057/9780230339323>

Sharlin, H. (1989). Risk perception: changing the terms of debate. *Journal of Hazard Matter*, 21(3), 262-271. doi: [https://doi.org/10.1016/0304-3894\(89\)80023-8](https://doi.org/10.1016/0304-3894(89)80023-8).

Simonovic, S.P., Carson, R.W. Flooding in the Red River Basin – Lessons from Post Flood Activities. *Natural Hazards* 28, 345–365 (2003). <https://doi.org/10.1023/A:1022921823614>.

Statistics Canada. (2011). *Snapshot of Canadian Agriculture from the 2011 Census*. 2011 Census. Ottawa. Retrieved from <https://www150.statcan.gc.ca/n1/pub/95-640-x/2011001/p1/p1-01-eng.htm>.

Statistics Canada. (2017a). *Carnduff, T [Census subdivision], Saskatchewan and Division No. 1, CDR [Census division], Saskatchewan (table). Census Profile*. 2016 Census. Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017. <https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E> (accessed January 8, 2020).

Statistics Canada. (2017b). *Housing in Canada: Key results from the 2016 Census*. 2016 Census. Ottawa. Released October 25, 2017. <https://www150.statcan.gc.ca/n1/daily-quotidien/171025/dq171025c-eng.htm> (accessed January 8, 2020).

Struik, Bert. [Bert Struik]. (2015, March 22). *Risk terms take 10a* [Video]. YouTube. <https://www.youtube.com/watch?v=We7IFCHkhM4>.

Sturgess, P. (2016). *Measuring Resilience Evidence on Demand*. United Kingdom Crown Copyright. doi: http://dx.doi.org/10.12774/eod_tg.may2016.sturgess2.

Tierney, K., & Bruneau, M. (2007). Conceptualizing and measuring resilience. *Transportation News*, 14-17.

United Nations Office for Disaster Risk Reduction. (2015). *Making Cities Resilient: My City is Getting Ready*. Retrieved from United Nations Office for Disaster Risk Reduction: <https://www.unisdr.org/campaign/resilientcities/>.

Wisner, B., Blaikie, P., Cannon, T., & Davis, I. (2004). The Challenge of Disasters and our Approach . In B. Wisner, P. Blaikie, T. Cannon, & I. Davis, *At Risk* (3 - 44). London: Routledge.

Appendices

Appendix A: Communities Impacted by the Flood

Below is the complete list of communities that declared states of emergency during the 2014 flooding event in Saskatchewan:

City of Yorkton, City of Melville, Town of Whitewood Town of Redvers, Town of Fleming, Town of Wolseley, Town of Bredenbury, Town of Watson, Town of Grenfell, Town of Lemberg, Town of Springside, Town of Churchbridge, Village of Gainsborough, Village of Alida, Village of Stockholm, Village of Carievale, Village of Spy Hill, Village of Quill Lake, Village of Elfros, RM of Martin #122, RM of Moosomin #121, RM of Rocanville #151, RM of Antler #61, RM of Argyle #1, RM of Reciprocity #32, RM of Fertile Belt #183, RM of Storthoaks #31, FN Star Blanket Cree Nation, Town of Balcarres, Town of Saltcoates, RM of Grayson #184, RM of Porcupine Plain #395, RM of Garry #245, Village of Abernathy, Village of Bangor, RM of Tulleymet #216, Town of Carnduff, RM of Mount Pleasant #2, RM of Walpole #92, FN Cowesses #73, RM of Orkney #244, Town of Langenburg, RM of Big Arm #251, Village of Liberty, RM of Kelvington #366, Village of Grayson, RM of Saltcoats #213, Resort Village of Eppers Beach, Village of Goodeve, FN Little Black Bear, Village of Hubbard, RM of Humboldt #55, Village of Calder, Village of Storthoaks, RM of Spy Hill #152, Town of Wawota, Village of Sifton, RM of Langenburg #181, RM of Good Lake #274, RM of Foam Lake #276, RM of Abernathy, RM of Kingsley #124, FN Ochapowace, FN Peepeekisis, FN Kawacatoose, RM of Elfros #307, RM of Ituna Bon Accord #246, Village of Tantallon, and Town of Regina Beach

(CBC Saskatchewan, 2014)

Appendix B: Interview Guide

Introduction

The purpose of this recorded interview and research is to identify how the flooding event in southeast Saskatchewan in the summer of 2014 influenced local residents' understanding of risk of future flooding in the area and actions to prepare for future floods. The research will be completed by myself, Jasmin Carlton, to complete the requirements of my masters program through Royal Roads University. Throughout this hour-long interview I will be asking several questions with follow-up questions and you are not expected to answer any question that makes you feel uncomfortable or that you do not wish to discuss. If you wish to stop at any point during our time together you are free to do so.

Your anonymity will be ensured throughout this process, the study, and my analysis of the research. A pseudonym will be used when referencing you and any of your information. Confidentiality and anonymity will be of the utmost importance and strictly adhered to. Although we may know each other prior to this interview you are participating because you want to and not because you are being forced to from pressure from me, our previous relationship, or a requirement to support my work.

Although this activity is for my master's thesis it is also valuable for you to positively experience this and contribute to the research being conducted to enhance the safety and security of rural Saskatchewan and your community. One more thing before we start – you signed the informed consent document prior to this but I want to open it up for any questions or concerns you might have now about that document, or anything listed in the document. I can also provide you with the contact information for my supervisor and Program Head.

Interview Outline and Prompt

Who Are You?

Tell me a little bit about yourself.

- Where did you grow up?
- What do you do?
- What do you believe are the most important things for me to know about you?
- What is your relationship status?
- What gender do you self-recognize as?
- What is your occupation?
- Do you consider yourself spiritual?
- How many hours do you volunteer each month?
 - o What kind of organizations do you volunteer for?
- What is most important to you that others may not consider as important?

Risk Perceptions

Can you tell me what you see as disaster risks for you and your home?

- What makes you feel safe or unsafe?
- Your home or your community?
- What kind of hazards do you face?

- Technological
- Natural
- What risk do you feel most often?
- Why do you think your home is uniquely at risk for these hazards?

Flooding

When the flooding happened in this area in 2014; what do you remember?

- What were you doing?
- Did you participate?
- How did you feel at the time?
- Looking back on this event how do you feel about it now?
- What are your positive memories from this time period?
- What surprised you about the flooding, events, and response?

Community

Can you share with me what you remember about the community of Carnduff as a whole during this time?

- Did they have a plan in place?
- Do they have a plan now?
- Do you feel like they are prepared now?
- Do you feel like you are getting enough information from the community about risks and what you should be doing?

Closing

Is there anything that you would like to say that you have not had a chance to say yet? Do you have any questions about the process or what we talked about here?

I would like to thank you for allowing me to spend time with you and for sharing with me so openly and honestly.

Appendix C: Research Ethics Board Approval

Marnie Jull

Fri 2019-05-24 2:34 PM

You; Jasmin Carlton; Gina Armellino ✉

Dear Jasmin -

On behalf of the Ethics Review Board, I am pleased to tell you that your application for ethical review has been approved.

I wish you all the best in your worthwhile research -

Marnie

Marnie Jull, PhD.

Associate Professor and Program Head

Conflict Analysis and Management program

School of Humanitarian Studies

Faculty of Social and Applied Sciences | **Royal Roads University**

Traditional lands of the Xwsepsum (Esquimalt) and Lkwungen (Songhees) families.

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