

FRONTISPIECE



“Fire synthesizes its surroundings. Those surroundings are cultural as much as natural, and choices about fire practices and regimes will inevitably be made on the basis of social values and philosophies, as integrated by political institutions. Science can enlighten that process but will not determine it” p.875

Pyne, S.J. (2004) Pyromancy: Reading Stories in the Flames.
Conservation Biology, 18(4): 874-877.

University of Alberta

Wildfire Risk Perception and Mitigation at Peavine Métis Settlement

by

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in partial fulfillment of the requirements for the degree of

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DEDICATION

To Madeline Gauchier & Jordy Noskiye
The first & the new generation of Peavine

---AND---

My husband Blake and my parents, Harvey & Gail Bablitz

ABSTRACT

This research used a qualitative community-based case study to examine characteristics of Peavine Métis Settlement that have encouraged residents' support of wildfire mitigation by the settlement. The specific objectives of my research were to:

1. Identify wildfire risk perceptions at Peavine Métis Settlement.
2. Identify the wildfire mitigation methods used in the community.
3. Explore *how* community characteristics of Peavine Métis Settlement affect local residents' risk perceptions, and support of wildfire mitigation programs.

This research makes three contributions to our understandings of wildfire risk perception and mitigation in Aboriginal communities. First, the high levels of community support for community wildfire mitigation have been influenced by four factors: local leadership, economics, community capacity, and land and home ownership. This study shows that locally-developed community wildfire mitigation programs may receive high levels of community support if programs are developed by local leaders, provide employment to community members, focus on building and using existing local capacity in the community, and take into account issues of land & home ownership (including insurance).

Second, this research examines how wildfire experience affects residents' wildfire risk perceptions and mitigation preferences. Wildfire experiences included: (1) traditional burning and firefighting experience, (2) only firefighting, and (3) bystander experience. Experience was found to influence wildfire risk perception in varying ways. Wildfire risk perception did not appear to affect whether or not settlement members conducted residential mitigation on their own property or supported community-level mitigation. The three types of wildfire experiences amongst participants did appear to affect

participants' reasons for implementing certain mitigation activities. Those with traditional burning and/or firefighting experience were found to implement wildfire mitigation activities for the main reason of reducing wildfire risk. Those with bystander experience were implementing wildfire mitigation activities for reasons other than reducing wildfire risk, such as general property maintenance or aesthetic preferences.

Thirdly, this research examines culture at Peavine, and how it influences residents' wildfire risk perceptions and mitigation preferences. Four cultural factors were determined to be influencing wildfire risk perceptions and mitigation preferences: local knowledge, place attachment, social relationships, and norms and values. It was found that participants supported community wildfire mitigation programs more than individual activities due to a preference for collective problem solving. Therefore, this study found that aspects of an Aboriginal community have important influences on wildfire risk perception and mitigation preferences.

Preface

The road to beginning this thesis was in no way straight. The only thing that has remained consistent is that I have always had an interest in hazards. Perhaps one of the defining moments for me was when my hometown of Whitecourt was threatened when I was in Grade 11 by the Virginia Hills fire. There was talk of evacuation and some of my friends were pulled out of school by their parents. Although we were never officially evacuated, I remember the orange colour of the sun, the ash raining down, and the general fear and uneasiness in the community.

As typical of small town kids, when I graduated high school, I knew I wanted to move away from home and go to University. I decided to go into Atmospheric Sciences, not so much to be a weather forecaster but to learn more about weather hazards like tornadoes and hurricanes. I took a course in introductory geology where I was fascinated with volcanoes and earthquakes. Because of this, I transferred in my second year into Geology and completed my undergraduate degree in this field. During this time, I was able to participate in a field trip to Hawaii, where my interest in volcanoes increased.

After graduating, I worked for one year as a geologist for the Alberta Geological Survey. However, I found the work boring. It was during this time that I became interested in the social side of hazards. Conveniently, Dr. Tara McGee was hired at the same time at the University of Alberta as a hazards researcher. I became her research assistant on a project involving urban wildfire mitigation. While working in this area, I decided that I wanted to go overseas to further my schooling. I ended up moving to New Zealand with my husband to begin my Masters in Hazard Management at the University of Canterbury. My research in New Zealand focused on staff training and warning system response at two ski areas located on Mt. Ruapehu, an active volcano. It was during this time that I realized I wanted to continue with the social side of hazards for my career.

At the end of my Masters, Tara approached me about developing a PhD research project with her on hazards and Aboriginal communities in Canada. I quickly agreed and we moved back to Canada to begin this new research course. My interest in this area was twofold. My husband was a wildland fire-fighter, which increased my interest in the social aspects of wildfire. Secondly, I had found out when I was in high school that I was of Métis heritage. At times, I feel part of a 'lost' generation whose Aboriginal heritage was stolen from us because people were embarrassed to be Métis. However, upon learning this my interest increased in the Métis. I knew about Métis culture through my great aunts and uncles, but I wanted to know what a contemporary Métis community was like.

Little did I know I would spend the next 4 years learning about my heritage, in addition to conducting my PhD research.

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Outside of the academic environment, I would like to thank all my friends who stuck by me. Deep thanks to my Edmonton girls: Hendrika, Roxanne, Danielle, and Jennifer. I would also like to thank Trina, Christine & Jesse, Christine & Kirk, the 1 pm ladies at Rocky Curves, members of Métis Local 845, and my kiwi friends. I would also like to thank the women of Prairie Animal Rescue, especially Terra who made my sister and I so welcome. I would also like to thank my foster puppies (Cheryl, Jaycee, Honey, Sammi, Blue, Cinder, Kauri, Kea, and Tommy) and their new families for reminding me what is important in life.

I would also like to deeply thank my study community, Peavine Métis Settlement, particularly all the study participants. Biggest thanks go to Lorne L'Hirondelle, my main community contact who also became a great friend. Thanks to the 2007-2010 council (Raymond, Layne, Dennis, Henry, Glenna), Violet Noskeye, and Lanis Gauchier. A special thank to Wanda Carifelle for being so good at remembering phone numbers. I would like to particularly thank Madeline Gauchier and her family for being so kind and welcoming to me during my research at Peavine – I hope we can stay friends for many

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CHAPTER 1: Introduction

Many Aboriginal communities in Canada are at high risk of wildfire¹, particularly those located in isolated regions of the boreal forest. Because of this risk, Aboriginal peoples frequently experience wildfire. For example, in 2010 several reserves were evacuated due to wildfires in Quebec and one home was burnt on the St. Paul reserve in Alberta (Anonymous, 2010b; Anonymous, 2010a; CanWest News, 2010; Loyie *et al.*, 2010; Sutherland, 2010). Numerous Aboriginal communities were also affected by the 2003 wildfire in BC, although data available does not identify the names of Aboriginal communities, the number of structures lost, and the number of residents evacuated (Filmon, 2004). Therefore, this population is crucial to focus on when trying to reduce wildfire risk to Canadians. Despite the risk to Aboriginal communities, there have been no studies that have focused on how social and cultural characteristics of Canadian Aboriginal communities influence current wildfire risk perceptions and mitigation preferences.

An important, often overlooked, Aboriginal group with communities in areas of high wildfire risk is the Métis². This is despite the fact there are over 380,000 Métis in Canada, accounting for 34% of the Aboriginal population (Statistics Canada, 2008).

Approximately 31% of the Métis people live in rural areas, like the Métis settlements of Alberta (Statistics Canada, 2008). The research presented here used a qualitative community-based case study approach to explore current wildfire risk perceptions and mitigation preferences, as well as factors that have affected acceptance and support for mitigation programs in Peavine Métis Settlement. The specific objectives of this research were to:

- Explore wildfire risk perceptions of residents at Peavine Métis Settlement.
- Identify wildfire mitigation methods used in Peavine Métis Settlement, both at the residential and community scale.
- Explore how community characteristics of Peavine Métis Settlement affect local residents' wildfire risk perceptions and mitigation preferences

In Chapters 4, 5 and 6 of this thesis, factors in Peavine Métis Settlement that influenced residents' wildfire risk perceptions are described, fulfilling Objective 1. These factors include wildfire experience (Chapter 5) and culture (including traditional/local knowledge) (Chapter 6). The wildfire mitigation programs being carried out in Peavine and factors influencing the development and implementation of these programs are described in detail in Chapter 4, satisfying Objective 2. Local community characteristics that are affecting wildfire risk perception and mitigation preferences in the settlement are

¹ The term wildfire refers to a fire in which 'wild' vegetation was burned. This can include forest fires, grass fires, and brush fires. The use of the term 'wild' does not imply that the fire was or is out-of-control.

² The Métis are persons of mixed Native and Euro-Canadian ancestry. The Métis National Council (2002) defines a Métis person as someone "who self-identifies as Métis, is of historic Métis Nation ancestry, is distinct from other Aboriginal peoples, and is accepted by the Métis Nation" (p.1).

presented in all three chapters, fulfilling Objective 3. These include local leadership, economics, wildfire risk perceptions, community capacity, fire experience, and culture (including norms, traditions, and values). The conclusion of the dissertation provides recommendations to wildfire managers based on the findings of the study to improve development and implementation of wildfire mitigation programs in Aboriginal communities.

1.1 Research Approach & Theoretical Context

Human geography is an academic discipline that studies people's relationship with the environment, through the spatial organization of human activity (Knox *et al.*, 2010). Cultural geography has emerged as a sub-discipline, where postmodern, post-structural, and postcolonial studies are used to learn about culture and the environment (Claval and Entrikin, 2004). In regards to this study, culture is defined as a set of shared values, traditions, and beliefs that come together to shape a way of life for a particular group of people (Gibson and Waitt, 2009). Culture therefore informs how people formulate and produce knowledge (Gibson and Waitt, 2009). For example, Aboriginal communities have a unique culture, including a local knowledge base, which is shared amongst residents and influences characteristics of their communities and how they make sense of their world. When we think about how people prepare for, mitigate, respond to, and recover from hazards that affect their community, culture plays an important role by influencing what individuals think about hazards and how willing they are to implement and/or support mitigation activities (Gaillard, 2007; Raish *et al.*, 2007; Bankoff, 2001; Dake, 1991; Johnson, 1991; McDaniels and Gregory, 1991; Johnson and Covelto, 1987); hence, the importance of studying environmental hazards through the lens of cultural geography.

Postcolonial Theory

This study follows a critical theory paradigm, specifically postcolonial theory. Postcolonial theory emerged in the 1970s by addressing that colonialism did not just involve the conquest of territories, economic exploitation, and political subordination of Indigenous groups, but also occupation of the minds and the removal of the power of culture (Barnett, 2006; Young, 2003; Gandhi, 1998). Postcolonialism recognizes that Indigenous knowledge has always been devalued compared to Western knowledge (Ellis, 2005; Wisner, 2004; Smith, 1999; Shkilnyk, 1985). In order for research to occur in a postcolonial world, it must explore how local people, especially those with Indigenous cultures, interact with knowledge and agencies despite unequal power (Robbins, 2006). Postcolonial theory was the ideal lens to research how characteristics of this community, including Métis culture, local knowledge and distrust of government, might influence wildfire risk perceptions and residential and community level mitigation strategies. In regards to the research study with Peavine, it was important to examine local culture and knowledge regarding wildfire and mitigation strategies in Aboriginal communities, which may differ from knowledge and ideas being used by government agencies to develop and implement wildfire mitigation across Canada. Other hazards studies have examined the importance of incorporating local knowledge into hazard mitigation programs to mitigate

the potential impacts of hazards (Carroll *et al.*, 2010; Becker *et al.*, 2007; Gaillard, 2007; Campbell, 2006; King and Goff, 2006; McAdoo *et al.*, 2006; Newton *et al.*, 2005; Bankoff, 2001; Skertchly and Skertchly, 1999). For example, it was found during the Indian Ocean tsunami that Indigenous people in the region had a better understanding of tsunami risk and warning signs than the non-Indigenous population, which resulted in a lower death-rate in Indigenous communities (Gupta and Sharma, 2006; McAdoo *et al.*, 2006; Sukrung, 2005).

Hazards Approach & Social Constructionism

In geography, research in natural hazards tends to focus on the *hazards approach*, which is grounded in the human-ecological perspective (McCaffrey and Kumagai, 2007; Kendra, 2006; White, 1973; Kates, 1971). This perspective emerged from the work of Harlan Barrows, and later from his student Gilbert White (Kendra, 2006; White, 1973). Hazards research in human geography concentrates on mitigation by exploring practical means and appropriate public policy to reduce hazard risk (McCaffrey and Kumagai, 2007). In other words, the study discussed in this thesis adopts a hazards approach by exploring the interaction between people and a hazard in order to understand what residents at Peavine think about wildfire, how and why residents of Peavine make decisions about wildfire mitigation, and what influences these perspectives and decisions. Subsequently these results are examined to develop recommendations for improving implementation rates and support for wildfire mitigation activities at both the individual and community level.

The theoretical framework for this study draws on social constructionism, which acknowledges that any body of knowledge is socially created and established as reality (Berger and Luckmann, 1966). Therefore, each society will have different ideas of reality and knowledge based on their experiences (Berger and Luckmann, 1966). For example, Aboriginal and non-Aboriginal people in Australia view fire very differently. Research shows that many Aboriginal peoples view fire as an ecosystem management tool natural to the environment (Edwards *et al.*, 2008; Bowman *et al.*, 2007; Preece, 2007; Bird *et al.*, 2005; Gott, 2005; Russell-Smith *et al.*, 2003; Whitehead *et al.*, 2003; Skertchly and Skertchly, 1999; Lewis, 1989) and that many non-Aboriginal people are less accepting of wildfire and the associated risks (Monaghan, 2004). These opposing views have developed from differing experiences with fire between Aboriginal and non-Aboriginal peoples throughout history.

The social construction of reality extends to every aspect of life, and has been particularly relevant in establishing core differences between Aboriginal and non-Aboriginal communities in Canada due to the vast differences in life experiences. The cultural uniqueness of Aboriginal peoples results in a unique worldview. Even relatively recent events have shaped how Aboriginal people see the world. For example, the removal of Aboriginal children into residential schools from 1879 to 1986 to teach them Euro-American ways has resulted in increased distrust for government amongst Aboriginal people (Milloy, 1999), influencing their view of government and subsequent policies.

Social constructionism is particularly relevant to hazards research as people's perceptions of wildfire risk and mitigation preferences are influenced by their culture, experiences, knowledge, traditions, and values (Raish *et al.*, 2007; Bankoff, 2001; Dake, 1991; Johnson, 1991; McDaniels and Gregory, 1991; Johnson and Covello, 1987). Consequently, a resident's perception of wildfire risk is influenced by their social setting. Local characteristics in a specific community will also affect how an individual or community will mitigate against wildfire.

Risk

The concept of risk is important to this dissertation. Risk can be defined as "the possibility of physical or social or financial harm/detriment/loss due to a hazard within a particular timeframe" (Renn and Rohrman, 2000, p. 14). Risk perception is particularly important in relation to the hazards approach. How individuals recognize risk will influence the type and level of mitigation activities they are willing to implement and/or support (Slovic *et al.*, 1987; Mileti, 1980; White, 1973; Kates, 1971). Slovic (1987) defines the study of risk perception as trying to "discover what people mean when they say that something is (or is not) 'risky', and to determine what factors underlie those perceptions" (p. 280). It is important to study risk perception in Aboriginal communities, such as Peavine, because the unique worldviews of Aboriginal peoples may result in risk perceptions that differ from non-Aboriginals, influencing the wildfire mitigation activities that Aboriginal peoples are willing to support and/or implement.

There are several different conceptualizations of risk; four of which will be discussed here. The first is the technical assessment of risk, where risk is analyzed based on probability and the magnitude of consequences (Kasperson *et al.*, 1988). For example, the risk of a wildfire is based on the vegetative type, atmospheric conditions, topography and the values at risk (including humans, structures, and infrastructure). Although this conceptualization is not used in this study, this type of risk assessment is commonly used by government agencies to identify the wildfire risk to a community. At Peavine and in neighbouring Aboriginal communities, a technical assessment of wildfire risk was conducted in 2001 by a government contractor (Walkinshaw, 2001). By examining vegetative type, ecological setting, and location of buildings, it was determined that the risk of structure loss from a crown fire at Peavine was low. This report resulted in some communities being targeted by government wildfire managers for wildfire mitigation activities and funding, while Peavine and other 'low' risk communities were not.

A second conceptualization is the psychometric paradigm where cognitive maps of risk perception and attitudes are created to produce a hazard taxonomy, which can be useful for understanding risk responses (Slovic, 1987; Starr, 1969). This paradigm emerged from research into heuristics individuals used to make sense of their world (Slovic, 1987). It was found that the acceptability of risk was 1000 times greater when the risk was voluntary and when the risk provided some type of benefit to the person undertaking it (Starr, 1969). Factor space was also used to show that factors such as control, familiarity, catastrophic potential, and knowledge also seemed to influence acceptability of risk

(Slovic, 1987). The psychometric paradigm has been important to research involving the human dimensions of wildfire because of the potential to examine how control, benefits, familiarity, catastrophic potential, and knowledge influence the acceptability of wildfire risk. For example, the benefits of a hillside, treed residence may far outweigh the risk of a potential wildfire (Gardner *et al.*, 1987).

Most relevant to this study is the cultural theory of risk. According to this conceptualization, individuals choose their risk perceptions to support their way of life (Dake, 1992; Wildavsky and Dake, 1990). Worldviews³ influenced by ideology and cultural biases, have been identified as strong predictors of risk perceptions (Boeck *et al.*, 2006; Dake, 1992; Wildavsky and Dake, 1990). Therefore, risk perceptions are not solely created by individuals, but influenced by the society in which they live (Dake, 1992; Dake, 1991). Important to this study, Aboriginal culture will have an important influence on how risks are perceived and addressed in the community. Related to the cultural theory of risk is the concept of the social amplification of risk. The social amplification of risk examines how risks interact with social, cultural, and political processes (Kasperson *et al.*, 1988). These processes may either increase or decrease risk perceptions, and therefore acceptability of risk (Kasperson *et al.*, 1988). For example, if one vocal resident thinks wildfire risk to their neighbourhood is extremely high, that individual may influence other residents in their community particularly if the vocal resident is held in high esteem in the community. Kasperson *et al.* (1988) note that one way social context can affect risk is through filtering of information, which may start very early in an individual's life. This is particularly relevant for this research, as Aboriginal communities in general have a small population base in isolated areas and residents rely on the opinions of their fellow community members which may be incomplete due to each person choosing which information is important to retain. At Peavine Métis Settlement, it was observed that members rely heavily on one another for information regarding wildfire, which is discussed in detail in Chapter 6.

Risk Perception

Risk perception is defined in this study as the intuitive judgments members of the public make about the probability or likelihood of risks affecting them (Slovic, 1987). There are generally two ways that risk perceptions are created : risk as feelings (also known as the affect heuristic) or risk as analysis (Slovic *et al.*, 2004). Risk as feelings involves making fast, instinctive, intuitive decisions about risk. Risk as analysis involves using logic, reason, and science to make decisions. The majority of the public tends to make intuitive risk judgments to evaluate hazards (Slovic, 1987), which are also influenced by imperfect information, biases, and difficulties in understanding risk concepts (Mileti, 1980). This is important to this study because it acknowledges that decisions about risk are made quickly based on intuition and opinions of others. The public has a broad conception of risk that incorporates knowledge (including personal experience and familiarity with the

³ Worldviews are defined by Slovic (1999) as general social, cultural and political attitudes that have an influence over a person's judgment of complex issues.

hazard), personality, voluntariness, political orientation, gender, and cultural biases (Slovic, 1999; Wildavsky and Dake, 1990; Kaspersen *et al.*, 1988; Slovic, 1987). Therefore, each community will have different conceptualizations of wildfire risk. This research examines how members of Peavine Métis Settlement view wildfire risks and how this is influenced by factors such as experience with fire, cultural influences, and political views. Understanding the risk perception of residents is important because it is likely that residents will view risk differently than outside managers. Disagreements about risk between the public and experts are common because they view risk differently, they have different worldviews, and/or they have different experiences (Slovic, 1999). However, although the public may lack certain information about hazards, sometimes their perspectives of risk are richer than that of experts, as they tend to include legitimate concerns that are often overlooked by risk managers (Slovic, 1987). In Alberta, wildfire mitigation in communities is generally completed by managers at the municipal and provincial level, some of which do not live in or have never visited the communities for which wildfire mitigation plans are developed. However, residents may have different perceptions of wildfire risk and the mitigation activities they are willing to implement at the residential-level and support at the community-level. This can lead to conflict between managers and residents over wildfire mitigation activities.

1.2 Peavine Métis Settlement

Peavine Métis Settlement is located in northwestern Alberta, 56 kilometres north of High Prairie, in the boreal forest (Appendix 2 & 3). The settlement covers nine townships, which is a large base of ~213,117 acres primarily covered in forest. There is limited documented history on the early days of Peavine. However, from discussion in the community, many Elders described their experience of the first decade on the settlement. Approximately 20 settlers moved to Peavine in 1938 when the settlement opened, which at the time was called Big Prairie Colony. The majority of the settlers were from Leicester, located on the southwest border of Peavine on the Peace River Trail⁴. Many of the current settlement Elders were children at this time. In 1942, shortly after the establishment of the Peavine, government officials visited the community to warn that it would be closed down if a school was not built, so some settlement members got together to build the school in order to keep the settlement open. This is still a point of pride for those involved. Settlers' early work included land clearing, farming, and building homes and community buildings. Early settlers were also employed in farming, hunting, trapping, logging, home construction, and road construction. Eight major families made up the population of Peavine in the early years, and these families still comprise the majority of the population.

The population of Peavine has grown steadily, increasing by 33% from 618 residents in 2001 to 822 residents in 2006 (Statistics Canada, 2007). The settlement estimates the current number of residents to be approximately 1000, including 600 children (60% of the population) under the age of 19. The population is much younger than the population

⁴ The Peavine River Trail is a historic road that connected Grouard to Peace River.

of Alberta where 26% of the population is under the age of 19 (Statistics Canada, 2007). This indicates that the population will keep growing and the settlement will keep expanding and building into the boreal forest. Settlement Elders are highly respected in the community, similar to other Aboriginal communities. Many current settlement Elders were the original settlers at Peavine.

Peavine now resembles an acreage community, as most residents live in well kept modest-sized homes on large pieces of land (Appendix 4). This has resulted from the complex system of home and land ownership on the Métis Settlements. Peavine Métis Settlement *owns* all the land, homes, and other buildings on the settlement. There are three ways a member of Peavine can *hold* land (including the structures), all of which have various rules and regulations that must be followed by the landholder and the settlement. The first is Métis Title, which means that the holder of Métis title has exclusive rights to use and occupy the land, make improvements, and transfer the title. The maximum amount of land that a member can have Métis Title on is one hamlet lot and 175 acres⁵ (approximately one quarter-section) (Bell, 1994). At Peavine, a few members choose to reside on their hamlet lot. There are two hamlet areas known as Central and Young Peavine, where there is a higher population density. The second is Provisional Métis Title, which can be granted by the Council (who holds Métis Title) to a settlement member so the member can use and make improvements to the land and eventually be able to apply for Métis Title (Bell, 1994). This provisional title can be held for a fixed term of five years, and can be renewed for another five. This situation resembles a fixed-term lease, although members do not pay for provisional title (Bell, 1994). The third way to hold land is through allotments, which occurs when a member already has Métis Title on the maximum amount of land (Bell, 1994). The settlement can grant the member additional land for a fixed period of time for reasons such as farming, ranching, and operating a business (Bell, 1994). All rules and regulations for a specific allotment are stated in a Memorandum of Allotment. Therefore, residents do not own their homes regardless of the type of title they are holding the land under. Typically, once a member is granted a home, it is theirs indefinitely. There are rules associated with each type of title that a member must live in the home for a specified amount of time each year, so generally members retain their home even after they have moved away from Peavine by returning to the settlement for periodic visits.

All types of landholdings are granted as quarter-section segments (approximately 160 acres). Members can have Métis title on three different sections of land. Those holding Métis title to a particular portion of land can sign over a portion or the entirety of their land, often to family members. This generally results in entire extended families living on one quarter section. This has resulted in homes being spread out over the entire settlement, unlike at other settlements, such as Gift Lake, where the majority of residents live in a central hamlet area.

⁵ An additional 167 acres can be given for Métis title if the land is used and required for the operation of a farm, ranch, or business (Bell, 1994)

Infrastructure at Peavine includes 249 private dwellings (Statistics Canada, 2007), 70 kilometres of gravel roads, a paved road to High Prairie, K-7 school, water treatment plant, recreation center, 3 office buildings, community hall, ball diamond, and public works shop with an attached fire department. At the time of this study, the settlement was building a new school, a new arena, and putting in new roads. There are also areas of undisturbed land on the settlement, which are used for traditional purposes such as hunting, berry-picking, and camping. There are lakes and streams within the boundaries used for fishing and recreation. The northwest area is currently being used for oil and gas development.

Peavine Métis Settlement is a relatively wealthy Aboriginal community. Much of this comes from good business investments in the last 15 years, as well as payments from the provincial government from 1990 to 2007 (see Section 2.2.1 for a detailed explanation of the payments). Peavine owns five businesses which contribute to the income of the settlement, including oil field companies, a hotel, a gravel company, and a lumber company. The oilfield at Peavine has generated a considerable number of jobs and income; however it has recently experienced a major slowdown.

Settlement members have various types of employment. Approximately 75 people are employed by the settlement, either in the general operations of Peavine or for one of the corporations owned by the settlement. Others work in private industry on the settlement, such as oil and gas, logging or construction. Some work off the settlement in High Prairie or the surrounding area. However, a large proportion of the adult population is unemployed (approximately 120 residents in the summer of 2009, comprising 30% of the adult population). In order to increase employment, the Council requires that any company that acquires a contract to work at Peavine (e.g. to build the new school) must employ settlement members. The settlement also offers employability training, which is commonly referred to by members as community projects. Peavine puts aside money in their budget for community projects, which generally run for approximately one month in the summer and one month before Christmas. Tasks include maintenance, clean-up, and construction.

The settlement functions as a municipality, which means it has a local elected government with administrative powers over a defined area of land. The local government at Peavine is a Settlement Council consisting of four councilors and a chair. The Council has the ability to enact by-laws applicable to the geographic area of the settlement and to accept, reject, or terminate settlement membership applications (for conditions related to age, residence, and/or Métis status) (Bell, 1994). Those living on the settlement must be members in order to qualify for associated benefits, such as being able to acquire title to land and to qualify for social programs. All members are given the opportunity to voice their opinion on each settlement budget, which can only be passed each year if the majority of members vote to approve it. The Settlement Council under the jurisdiction of the Métis Settlements General Council is the political and administrative body of the eight Métis settlements in the province. The Métis Settlements General Council has “legislation law-making authority over membership, hunting, fishing,

trapping, timber and other matters relating to land” (Métis Settlements General Council, 2010, p.1). Métis Settlement General Council consists of 44 members, with 40 elected members (the Settlement Councils), and 4 elected Executive members (Métis Settlements General Council, 2010). The Métis Settlement General Council is under the jurisdiction of the province of Alberta.

Similar to other Aboriginal communities, members of Peavine struggle with many socioeconomic issues. Although the exact number is unknown, based on discussions in the community, there are numerous members of the community who struggle with substance abuse, including alcohol and illegal/prescription drugs. Violence also occurs, which is common in many Aboriginal communities (LaRocque, 1993). In order to deal with these issues, Peavine’s Council and the Métis Settlements General Council have taken the initiative to establish a Safe Communities plan, which has including increasing the RCMP presence on all Métis settlements (Metis Settlements General Council, 2007). The number of unemployed adults at Peavine is also of concern to the Settlement Council. The settlement has programs in place to help residents find employment, such as employability training (more commonly referred to as community projects), a Northern Lakes College campus, and safety and job ticket training. The settlement also invites companies to come to Peavine to recruit members. However, economic problems still abound, which affects families including children. To minimize the impact on children, the settlement along with the Northern Lakes School Division provides a hot breakfast and lunch for students. As well, students receive financial incentives from the settlement for good attendance and grades, and money to help cover expenses associated with enrolling in sports, such as hockey.

1.3 Wildfire Hazard at Peavine Métis Settlement

Wildfires are a common occurrence at Peavine. The community is actually named after the pea vine, an early succession plant that quickly establishes after a wildfire. During discussions with community members, Elders indicated that Peavine was covered with pea vines following several large fires. The first fire remembered by settlement members was a large wildfire on Peavine that burned in the early 1930s, prior to the opening of the settlement, due to a fire started by a squirrel hunter that quickly went out of control. Participants commented that when they moved to the settlement they settled in this burned area because there were fewer trees and bush to clear. A second large fire burnt through most of the southern section of Peavine in 1952 (Appendix 5). Participants indicated that no homes were burnt during this fire, although it apparently did pass near some of the structures including barns and homes, which was recounted by settlement Elders. Members were not evacuated during this fire. Other fires recorded by the Government of Alberta occurred in 1961, 1966, 1968, 1982, and 2007 (Appendix 5), none of which resulted in resident evacuation. Benefits associated with these fires identified by participants included the cleaning of deadfall and rebirth of young, healthy forests which have increased subsistence activities such as berry-picking and hunting, as many animals hunted by members are drawn to the new growth of vegetation in early succession areas. Residents in other Northern Albertan Aboriginal communities have also

reported these same benefits (Lewis, 1977). The 1982 fire is locally known as the Pelican Lake fire, which occurred in the northeast area of the settlement. Interview participants reported that many Peavine wildland firefighters, including themselves, fought this fire. Settlement members noted that they could see the flames at night, the air was full of smoke, and ash fell on homes. However, residents were not evacuated. Settlement members said that the fire was difficult to control and had the potential to burn into the community, but fortunately it was eventually extinguished by precipitation.

There were 27 minor wildfires between 1990 and 2000, with 53% human-caused (including recreation, abandoned fires, resident, and exhaust causes) and 47% lightning-caused (Walkinshaw, 2001). Fire occurrence was found to be equally split between spring, summer, and fall, with 80% of fires occurring in the forest and 20% in the grasslands on the settlement (Walkinshaw, 2001). The majority of the fires were less than 2 hectares in size, which means the fires were either contained quickly or burned themselves out after burning just a small area. From 2005 to 2010, there have been approximately six fires per year on the settlement (L. L'Hirondelle, Peavine Forestry Coordinator, personal communication, 2010). Many of these were small and extinguished by members. They were therefore not reported to provincial wildfire authorities. At the time of my study, mountain pine beetle-killed trees have substantially increased the fuel load on the settlement, substantially increasing wildfire risk. One of the recreation areas in the community, known as Big Foot Park, has a large pine forest where settlement members noted that beetle-killed trees have been found by the forestry coordinator.

Peavine Métis Settlement is currently comprised of vegetative zones typical of the boreal forest. Approximately 50% of the settlement is covered by deciduous forests, which are early succession forests that are growing back after the large wildfires described above swept through the settlement (Appendix 5). Twenty percent of Peavine is grasslands including natural prairies and man-made fields, which are used for agricultural and grazing purposes. Thirty percent of the settlement is covered by mixed wood boreal forest. Due to these different vegetative zones, the wildfire risk at Peavine varies. Approximately 40% of the settlement is at low risk to wildfire, 30% is at moderate risk, and 30% is at high risk. The risk level was determined by taking into account vegetative type and values at risk of wildfire (including homes, buildings, barns, outbuildings, recreation areas, and traditional-use areas). The highest risk areas of the settlement include recreation areas which are located in forests comprised mostly of pine. Moderate to high risk areas include prairies and agricultural lands which are at risk of grassfires, particularly prior to green-up⁶ (I. Johnston, Wildfire Prevention Officer, Alberta Sustainable Resource Development, personal communication, 2007; W. Lesiuk, Forest Protection Technician, Alberta Sustainable Resource Development, personal communication, 2007). Low risk areas include the early succession forests that were previously burned over.

⁶ Green-up occurs after the first spring rains when deciduous trees and plants bud and grow their leaves.

Homes are located in all three vegetative zones and are therefore at varying degrees of risk. The risk of structure loss from wildfire at Peavine Métis Settlement was identified as low in 2001 because most homes are located in previously burned areas which now consist of aspen forests (Walkinshaw, 2001). Almost all homes on acreage lots have large lawns extending 20 metres from the home and further in some cases, for various reasons including aesthetic preferences and reducing wildfire risk. However, in the last ten years the risk to structures has increased, as new homes have been built in areas at moderate to high risk. An example of a moderate to high risk area on the settlement is the hamlet known as Young Peavine, consisting of approximately 20 homes, where structures are adjacent to boreal spruce and pine forests. Young Peavine has received the most population growth and building in the last 10 years, as it is located on the south section of the settlement nearest to the community of High Prairie where many settlement members work and shop.

During observations and discussions with settlement members, members indicated they believed wildfire risk on the settlement is increasing. Their opinions on increasing wildfire risk can be separated into five groups. The first is the presence of mountain pine beetle in settlement forests. BigFoot Park, a popular recreation area located in a pine forest, was severely affected by mountain pine beetle at the time of my fieldwork. Wildfire mitigation has been completed in this area, including the thinning of trees and trimming of branches up to two metres up the trunk. However, the presence of pine-beetle killed trees has elevated the wildfire risk in the park, as studies in Canada have shown that mountain pine beetle is causing an increase in fuels (Canadian Forest Service, 2005). Although gazebos are the only structures in this recreation area, the area holds significance for members for traditional land-use, such as berry-picking and hunting. Burning of this recreation area would be devastating for settlement members.

The second reason participants gave for the increasing wildfire risk is the changing climate. All participants felt that the last few years at Peavine had been the driest in their memory, with low snowfall in the winter and low amounts of rainfall in the spring and summer⁷, which increased the risk of wildfire fire. The reduction in precipitation in recent years has resulted in a reduction in standing water and drier vegetation. The period between snowmelt and green-up of vegetation is now longer due to dry conditions, increasing the high risk period for wildfires, particularly grassfires. A few participants perceived these changed conditions to be due to climate change; however a few participating Elders felt the drier conditions were cyclic, and weather on the settlement would soon become wetter again.

A third factor participants felt was increasing wildfire risk at Peavine was population growth. Fifty years ago, there were few structures on the settlement and a population of around 200. In 2010 the population has grown to just over 1000, with 250 buildings including houses, community buildings and structures such as barns. Many of these

⁷ Since 1997, annual temperatures in Canada have been above normal with 2010 being the warmest year on record (Environment Canada, 2011). Precipitation levels in Northern Alberta in 2010 were also 20% lower than normal (Environment Canada, 2011).

homes are located in the central area of the settlement, which was burned in a wildfire in 1952 and is currently covered in early succession aspen forests. However, new areas of Peavine where homes are increasingly being built have been identified by the forestry coordinator as moderate to high wildfire risk because homes are built in mixed wood boreal forest.

A fourth factor identified by a few participants as increasing wildfire risk was past and current fire suppression on the settlement. These participants understood the need for fire suppression to protect people and structures, however felt that some areas of the settlement would be healthier if they were burned periodically. Other participants also identified encroaching vegetation on the settlement, particularly since the last major wildfire in 1952. Studies in other Indigenous communities have also found that residents are worried about the removal of fire from the ecosystem and the resulting increase in vegetation (Carroll *et al.*, 2010; McDaniel *et al.*, 2005; Carroll *et al.*, 2004; Lewis, 1982).

Participants identified changing land use on the settlement as also increasing the wildfire risk. Because of the isolation of Peavine, prior to 2000 there were very few people on settlement land other than members. Participants felt that members were responsible with fire and less likely to start an out-of-control wildfire. However, in 2000 Peavine was opened up by the council to oilfield development. This has brought many benefits, including increasing income and employment. However, several participants worried that this influx of ‘outsiders’ was increasing the wildfire risk due to the ‘outsiders’ perceived lack of knowledge. One participant identified the oilfield area of Peavine (northwest) as the highest risk for wildfire:

The regular occurrence of wildfire and the varying and increasing levels of wildfire risk make Peavine an ideal Aboriginal community partner for this study.

1.4 Thesis Structure

This thesis is paper-based and structured around factors influencing wildfire risk perception and residential and community-level mitigation activities at Peavine Métis Settlement. This introduction chapter has provided the goals and theoretical context of the study, as well as introducing the case study community. Chapter 2 provides the background to the research presented in this thesis, including (1) a review of Métis history and the Alberta Métis Settlements, (2) wildfire hazard and traditional fire use in Northern Alberta, (3) the human dimensions of wildfire, and (4) wildfire mitigation strategies. Chapter 3 details the methodology of the study, including the use of community-based qualitative research, the specific instruments of study, data analysis, study limitations, dissemination of research results, and validity of the research methods used for this study.

Chapters 4, 5 and 6 are presented in paper format. Chapter 4 examines the wildfire risk mitigation program at Peavine Métis Settlement, called Peavine FireSmart Projects, and identifies four factors contributing to the support for the program in the community. A

version of Chapter 4 will be submitted for publication to *Environmental Hazards*. Chapter 5 examines the influence of wildfire experience on wildfire risk perception and mitigation preferences. A version of Chapter 5 will be submitted to the *International Journal of Wildland Fire*. Chapter 6 examines culture in Peavine Métis Settlement and the influence of culture on wildfire risk perception and mitigation preferences. A version of Chapter 6 will be submitted to *Society & Natural Resources*.

Chapter 7, the conclusion, begins with a general discussion on how the findings relate to the goals and objectives of the research study. The academic and practical contributions of the research are presented. Future research directions are also discussed.

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CHAPTER 2: Background

This chapter provides the context for this research. First, a history of the Métis and the Alberta Métis Settlements is presented. Then, wildfire in the province of Alberta is discussed, followed by a summary of the academic literature on the human dimensions of wildfire. Wildfire mitigation strategies are also presented.

2.1 The Métis

To understand the worldviews of members of Peavine Métis Settlement, it is important to be aware of the history of the Métis people. The Métis have long considered themselves a distinct Aboriginal group in Canada, but it was only in 1982 that the rewriting of the Constitution of Canada included the Métis as one of Canada's distinct Aboriginal groups, along with the First Nations and Inuit (Teillet, 2007; Weinstein, 2007; Department of Justice Canada, 1982), forty-four years after the formation of Peavine Métis Settlement. This is considered to be one of the greatest successes of the Métis (Purich, 1988), as no other country in the world has constitutionally recognized its mixed-blood population as Aboriginal peoples (Teillet, 2007). The road to gain this recognition was not easy, and continues to be difficult for the Métis as they struggle with various levels of government over issues such as harvesting rights, land ownership, jurisdiction, and self government (Dickason, 2007; Lischke and McNab, 2007; Teillet, 2007; Weinstein, 2007; Friesen and Friesen, 2004; Purich, 1988). Historically, the Métis have been characterized by almost universal landlessness and poverty, following their successes in the fur trade and buffalo hunts of the mid-1800s (Peterson and Brown, 1985). For a long time in Canada, many Métis were unaware of their heritage or embarrassed by it (Barter, 2007; Dickason, 2007; Koebel, 2007; Sutherland, 2007; Weinstein, 2007; Belcourt, 2006; Campbell, 1973). The Métis are politically different from other Aboriginal groups in Canada because the Métis are under provincial jurisdiction¹ and the First Nations and Inuit are under federal jurisdiction (Friesen and Friesen, 2004).

There are disputes over who the Métis actually are and different definitions have emerged. Even at Peavine, there are disputes over who is truly Métis. The word Métis is French and can be translated to English as “a child of different races, a mix” (Purich, 1988). The Cree word for the Métis is *otipemisiwak*, which means the people who work for themselves (Belcourt, 2006; Berry and Brink, 2004). Métis is not a generic term that represents all those in Canada who are biracial: Rather, it refers to those who have a distinct cultural heritage and a sense of self-identity (Brown, 2002). It is generally agreed that Métis refers to a person of mixed Indian and Euro-Canadian ancestry, but it is hard to construct a more precise definition (Sawchuk, 1998). The Métis National Council (2002, p.1) identifies those who are Métis as a “person who self-identifies as Métis, is of historic Métis Nation Ancestry, is distinct from other Aboriginal Peoples and is accepted by the Métis Nation”. There are still disputes over whether the term Métis refers only to those

¹ However, Métis residing in the territories are under federal jurisdiction (Friesen and Friesen, 2004). There is still debate over whether the Métis should remain under provincial jurisdiction (Bell, 1994)

who are descendant from the Red River settlement in Manitoba (Abley, 2009; Weinstein, 2007). The Métis National Council originally represented Métis from the prairie provinces, and later included Métis associations in Ontario and British Columbia (Abley, 2009). However, self-identifying Métis in the Northwest Territories and Eastern Canada have been notably excluded (Abley, 2009).

In the 2006 census (Statistics Canada, 2008), Aboriginal people were found to represent approximately 4% of the total population of Canada (Table 2-1). Between 1996 and 2006, the population of Aboriginal people grew by 45%, nearly six times faster than the non-Aboriginal growth rate. In 2006, The Métis were found to represent 34% of the Aboriginal population in Canada, with 389,785 identifying themselves as Métis. It was noted that the Métis population has almost doubled (increasing by 91%) since 1996, due to demographic factors (such as high fertility rates) and non-demographic factors (such as a growing tendency for people to recognize themselves as Métis). This growth outpaced the increase in populations of First Nations (29%) and Inuit (26%) as well as the non-Aboriginal population (8%) growth rate (Statistics Canada, 2008). Statistics Canada (2008) predicts that this growth is likely to continue because the median age of the Métis is 30 years, which is well below the 40 year median age of the non-Aboriginal population. Most Métis (69%) reside in urban areas. Alberta has the highest population of Métis people at 85,500, which is 22% of Canada's total Métis population.

Land ownership has historically been tenuous for the Métis. After the 1885 Métis rebellion and until 1925, the Government of Canada offered scrip² to all landholders in the prairies, the largest of which were the Métis (Weinstein, 2007; Friesen and Friesen, 2004; Purich, 1988). The purpose of scrip was to extinguish Métis land claims (Berry and Brink, 2004). Scrip was different than treaties, because treaties were collective agreements over collective rights whereas scrip was about individual grants of land (Teillet, 2007). In this way, treaties affirmed the existence of Aboriginal peoples and their rights by giving them pieces of land to establish their communities as a group of people. Scrip did the opposite by offering only small pieces of land to individual Métis families³, pulling apart communities and extended families (Teillet, 2007; Carter, 1999; Pocklington, 1991). The government issued scrip certificates that entitled the bearer to either a certain amount of land (80, 160, or 240 acres) or a sum of money (\$80, \$160, or \$240) (Friesen and Friesen, 2004; Purich, 1988). In order to claim land scrip, one had to travel to dominion land offices and wait for formal approval from Ottawa (Weinstein, 2007). Interestingly, land had to be surveyed before it could be claimed for land scrip, so Métis from large areas of the Northwest could not use land scrip to obtain title to their traditional lands as it had not yet been surveyed (Weinstein, 2007). Some historians argue that because of this, many Métis did not actually have a choice between land or money scrip and most took money scrip (Weinstein, 2007; Berry and Brink, 2004; Friesen and Friesen, 2004; Purich, 1988). Most Métis who took money scrip sold their scrip

² Scrip is the name for grants given under the Dominion Lands Act and were a coupon that entitled the bearer to a specific amount of land or money (Weinstein, 2007).

³ Prime Minister John A. McDonald remarked at the time that the half-breeds in Canada were whites and should be treated as whites (Berry and Brink, 2004).

certificates for less than they were worth to scrip speculators in order to obtain their money faster (Weinstein, 2007; Friesen and Friesen, 2004). Some Métis historians argue that up to 90% of scrip certificates ended up in the hands of land speculators, bankers, lawyers, and merchants for much less than it was worth (about 25% to 33% of face value) (Berry and Brink, 2004; Purich, 1988).

The history of scrip is important to this study because the result was that numerous Métis did not end up owning land as a result of the scrip system (Friesen and Friesen, 2004; Purich, 1988), and blamed the government for taking away their land. Many Métis charge that the government knew about the scrip trafficking but did nothing to stop it (Weinstein, 2007; Purich, 1988). Distrust of the government grew and the Métis sunk into the background of Canadian culture (Weinstein, 2007). From the 1870s to the 1920s when scrip was being implemented, some Métis families (including those who eventually settled in Peavine) moved west into Alberta, British Columbia, and the territories ahead of the European settlers, hoping to maintain their lifestyle (Weinstein, 2007; Métis Settlements General Council, 2005; Carter, 1999). Others remained where they were, but became landless and were forced to live on road allowances in an impoverished state (Berry and Brink, 2004; Carter, 1999; Campbell, 1973). Others assimilated with European culture and communities (Weinstein, 2007). There is now disagreement over whether the Métis claims over Aboriginal title to the land have been resolved (Purich, 1988). The federal government believes Métis claims to land were satisfied under the scrip system, but the Métis believe the scrip system did not deal with their land claims (Purich, 1988). However, the province of Alberta has tried to settle the land disputes with the Métis people with the opening of the Métis Settlements, one of which is Peavine Métis Settlement.

2.1.1 Alberta Métis Settlements

Alberta has had a unique relationship with its Métis people, the history of which has again contributed to the worldviews of the Métis people of Peavine. Early Métis communities in Alberta include Fort des Prairies (now known as Edmonton), the Lac La Biche Mission, Fort Vermillion, Lac Ste. Anne, Fort Chipewyan, and Lesser Slave Lake (Métis Settlements General Council, 2005; Purich, 1988). A number of events that occurred in the late 19th century, such as the decline of the fur trade, the depletion of traditional food sources such as buffalo, and landlessness after scrip, made it difficult for the Métis people to make a living in Alberta.

The beginning of the current era of relationships between the Métis and the province of Alberta began in 1930 when responsibility for natural resources in Canada was transferred from the federal government to the provinces (Weinstein, 2007; Berry and Brink, 2004). During this transfer, the federal government also removed itself of any further responsibility for the Métis people, shifting the task to each individual province⁴

⁴ This had many negative consequences, as Métis histories and culture were kept out of national museums, the Métis were ignored in discussions of cultural policies, and in 1941, the Métis were removed as a distinct people from the Canadian census (Weinstein, 2007).

(Weinstein, 2007). In Alberta a group of Métis leaders came together in 1932 to form l'Association des Métis de l'Alberta⁵ to pressure the Alberta government into appointing a royal commission to investigate the conditions of the Métis people in the province (Weinstein, 2007; Friesen and Friesen, 2004; Purich, 1988). The main goal was to secure land to protect Métis culture, lifestyle, and traditions (Métis Settlements General Council, 2005; Pocklington, 1991). In 1936, the Ewing Commission recommended that a Métis farm colony system be created as a government relief program (Weinstein, 2007; Friesen and Friesen, 2004), as this was determined the cheapest way to deal with the socio-economic problems of the Métis people (Pocklington, 1991). The province passed the Métis Population Betterment Act in 1938, which created Métis colonies that would receive land from the province (Weinstein, 2007; Métis Settlements General Council, 2005; Friesen and Friesen, 2004; Sawchuk, 1998; Purich, 1988). In the 1940s, the province put aside land for 12 colonies (Weinstein, 2007; Berry and Brink, 2004). The Métis Rehabilitation Branch was created within the Department of Social Services and Community Health to be responsible for the settlements⁶ (Pocklington, 1991).

The commission made recommendations on the siting of the settlements, such as location near a lake, sufficient timber, and agricultural land (Purich, 1988). A local three-person council was elected for each settlement, and an area supervisor hired by the province was located at each settlement (Sawchuk, 1998). Métis families began to move to these settlements, and settlers had to break land for farming, build roads, cut timber for home construction, as well as earn a livelihood (Métis Settlements General Council, 2005; Friesen and Friesen, 2004). However, many Métis were upset at how the settlements were run, as the supervisor was only responsible to the province of Alberta, not the Métis people living there (Berry and Brink, 2004; Sawchuk, 1998; Driben, 1985). Some Métis were disappointed at the locations of the settlements, as the land was in isolated areas of the province (Berry and Brink, 2004; Driben, 1985). The government also decided who could live on the settlements (Sawchuk, 1998; Purich, 1988). Eventually, four settlements were closed⁷ (Wall, 2008). Residents were relocated to the remaining eight settlements: Buffalo Lake, East Prairie, Elizabeth, Fishing Lake, Gift Lake, Kikino, Paddle Prairie, and Peavine (Métis Settlements General Council, 2005; Purich, 1988).

This period had important impacts on members of Peavine Métis Settlement. First, the responsibility of the supervisor only to the province added to the lingering distrust of government. Secondly, the isolated location of Peavine meant that members had to rely heavily on one another to survive, as food was only provided through a subsistence lifestyle. Finally, the fact that the government could pick who they felt was Métis and who they wanted to live on the settlement added to the dislike and mistrust of government, as Peavine residents felt that they couldn't even establish their own

⁵ The first leader was Joseph F. Dion, who was not Métis but First Nations by birth (Wall, 2008). This group later became the Métis Association of Alberta, and then the Métis Nation of Alberta (Weinstein, 2007; Sawchuk, 1998).

⁶ In the 1980s, it was renamed the Métis Development Branch and moved to the Department of Municipal Affairs (Pocklington, 1991).

⁷ The closure of these four settlements resulted from a provision in the Métis Population Betterment Act that allowed the government to repossess land no longer deemed suitable or required (Pocklington, 1991).

communities without government involvement. This again contributed to the air of colonialism Métis people have long struggled against.

In a study conducted by Pocklington (1991) on the Métis settlements in 1984, councilors from all the settlements regarded unemployment and housing as the biggest problems facing their settlement. The majority of councilors felt that settlements would be better off if they were politically independent. The majority of members mentioned that they liked living on their settlement, enjoying the tranquility of the setting, the pace of life, the low cost of living, and the ability to hunt in the off-season. Complaints about settlement life included high levels of unemployment, the high number of people on welfare, and the prevalence of favoritism between council members and family.

Restructuring of the legislation surrounding the settlements continued until the Alberta-Métis Settlements Accord was completed in 1990. This legislation is the first in any province to grant an Aboriginal group collective ownership of land and self government without federal involvement in the process (Bell, 1994). The Accord established a new Métis self government, a landholding system, and a means to resolve long-standing arguments over oil and gas revenue (Weinstein, 2007). A new regional government was enacted called the Métis Settlements General Council, which has the power to enact laws and policies for all the settlements, and the power of local individual settlement councils were expanded (Weinstein, 2007; Sawchuk, 1998; Purich, 1988). Each settlement has powers analogous to those of a municipality with a small civil service (Bell, 1994; Pocklington, 1991). Each settlement elects their own council every 3 years (any members over that age of 18 can vote) consisting of five members including a Chairman (Pocklington, 1991). The Métis Settlements Appeal Tribunal was established to deal with membership claims and land allocations decisions (Weinstein, 2007; Purich, 1988). The Métis Settlements Land Protection Act was also passed, making the Métis Settlements General Council the second largest landholder in the province, after the crown (Weinstein, 2007). Settlement councils have the authority to allocate land to members⁸ (Bell, 1994). The Métis Settlements Land Registry was created to deal with the administrative and legal elements of land ownership (Bell, 1994). The province was required to pay \$310 million to the settlements over 17 years to settle existing lawsuits (Weinstein, 2007). In regards to resources, the province retained water and subsurface rights, but agreed to co-manage nonrenewable resources with the settlements (Weinstein, 2007; Bell, 1994). These Métis settlements are the only significant Métis land base in Canada (Weinstein, 2007; Sawchuk, 1998), covering 1.25 million acres and home to approximately 6,500 people⁹ (Métis Settlements General Council, 2005).

Even though the signing of the Accord transferred responsibility of the settlements to the Métis, it does not seem to have affected the general mistrust of government amongst settlement members. As well, some members of Peavine still feel the government is too intrusive into programs provided on the settlement. Not all Métis support the idea of

⁸ This occurs in three ways (Métis title, provisional Métis title, and allotments), all of which have various rules and regulations that must be followed by the landholder and the settlement (Bell, 1994).

⁹ It must be noted that the Métis living on the settlements represent only 6,500 of 85,000 Métis in the province of Alberta.

Métis settlements. Clément Chartier, the current president of the Métis National Council, has indicated that he is willing to support self-government with a land-base for those Métis community that want it (Abley, 2009). But he argues that he does not want to create a system of separateness, and he hopes for Métis citizens to be integrated into Canada, not islands unto themselves (Abley, 2009).

2.2 Wildfire

To understand the wildfire hazard at Peavine Métis Settlement, it is crucial to examine the history of wildfire in the province of Alberta, specifically the boreal forest. In the following section, the history of wildfire in Alberta is introduced. Secondly, the history of traditional burning practices of the First Nations and Métis of Northern Alberta is presented. Finally, the establishment of research in the field of human dimensions of wildfire is covered, followed by the discussion of the development of residential and community-level wildfire mitigation activities.

2.2.1 Hazard

Peavine is located in the boreal forest which is a forest prone to wildfire¹⁰. Pyne (2007b) summarizes wildfires in Canada in the following way: “Canada is a large and combustible swathe of fire-planet Earth. Historically, fires swept its prairies every two or three years; combusted its Cordilleran forests every five to fifty; and devoured its boreal forest, in immense chunks, every 50 -120 years” (p.960). The boreal forest¹¹, which covers 48% of Alberta, contains highly flammable vegetation, such as conifers like spruce and pine, that have been home to Canada’s largest wildfires (Pyne, 2007a). Fire risk is often high in the spring, when vegetation is dry (Pyne, 2007a). Historically, grass fires were also extremely common, and many prairies in the boreal forest were maintained by Aboriginal burning¹² (Pyne, 2007a; Stewart, 2002). The name ‘Blackfoot’ for the Blackfoot First Nations actually came from the name they called themselves, *soyitapix*, which means ‘people whose moccasins were blackened by [grass] fire’ (Holt, 1998).

Every few years, there are large wildfire outbreaks that threaten communities all across Canada, particularly in the wildland-urban interface. The wildland-urban interface (WUI) refers to “an area where various structures (most notably private homes) and other human developments meet or are intermingled with forest and other vegetative fuel types” (Chisholm Fire Review Committee, 2001, p.8). Large wildfires that have occurred in Alberta in the past 15 years include the 1997 Virginia Hills fire which burned 154,094 ha and threatened the communities of Swan Hills and Whitecourt, the Chisholm fire of 2001 which consumed 116,000 ha as well as 10 homes and 48 outbuildings (Chisholm Fire

¹⁰The term wildfire refers to a fire in which ‘wild’ vegetation was burned. This can include forest fires, grass fires, and brush fires. The use of the term ‘wild’ does not imply that the fire was or is out-of-control.

¹¹ A high proportion of Canada’s boreal forest is publicly owned (Apsey, 2003).

¹² There is debate on whether the prairies were formed by anthropogenic fires, or just maintained by them. The debate is summarized in Pyne (2007a, p.31-40).

Review Committee, 2001), and the Lost Creek fire of 2003 which burned 22,000 ha and threatened two municipalities in the Crowsnest Pass.

Aboriginal Peoples in Northern Alberta have a history of using fire (Figure 2-1) and it is estimated that the practice of traditional burning dates back to approximately 8,500 years ago (Holehouse, 2001; Lewis, 1982). It is likely that these traditional burning practices had significant influence on the worldviews of the ancestors of current Peavine residents, which may have influenced the views of their descendants. Importantly, there is a major difference between the wildfires reported above and the traditional burning practices of the Aboriginal people in Alberta. Wildfire can either be started by natural or human causes, and generally occur in the summer months or other times when vegetation is dry and conducive to burning out-of-control. Traditional burns are controlled, and generally take place in low risk seasons such as the late fall. These fires are started by people with knowledge and experience about fire behaviour and fire control, and there is generally a purpose for burning. Lewis (1988b; 1988a; 1983; 1982; 1980; 1978b; 1978a; 1977) and Ferguson (1979) researched traditional burning practices in Northern Alberta in the 1970s amongst the First Nations and Métis. They found that Aboriginal peoples in this area did not regard fire as a hazard, but as a tool for the maintenance of meadows, opening up grasslands, burning deadwood, obtaining firewood, improving settlements and campsite areas, making and maintaining trails, opening up animal habitat, increasing berry production, reducing pests, religious reasons, and aesthetic benefits. The most important resources to Aboriginals were the early succession species that appear soon after a fire, such as bison, moose, deer, elk, rabbits, grouse, grass seeds, legumes, berries, and bulbs (Lewis, 1977). Natural fires (mainly lightning caused) were too infrequent and irregular in occurrence and location to be relied upon, and usually occurred as destructive wildfires in the summer (Lewis, 1977). One of the main reasons for burning in Northern Alberta was to increase the growing season. Spring fires resulted in the warming of the soils and melting of frost, thus allowing the growing season of plants to begin earlier (Lewis, 1982; Lewis, 1977). Fire was also used each spring to reduce risk to the settlement areas (Lewis, 1977). Old deadfall forests were burned in the spring by the Aboriginal peoples because they felt it was safer to burn the forest than risk a fire caused by lightning in the summer (Lewis, 1977).

Lewis (1977) and Ferguson (1979) found that Aboriginal peoples involved in burning had a very good understanding of fire, and their burning was conducted based on seasonality, fuel conditions, wind, general weather conditions, and the frequency of burning. It is likely this knowledge and burning skills were passed on from generation to generation through traditional knowledge. All burning took place in the first two weeks of spring, never in the summer as this was acknowledged as a dangerous time for burning (Lewis, 1983). An Elder in Ferguson's study (1979) commented that "*I didn't set the forest on fire just for the sake of burning, but so that I could return to hunt the next year and live*" (p.81). A participant in Lewis' study (Lewis, 1977) commented: "*Fires had to be controlled. You couldn't just start a fire anywhere, anytime. Fire can do a lot of harm or a lot of good. You have to know how to control it*" (p.16). Burning practices were influenced by three factors: (1) climatic fluctuations; (2) changing economic goals, and

(3) sociopolitical constraints (discouragement then active suppression of fire) (Ferguson, 1979). Aboriginal burning was an important influence on the Northern Alberta landscape as late as the 1940s (Lewis, 1988a).

In northwestern Alberta, the area of the province where Peavine is located, numerous prairies and meadows were kept open by Aboriginal burning, such as the areas of Grande Prairie, Valleyview, High Prairie, Spirit River, Fairview, Grimshaw, Peace River, and others (Lewis, 1988b). A settler in Slave Lake noted that as a young man in 1912, he remembered seeing “hundreds of fires” in the area that the Aboriginal people had set to burn off meadows and that the area was much more open (Lewis, 1977). The use of traditional burning amongst Métis people is important to understand, as it will have considerable impact on the wildfire risk perceptions and acceptance and support of mitigation strategies amongst the residents of Peavine Métis Settlement. This will be explored further in Chapter 5.

2.2.2 Human Dimensions of Wildfire

Any study of the human dimensions of wildfire must take place within a context of ongoing academic and policy work already underway on the topic. Research on wildfire began in the mid-1900s with studies of the physical components of wildfire, such as fire behaviour and risk reduction methods such as prescribed burning (Davis, 1959; Buell and Cantlon, 1953; Lyman, 1947; Hayes, 1941). Contemporary wildfire studies in Canada have focused on changes in wildfire behavior and risk resulting from climate change (Flannigan *et al.*, 2005; Gillett *et al.*, 2004), mountain pine beetle (Canadian Forest Service, 2005), and fire suppression (Buchan, 2006; Busenberg, 2004). Wildfire mitigation strategies for communities and individuals, such as prescribed burning, creation of defensible space, and using fire-resistant building materials, have been developed from the results of this physical science research (Cohen, 2000; Cohen, 1999). However, social, psychological, cultural, and political factors that modify individuals’ risk perceptions and their willingness to participate in mitigation activities are not considered in these engineering solutions (McFarlane, 2006).

Wildfire research has expanded in the last few decades to include social science dimensions of wildfire, led by researchers in the United States, Australia, and Canada. The first published works on the social dimensions of wildfire were from the United States beginning in the late 1980s with a study published by Gardner *et al.* (1987) about acceptance of wildfire mitigation programs amongst urban residents in San Bernardino County in Southern California. Large wildfires in the United States in the 1990s (including the Oakland wildfire of 1991) further increased interest in the human dimensions of wildfire. The development of the United States National Fire Plan in 2000 led to an increase in research funds in this area, resulting in numerous studies being published since 2000, including two books “People, Fire, and Forests: A Synthesis of Wildfire Social Science” (Daniel *et al.*, 2007) and “Wildfire Risk: Human Perceptions and Management Implications” (Martin *et al.*, 2007b). Academic research on the social dimensions of wildfire in Australia began in the 1990s and is set to increase following

recommendations of the 2009 Victorian Bushfires Royal Commission (Teague *et al.*, 2010) which include the Commonwealth establishing a national centre for bushfire research in physical, biological, and social sciences relevant to bushfires. In Canada, the first published works in the field have primarily focused on residents of communities in Alberta and British Columbia, beginning in 2005 (Harris *et al.*, 2011; Faulkner *et al.*, 2009; McGee *et al.*, 2009; McFarlane *et al.*, 2008; Kulig *et al.*, 2007; McFarlane *et al.*, 2007b; McFarlane *et al.*, 2007a; McGee, 2005; McGee *et al.*, 2005a; McGee *et al.*, 2005b).

Literature on wildfire risk perception has shown that wildfire risk involves the complex interaction between wildfire and social, institutional, community, and individual actions (Daniel, 2007a; Shindler, 2007; Steelman, 2007; Brenket-Smith *et al.*, 2006). McCaffrey (2004) related wildfire risk perceptions to findings from factor analysis conducted by Slovic *et al.* (1987) that dread risk, unknown risk, and number of people exposed to a risk were significant in determining risk perception. McCaffrey concluded that wildfires generally rank low in the public's risk perception because fire suppression activities give the illusion of control over wildfire, the extent of most wildfires is limited, there is generally a lot of warning time for evacuation, and there are relatively few deaths associated with wildfire compared to other hazards. Wildfire risk perception has been found to vary depending on the scale. For example, an individual may not believe a wildfire is likely to affect their home, but may believe the wildfire risk to the entire community is high (Stelman, 2007).

In studying the human dimensions of wildfire, some authors have found that risk perception appears to influence acceptance and adoption of residential mitigation measures (Faulkner *et al.*, 2009; Martin *et al.*, 2007a; Bushnell *et al.*, 2006a), while others have found that perceiving a wildfire risk will not necessarily lead to implementation of mitigation activities (McCaffrey, 2007; Beringer, 2000). Researchers have identified several other factors that appear to encourage a person to implement residential mitigation or support community-level wildfire mitigation. These include experience with wildfire (Schulte and Miller, 2010; Shindler, 2007; Bushnell *et al.*, 2006b; Nelson *et al.*, 2004), preferences and values (Schulte and Miller, 2010; Daniel, 2007b; Martin *et al.*, 2007a; Shindler, 2007; McGee, 2005; Nelson *et al.*, 2005; Monroe and Nelson, 2004; Fried *et al.*, 1999; Gardner *et al.*, 1987), personal responsibility (McGee, 2005; Gardner *et al.*, 1987), length of time in community (McGee and Russell, 2003), trust (Shindler, 2007; Winter and Cvetkovich, 2007; Vogt *et al.*, 2005; Nelson *et al.*, 2004), economic constraints (Bushnell *et al.*, 2006b; Collins, 2005; McGee *et al.*, 2005a), sense of community (Schulte and Miller, 2010; Sturtevant and Jakes, 2007; Paton *et al.*, 2006; McGee, 2005), response efficacy (Schulte and Miller, 2010; McGee *et al.*, 2009; Martin *et al.*, 2007a), social context (Daniel, 2007b; McCaffrey, 2007; Brenket-Smith *et al.*, 2006), and cost/benefit (Stelman, 2007).

Many people apply an informal type of benefit-cost analysis when presented with wildfire mitigation strategies. The principle costs are related to reducing the aesthetic features of the landscape that drew the resident there in the first place (Daniel, 2007b; Martin *et al.*,

2007a; Westhaver *et al.*, 2007; Gardner *et al.*, 1987). In other words, some residents feel that the effort required, the cost of mitigation activities, and the degradation to the landscape is not worth the benefit of reducing wildfire risk (Daniel, 2007b). However, research indicates that most residents implement wildfire mitigation activities for reasons other than wildfire mitigation, such as to improve the aesthetics of their home or property or as regular property maintenance (McGee, 2005; McGee *et al.*, 2005a).

Indigenous Communities

Much of the international literature on Indigenous peoples and wildfire focuses on traditional burning practices, documenting historical reasons for traditional burning as well as techniques and knowledge (Bowman *et al.*, 2007; Bird *et al.*, 2005; Russell-Smith *et al.*, 2003; Dods, 2002; Kimmerer and Lake, 2001; Dey and Guyette, 2000; Clark and Royall, 1995; Gottesfeld, 1994; Lewis, 1988b; Reid, 1987; Arno, 1983; Lewis, 1983; Ferguson, 1979). However, the findings do not relate traditional burning to how Indigenous peoples currently perceive wildfire risk and how they are trying to mitigate wildfire risk to their communities, and there have been calls for more research in this area (Raish *et al.*, 2007; McFarlane, 2006; Spillman and Cottrell, 2004). Some recent studies have examined the contemporary human dimensions of wildfire in Indigenous communities by focusing on current risk perceptions and support for prescribed burning (Carroll *et al.*, 2010; Gonzalez-Caban *et al.*, 2007; Raish *et al.*, 2007; Winter and Cvetkovich, 2007; McDaniel *et al.*, 2005; Raish *et al.*, 2005; Carroll *et al.*, 2004; Monaghan, 2004; Spillman and Cottrell, 2004; Lewis, 1982). These studies, as well as their relation to the research presented in this study, are discussed in detail in the following paragraphs.

Two studies conducted in the US involved quantitative surveys of Indigenous participants as well as the general population. One study by Winter and Cvetkovich (2007) comparing trust of wildfire managers amongst different ethnic groups found that Native Americans were more concerned about wildfire than other ethnic groups and had a higher self-assessed level of knowledge of wildfire than other ethnic groups in the region. Native American participants were found to have the lowest trust in wildfire managers, and were split between whether some fires should be allowed to burn and only structures protected, or whether all fires should be extinguished. Another study was conducted with Native Americans in Montana on their willingness-to-pay for prescribed burning and mechanical fuel reduction compared to the general population (Gonzalez-Caban *et al.*, 2007). These researchers found that support for prescribed burning was similar between Native Americans and the general population, and the Native Americans supported mechanical fuel reduction programs at a higher level than the general population. The study presented in this dissertation will explore whether factors such as the high levels of wildfire knowledge, low trust in outside wildfire management, support for re-implementing traditional burning, and preference for mechanical fuel reduction influence mitigation preferences at Peavine Métis settlement.

Historical traditional burning practices in Indigenous communities have been found to influence support of the re-implementation of traditional burning practices (similar to prescribed burning) as a type of wildfire mitigation for communities. Indigenous peoples in Bolivia were found to be extremely knowledgeable about fire and the importance of fire, including traditional burning practices, even though their traditional burning practices had been banned by the government and their knowledge of fire devalued (McDaniel *et al.*, 2005). Participants supported re-implementing traditional burning practices (McDaniel *et al.*, 2005). Two studies in the Pacific Northwest (US) found that although traditional burning practices have changed, residents of Indigenous communities still understand the importance of traditional burning practices and feel that stopping Indigenous burning practices has led to increased wildfire risk (Carroll *et al.*, 2010; Carroll *et al.*, 2004). Indigenous peoples in the American southwest were found to have a strong desire to manage their own burning programs for economic benefits as well as involvement in management decisions about prescribed burning (Raish *et al.*, 2005). These studies show that Indigenous people in both Central and North America acknowledge the historical use of traditional burning practices and the importance of reinstating these practices to reduce wildfire risk. This dissertation will explore whether these findings are applicable to a Métis community in Canada (see Chapter 5 for discussion).

Research on Aboriginal perception of wildfire risk and mitigation preferences are also taking place outside North America. One qualitative study examined contemporary wildfire mitigation in two remote Aboriginal communities in Northern Australia. Monaghan's (2004) research focused on socio-political influences on fire hazard management. He found that wildfire mitigation was an important part of life for these Aboriginal people. Aboriginal participants regarded wildfire in the dry season as the main hazard in their region. In these communities, Aboriginal residents conducted various mitigation activities, such as firebreaks, fencing, and vegetation management, around their communities, outstations, and camping areas. Monaghan also found that Aboriginal residents were more accepting of wildfire risk and had more trust in the capacity of their community (including the Council, the police, and the state emergency services) to deal with wildfire than non-Aboriginal people in the community. Monaghan found that the socio-political context of each community, particularly the presence of local kinship networks, increased the development and implementation of wildfire risk management. Most community members in both communities felt that intervention from outside agencies was not required for wildfire management as most people felt they already deal with the issue adequately in their community. This study will examine similar themes in a Canadian context, using a qualitative case study to help explain why residents of Indigenous communities appear to support wildfire mitigation implemented in their communities by their own leadership.

In Canada, research was conducted in Northern Alberta on Aboriginal people and wildfire in the 1970s, using qualitative methods to interview residents about traditional burning practices (Lewis, 1988b; Lewis, 1983; Lewis, 1982; Lewis, 1980; Ferguson, 1979; Lewis, 1978b; Lewis, 1977). Participants were primarily First Nations peoples, as

well as a few Métis. Although the study did not focus directly on wildfire mitigation, Lewis (1988b; 1988a; 1982; 1978b; 1977) found that Aboriginal peoples still wanted to use traditional burning practices around their communities in the spring to mitigate future wildfire risk in the more dangerous summer months; however this practice was illegal due to government fire suppression policy. This study will examine whether traditional burning practices were used by the Métis of Peavine and how traditional burning experience may influence risk perceptions and mitigation preferences.

None of these studies have examined the implementation of residential mitigation activities or support for a contemporary local community-level wildfire mitigation plan in an Aboriginal community. Wildfire research has not focused on Aboriginal communities in Canada and how social and cultural factors influence risk perception and mitigation preferences at both the residential and community level. The research presented in this dissertation contributes to research in the area of human dimensions of wildfire. Specifically, this study documents contemporary wildfire risk perceptions and factors that influence these perspectives in an Aboriginal community. This research also examines contemporary wildfire mitigation at both the residential and community-level within a Métis settlement, and explores how characteristics of an Aboriginal community influence mitigation preferences.

2.2.3 Wildfire Mitigation

In the United States, Cohen (2001; 2000) found that fuel management immediately around the home reduces the potential for home ignition from both direct heat and embers/firebrands (pieces of burning wood that can be carried by winds). In Cohen's research, fuel management beyond that zone made little difference as to whether or not a home burned (Cohen, 2000; Cohen, 1999). Cohen's research findings have influenced the development of mitigation programs in the US and elsewhere, although it is unknown whether fuel management around the home will reduce wildfire risk in all ecological settings (Moseley, 2007). In addition, community-level mitigation programs still appear to be a priority in many areas. This could be because this is the area that fire managers are actually able to make changes to, unlike private properties where the owner decides whether or not they are willing to implement mitigation activities.

In Alberta, a FireSmart manual was developed in 1999 by Partners in Protection, a group of provincial stakeholders. The manual contains mitigation activities that are recommended to residents and communities in the wildland-urban interface (Partners in Protection, 2007). Wildfire mitigation activities can take place either at the community-level or individual property level. Wildfire mitigation activities that can be undertaken by a resident on their property are referred to in this thesis as residential mitigation. The FireSmart manual identifies three priority zones for wildfire mitigation (Figure 2-2) (Partners in Protection, 2003a; Partners in Protection, 2003b). In Priority Zone 1 (a 10 metre radius from the home), residents are advised to remove flammable vegetation (such as pine, spruce, and juniper), deadfall, or woodpiles from this area and to keep the grass mowed and watered. In Priority Zone 2 (10 to 30 metre radius from the home), residents

are advised to remove highly flammable trees and debris that would support a crowning fire and make sure that remaining trees do not touch. In Priority Zone 3 (30 to 100 metre radius from the home), residents are advised to thin or remove shrubs and trees and retain fire-resistant trees. Structural changes are also recommended, and include the use of fire resistant building materials, such as roofing material, exterior walls, soffits, eaves, doors, and windows.

Wildfire mitigation activities can be conducted on public lands, and are referred to as community mitigation. The FireSmart manual (Partners in Protection, 2003a) incorporates recommendations for communities to undertake in order to reduce wildfire risks, with a focus on vegetation management, structural options, and infrastructure. Vegetation management involves removing, reducing, or converting vegetation, thereby reducing the fuel-load. Fire breaks are included in vegetation management. One disadvantage of vegetation management as a wildfire mitigation activity is that it must be repeated, sometimes every few years, to maintain its effectiveness. Vegetation management plans will be unique to each community. Structural mitigation includes building or renovating public structures with less flammable materials such as fire-resistant siding or metal roofing. Structural mitigation activities need to be performed much less frequently than vegetation management. FireSmart infrastructure includes the network of roadways, open spaces, water supply, and utilities that are in a community for fighting fire.

In Canada, a study has been conducted to test the effectiveness of community-level FireSmart recommendations, such as thinning, on fire behaviour in the boreal forest (Schroeder, 2010). This research found that thinning was effective in causing a crown fire to change into a slower-moving surface fire, but provided no reduction in risk from spot fires started by aerial embers (Schroeder, 2010). Therefore, the authors recommended that thinning be considered a “risk reduction technique, not a fire prevention technique” (Schroeder, 2010, p.11). Further research is being conducted in this area, including evaluating the effectiveness of the FireSmart priority zones in protecting structures (Walkinshaw and Schroeder, in preparation).

The Alberta provincial government has adopted the term ‘FireSmart’ into their own discourse about wildfire mitigation. The provincial government encourages each municipality at high risk of wildfire to complete a Community FireSmart Plan consisting of a FireSmart WUI Plan and a FireSmart Community Zone Plan (Flanagan, 2008; Alberta Sustainable Resource Development, 2005). A FireSmart WUI Plan incorporates the area in a community that falls within the wildland-urban interface¹³ (Alberta Sustainable Resource Development, 2005) and focuses on wildfire mitigation measures such as fuel management, education, legislation, development and planning (Flanagan, 2008). A FireSmart Community Zone Plan incorporates wildfire mitigation measures in a variable 10 kilometer radius around the WUI zone (Flanagan, 2008; Alberta Sustainable

¹³ The Wildland - Urban Interface (WUI) refers to “an area where various structures (most notably private homes) and other human developments meet or are intermingled with forest and other vegetative fuel types (Chisholm Fire Review Committee, 2001), p. 8).

Resource Development, 2005). FireSmart grants are also offered to municipalities and Métis Settlements to develop their own wildfire mitigation programs and implement wildfire mitigation activities.

In Alberta, local governments are responsible for implementing the community-level wildfire mitigation activities (with help from SRD) on public land within their boundaries, the provincial government is responsible for mitigation on provincial government land, and homeowners are responsible for mitigation on their own private property. However in Métis settlements, land and homes are owned communally and not by individual residents. Therefore, responsibility for wildfire mitigation on individual properties is not clear. This is particularly important at Peavine, as residential mitigation activities (such as vegetation management around the home) are commonly initiated and implemented by the settlement (see Chapter 4). The same holds true for community-level mitigation activities. In non-Aboriginal communities, individuals are not able to conduct mitigation activities on public land that is managed by the government. However, due to the collective ownership at Peavine, individual members are free to perform certain mitigation activities on any area of the settlement. For example, a member could reduce high hazard trees bordering their property, but could not bulldoze a fireguard anywhere on the settlement without permission from the Settlement Council.

Therefore, some important distinctions must be made regarding mitigation activities as they apply to Peavine (Table 2.2). In this thesis, mitigation activities conducted on individual properties will be referred to as residential-level mitigation activities; however these activities may be conducted by individuals or the settlement. Mitigation activities conducted on public land upon which no member holds title will be referred to in this thesis as community-level mitigation. These activities may also be implemented by either individuals or the settlement. This study will address the complexity of wildfire mitigation in an Aboriginal community by exploring residential and community-level wildfire mitigation at Peavine Métis Settlement.

2.3 Conclusion

This chapter first presented a brief introduction to Métis history as it relates to this study. This is a crucial area to consider in regards to the research presented in this dissertation. The historical treatment of the Métis in Canada has led to a general mistrust from the Métis people towards any level of government. The formation of the Métis settlements in Alberta was intended to improve relations between the Métis and the provincial government; however distrust of the government still remains. Many Métis in Canada still feel their knowledge, traditions, and culture are not valued by government. The second section of this chapter explored wildfire hazard and history in Alberta. Research on the human dimensions of wildfire was also presented, including a focus on research with Indigenous communities, as this study explores the human dimensions of wildfire in a Canadian Aboriginal community. Finally, the development of wildfire mitigation strategies were discussed, as well as the current wildfire mitigation program in Alberta

called FireSmart and the complexities arising through application of FireSmart mitigation strategies to Aboriginal communities.

2.4 Tables and Figures

Table 2-1. Population and percentage of total population of Aboriginal Identities and Non-Aboriginals , Canada, 2006 Census (Statistics Canada, 2008)

Identity	Population	Percentage of Total Population
Aboriginal	1,172,790	3.8%
First Nations	698,025	2.2%
<i>Métis</i>	389,785	1.2%
Inuit	50,485	0.2%
Multiple and Other	34,500	0.1%
Non-Aboriginal Population	30,068,240	96.2%
Total	31,241,030	

Table 2-2. Differences in Mitigation Strategies between Métis and non-Aboriginal communities in Canada

Community	Residential Mitigation Activities		Community-level Mitigation Activities	
	Individuals	Community	Individuals	Community
Non-Aboriginal	Yes	No	No	Yes
Métis	Yes	Yes	Yes	Yes



Figure 2-1. Aboriginal peoples demonstrating a prairie fire start, 1903 (From the Provincial Archives of Alberta, Edmonton)

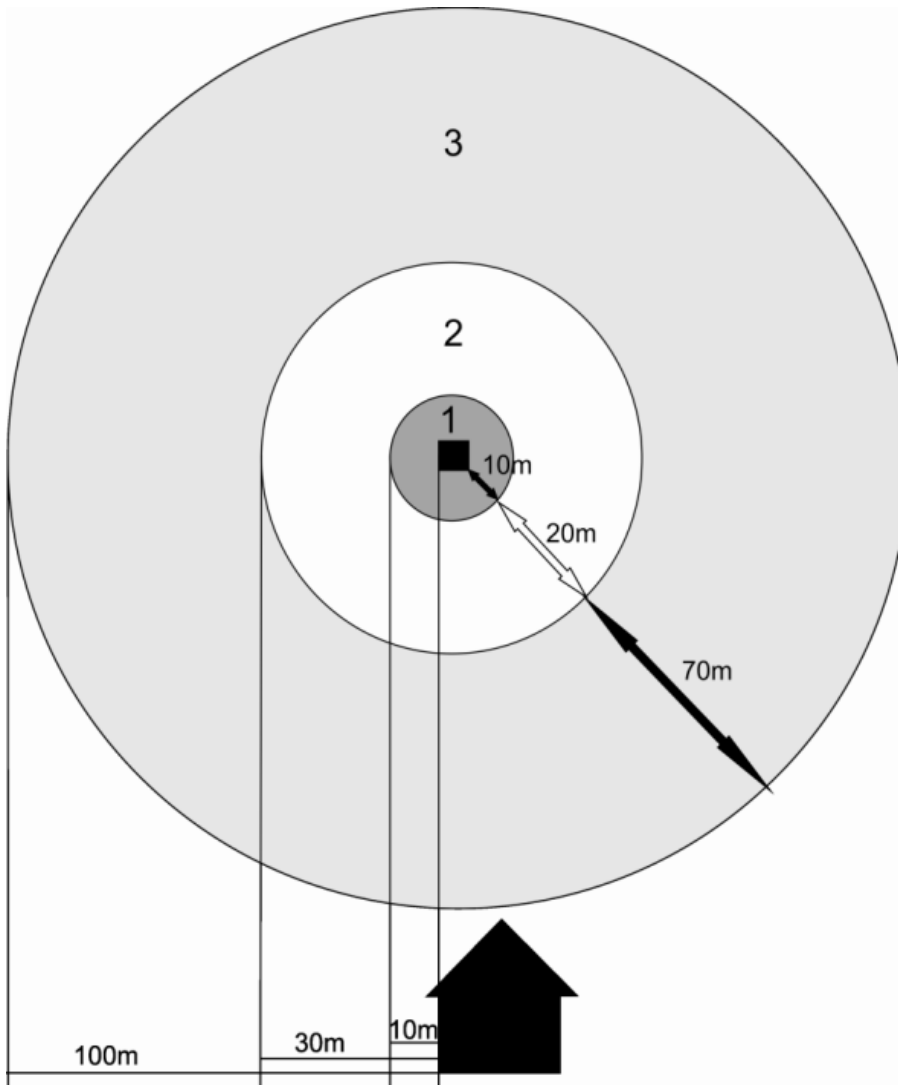


Figure 2-2. FireSmart Priority Zones (adapted from Partners in Protection, 2003a)

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CHAPTER 3: Methodology

This chapter describes the research approach, instruments of study, study limitations, ethical issues, and concerns of rigour. All letters, ethics approvals, interview and focus group guides, and coding frameworks can be found in the appendices of this dissertation.

3.1 Community-based Qualitative Research

Because the research area for this study is an Aboriginal community, care must be given to choosing the appropriate method of study. It is crucial to recognize that Euro-American approaches to gathering data may not be appropriate in their current form (Castleden *et al.*, 2008; Smith, 1999; Adamowicz *et al.*, 1998). Choosing an appropriate methodological approach is critical because it will influence which research methods are used and shape data analysis (Smith, 1999). Important is recognizing that research is an exercise of power where something is at stake for the community involved, not a distant academic exercise (Smith, 1999). A legacy of research is that many research programs are framed by thinking that the problems lie with the individual or Indigenous community rather than larger socioeconomic and political issues (Smith, 1999).

This study takes an ethnographic approach. Ethnography is the study of people and their culture using methods that involve long-term community engagement and observation (Tedlock, 2008; Atkinson and Hammersley, 2007). It involves using a naturalist approach by observing people in their everyday contexts, with relatively unstructured data collection methods (Tedlock, 2008; Atkinson and Hammersley, 2007). Typically, ethnography involves the study of only one case, due to the in depth nature of the research (Atkinson and Hammersley, 2007). The influence of a researcher using an ethnographic approach on data collection and analysis must be carefully considered and the researcher must be constantly reflexive (Atkinson and Hammersley, 2007). Also, ethnography must be approached with caution, particularly in research with Indigenous communities, because of its links to British colonization (Atkinson and Hammersley, 2007; Smith, 1999).

The research presented here is the result of a community-based research project. This approach was chosen to be able to involve the community in all stages of the research process and to ensure the research makes useful contributions to the community. Community-based research was also ideal because it places an emphasis on the creation of knowledge with the participation and contribution of those in the community (Herbert, 1996), and is consistent with the social constructionist and critical theory paradigms described in Chapter 1 (Poupart *et al.*, 2009; Davidson-Hunt and O'Flaherty, 2007; Huntington *et al.*, 2006; Israel *et al.*, 1998). A community-based approach also assumes that individuals can reflect on their own lives, create knowledge, have their own priorities and questions, and have skills and concerns that can contribute to the research process (Smith, 1999). Community-based research involves observing participants in their natural setting, which is important to an ethnographic approach (Atkinson and Hammersley, 2007). Community-based research was found to be challenging, especially in the time

constraints of a PhD program, however the benefits of using this research approach were numerous. An important criterion for community-based research is the individual suitability of the researcher to carry out this type of research. Some individuals may not have the patience, sensitivity, or interpersonal skills to work in this type of research program (Schnarch, 2004).

All methods used for this exploratory study were qualitative, which is the ideal methodology to use for research with Indigenous communities when using a postcolonial approach. There are a few reasons for this, all of which have to do with the recognition of Indigenous knowledge as equal to Euro-American knowledge. The first reason is that qualitative research examines the socially constructed nature of reality, as well as addressing the relationship between the researcher and the topic of study (Denzin and Lincoln, 2005). Secondly, a qualitative approach acknowledges that important knowledge is created by Indigenous people and that this knowledge is accepted as a valid interpretation of reality (Smith, 1999). Thirdly, qualitative methods involve taking an interpretive, naturalistic approach to the collection and analysis of data (Denzin and Lincoln, 2005). Fourthly, the aim of qualitative research is to make sense of peoples' experiences by focusing on ordinary events in a natural setting (Longhurst, 2009; Miles and Huberman, 1994). The telling of stories from the past and giving voice to injustices are important for postcolonial research (Smith, 1999). Finally, qualitative methods lend themselves to self-determination, where an Indigenous community has solo input into their destiny (UNPO, 2006; Smith, 1999).

Qualitative research has many strengths. One of the main benefits of using qualitative research in a community-based project is that data is collected in the study community, resulting in local groundedness and data richness (Miles and Huberman, 1994). Also, qualitative research allows for the data to be collected over an extended amount of time, meaning that changes that occurred during this time can be documented. Qualitative research gives leeway for researchers to be flexible with research design, which was appropriate for this study where the community was involved in research decisions. Qualitative methods are useful for attempting to understand complex behaviours, experiences, and opinions (Longhurst, 2009), such as in wildfire mitigation where a simple behaviour such as clearing vegetation around one's home is affected by complex factors.

3.2 Case Study

The research project involved a case study with Peavine Métis Settlement in the Lesser Slave region of Alberta. A case study was chosen because it is the preferred research strategy when “how” or “why” questions are being posed¹, when the focus is on a contemporary phenomenon, and when the investigator has little control over events (Yin,

¹ The main research objective is to “explore how community characteristics of Peavine Métis Settlement affect local residents' wildfire risk perceptions and mitigation preferences”

2003). The qualitative case study also involves the researcher spending extra time in the community, in contact with the participants and activities, and then reflecting on the meanings of what is going on (Stake, 2008). Whatever details of life a researcher is not able to see is found by interviewing participants or researching (Stake, 2008). In a qualitative case study, it is expected that a researcher will incorporate some of their views and meanings into the data and will exclude data they do not find important or relevant (Stake, 2008). Therefore, the need for reflexivity becomes important. A key consideration when conducting case studies is to consider generalizability of the results. Yin (2003) makes the important distinction that case studies are generalizable to theoretical propositions, but not to populations.

3.3 Fieldwork

The unit of analysis for this study is the individual in the community, because in Aboriginal communities the individual's identity is tied strongly to the community and their culture and therefore is difficult to separate. This is also an appropriate unit of analysis when conducting studies that examine culture (Woolcock, 2003). Semi-structured interviews, focus groups, and participant observation were the main instruments of study. The main goal of these methods is not to be representative but to understand how participants experience their lives and community (Valentine, 2005).

The influence of the researcher on the data is important to consider in qualitative research. It is crucial for the researcher to remain reflexive throughout the research process, constantly positioning themselves in the research process. The prologue of this thesis contains a detailed self-portrait, including how I was denied knowledge of my Métis heritage during my childhood, which probably had some effect on the research process. For example, I had to be careful not to romanticize the community even though I felt sympathy for the struggles they faced as a group of Métis people. Also, I was very interested in learning about Métis traditions and culture so I spent extra time in the community which another researcher may not have done. A researcher's ability to be reflexive may be damaged if the researcher allows themselves to fully integrate with the community (Jorgensen, 1989). A main concern would be that there is a likelihood for the researcher to 'go native' or less dramatically, to begin to sympathize and romanticize the results (Walsh, 2009; Bryman and Teevan, 2005; Cook, 2005; Jorgensen, 1989). I tried to limit this by always considering myself as an outsider in the community. Also, by being in the community for an extended period of time, I became aware of social and economic problems in the community.

3.3.1 Community Entry

The following criteria were used to select the chosen case study community:

1. Moderate to High Wildfire Risk
2. Homes in the Wildland-Urban Interface
3. Undertaking wildfire mitigation at the residential and community level
4. Strong interest in participating
5. Aboriginal culture

In early 2007, I met with government officials from both the Canadian Forest Service and Alberta Sustainable Resource Development in separate meetings to discuss potential study communities. As a result of these meetings, seven Aboriginal communities in north-western Alberta were identified that fulfilled three to five of the criteria above. After meeting with regional Alberta Sustainable Resource Development (SRD) employees in June 2007 to further discuss potential communities, this list was further shortened to three communities based on the recommendations of SRD employees. I then met with the forestry coordinators in each of the three potential case study communities (also in June 2007) to tour each community and examine the wildfire risk and mitigation measures implemented, as well as to discuss their interest in participating in the research study. Using information from these meetings and the above criteria, I selected the Peavine Métis Settlement as the most appropriate community to conduct the study in as the community filled all of the above criteria, including having varying levels of wildfire risk, a community level wildfire mitigation program, and were very keen to participate in the study.

Over the course of a year, I met regularly with the forestry coordinator from Peavine to discuss the development of the study and this contact acted as a gate-keeper (Walsh, 2009; Valentine, 2005). He arranged for me to attend a Council meeting to request Council approval to conduct the study in the community. I attended a Council meeting in May 2008 to present my initial research proposal (Appendix 10), and the community formally agreed to participate in the study. Letters of confirmation of involvement and support for the research project were subsequently obtained from the Settlement Council (Appendices 9 & 11).

I then began to develop a research protocol with the Council, as is recommended by community-based researchers (Davidson-Hunt and O'Flaherty, 2007). This was a challenging process because the Council was not familiar with academic research issues such as ownership of data and authorship. In the end, a formal research protocol was not developed, because the Council was not interested in a formal arrangement and instead trusted me to 'do the right thing'. In order to carry out a community-based research project, a community advisory committee was established to provide community input into the study². The settlement advisory committee consisted of two settlement employees and one community Elder. The main activities of the community advisory group included discussing the research, recommending potential interview participants, and answering my questions about the community. One of the community advisory group members came to the interviews with community Elders and helped to translate if the Elder was not able to understand the question³.

3.3.2 Interviews

Interviews were conducted with settlement members over a two year period. Purposive sampling was used to recruit participants to make sure all age groups as well as differing

² Due to funding constraints, it was not possible to hire community research assistants.

³ The majority of adults at Peavine are bilingual, speaking Cree and English.

opinions were represented. In most circumstances, potential participants were suggested by my community advisory group and I then contacted this person by phone. If they agreed to participate, we would decide on a location and time for the interview to take place. After the interview, many participants recommended someone else for me to interview; due to the purposive sampling strategy, some of these recommendations were followed up on and others were not dependent on the current sample.

Interviews were conducted in a variety of locations around the settlement including the settlement office, Peavine Enterprises office, the recreation center, and participants' homes. The choice of the interview location was left up to the participant. It was important to select a location that is comfortable to the participant to create a relaxed environment for the interview, which in most cases was the participant's own home (Longhurst, 2009; Seidman, 2005; Valentine, 2005). At the beginning of each interview, participants were given an information sheet and asked to sign a consent form (Appendices 12 & 14). All interviews were recorded with a digital recorder. This was chosen so I could focus on the interview and not on taking notes (Longhurst, 2009). Many participants felt uncomfortable with tape recording at first, but seemed to forget about the recorder as the interview progressed.

These interviews can be broken down into two groups:

Key Informants - In October 2008, a week was spent in the community interviewing key informants (n=5), which included the forestry coordinator, the settlement historian, and a sample of community Elders. In January 2009, an interview was conducted with the settlement chairman. Therefore, a total of 6 key informants were interviewed. The interview guide can be found in Appendix 15. The initial data analysis from these interviews helped me to develop the interview guide for the next round of interviews.

Community - In June 2009, interviews were conducted with community members (n=23) during another week long stay in the community. Eight weeks were spent in the community from September to December 2009. During this period, more interviews were conducted with community members (n=9). Therefore, a total of 32 community members were interviewed for this study. The interview guide can be found in Appendix 17.

The interviews were semi-structured. The themes to be covered during the interview were identified ahead of time, but the interview style, wording of questions, and probes were developed during the interview (Kirby *et al.*, 2006; Valentine, 2005). This style of interviewing allows participants to raise unanticipated issues they felt were important (Longhurst, 2009; Valentine, 2005). I also shared my relevant life experiences with the participants. This has become a widely accepted research practice (Valentine, 2005). I used this technique to make participants comfortable during the interviews. However, I took care not to influence the participants' responses or make them feel uncomfortable to express their own opinion. I felt that this created a relaxed environment where most participants talked for much longer than they would have in a formal interview setting.

The interviews were broken down into two parts. In the first section, we discussed the participant's history and memories of the settlement, pros and cons of living at Peavine, and involvement in their community. In the second section of the interview, we discussed past wildfires on the settlement, firefighting history, wildfire risk perception, wildfire mitigation activities, and wildfire response. Interviewing was a good way to understand the beliefs, attitudes, and expectations of interview participants, and to understand the thinking that shaped their worldviews (Krippendorff, 2004). This is because participants were able to describe and explain their lives and experiences in their own words (Seidman, 2005; Valentine, 2005). Interviews also allowed for issues surrounding wildfire to be looked at in the context of everyday life, and allow for the analysis of deeper issues, such as values, that affect wildfire risk perception and mitigation decisions (Baxter & Eyles, 1999).

Interviews ranged from 15 minutes to an hour and a half. A breakdown of the demographics of the participants can be found in Table 3-1. The interviews with older residents tended to be longer than those with younger participants. Elders in the community had a lot to say about all the topics that were discussed. The two 18 year-old participants had the shortest interviews, as they had limited opinions on the interview topics and were very reserved, despite my best efforts at encouraging them to share their thoughts. Although it was originally planned for interviews to have only one participant, seven participants felt more comfortable to be interviewed with a friend. There were also situations where someone else came into the room and wanted to be included in the interview as well. Both these situations are examples of 'spontaneous recruitment' (Peek and Fothergill, 2009).

It is important to consider issues of power when using interviewing as a research method (Longhurst, 2009; Seidman, 2005; Valentine, 2005). Some participants were intimidated at first by the interview process. Many in the community had never been to secondary school and expressed fears that they would have nothing to contribute that I did not already know. I tried to balance these power issues by sharing my relevant life experiences and ideas with the participants (as described above), as well as being actively involved in the community (see Section 3.3.4). During my time in the community, I found that the issue of power seemed to diminish significantly.

After each group of interviews were transcribed, I returned to meet with each participant. Each participant was given their transcript and a summary of my initial analysis of the interview that was appended to the front of the transcript (Appendix 18). Participants were asked to review their transcripts and comment on anything they would like to elaborate on or have taken out (Figure 3-1). This step was needed to verify that the transcriptions were accurate and that the participants agreed with my preliminary analysis of their interview data (Miles & Huberman, 1994). Most participants were happy with their summary and transcripts; however two participants asked me to remove portions on the interview, which I did. One participant wanted to add to his transcript, so I conducted another interview with him. Interviewing continued until theoretical saturation was reached (Kirby *et al.*, 2006). It was at this point that I began to be able to predict what the

participant would answer to my questions based on their age, what family they were from in the community, and their firefighting experience. Initial data analysis occurred throughout the entire interview process, which was over a one year period. Main themes recurring in the interviews were identified to help structure future interviews and the focus group questions.

There are several limitations to using interviews that have been identified in the literature. One is that the researcher generally only has contact with the participant during the interview (Bryman and Teevan, 2005). Interviewing puts the participant in an unnatural environment and disrupts the natural events of their lives (Bryman and Teevan, 2005). These are both limitations because they may not allow the researcher to see the 'full' picture. These limitations were overcome in my research by using focus groups and participant observation in addition to interviews to develop a broader picture of the participant's lives and their community. The interview is loaded with issues of power, such as who controls the direction of the interview and the topics, who controls the results, and who benefits from the analysis (Longhurst, 2009; Seidman, 2005). This was minimized through methods described above, such as sharing experiences and ideas with the participants, meeting with participants outside the interview, and spending a substantial amount of time in the community.

3.3.3 Focus Groups

Two focus groups were conducted in the community (Figure 3-2). The purpose of these focus groups was to examine the influence of firefighting experience on wildfire risk perception and mitigation, to verify data collected in the interviews, and to see if any new concepts emerged when new participants were interviewed in a group setting. Participants were recruited over a month-long period using purposive sampling strategies including word of mouth, phone calls, and advertising in the settlement office. Potential participants were provided with an information sheet (Appendix 20). Focus groups were held over the supper hour in the recreation center, and food was provided. In choosing a location for focus groups, it was very important to recognize the power of space and place (Kamberelis and Dimitriadis, 2005). The recreation center location was chosen so that the space would be familiar and accessible to all participants. It is a building that is owned by the settlement, and was foreign to myself as a researcher. I was only allowed entry into this building because of my relationship with the Council. Each participant was asked to sign a consent form (Appendix 20). Ground rules were laid for the focus group discussion, such as only one person was to speak at a time and that everyone would be given a chance to share. Topics covered in the focus groups included participants' fire experience including recruitment and training, their wildfire risk perceptions, residential wildfire mitigation activities, and their support (or lack of support) for wildfire mitigation in the community. Questions were open-ended and started out very general, and became more specific as the focus group progressed. I was interested in seeing if different perspectives emerged during the focus groups as opposed to interviewing, as participants may be reminded of events or experiences they would not have thought of during an interview (Peek and Fothergill, 2009; Kamberelis and Dimitriadis, 2005).

The first focus group included 4 participants, and lasted two and a half hours. The second focus group included 15 participants, and lasted one hour. Five of these participants had already completed an interview and wanted to attend a focus group. The reason for the increased turnout at the second focus group was word-of-mouth around the settlement, as many heard about the first focus group and wanted to come out to express their opinions at the second focus group. Three of the participants from the first focus group also attended the second, and five other participants took part in both the interview and a focus group. Therefore, there were a total of 16 focus group participants (n=16). The size and composition of the group was chosen based on the research goal (Peek and Fothergill, 2009), which was to identify community characteristics and values that affect wildfire risk perception, residential wildfire mitigation, and support for community-level mitigation. Participants in both groups varied in age, gender, and years of firefighting experience (Table 2-1). All participants were members of the settlement and were either former or current firefighters. All participants were known to one another, which was expected due to the size of the community. This can influence participants because they may not feel comfortable to share their opinion because they know others in the group (Peek and Fothergill, 2009). However, in a small isolated Aboriginal community, it is impossible not to have participants know each other. Also, because all focus group participants had firefighting experience, it was useful to explore how this factor influenced wildfire risk perceptions, residential wildfire mitigation, and support for community-level mitigation.

Tables were arranged in large circle, so that all participants could hear and see each other. The main conversation was carried by the group members, and I only stepped in to prompt or guide the discussion. This is a benefit of using focus groups, as they address issues of power between the researcher and participants. The main interaction is a 'horizontal' interaction between participants, as opposed to an interview where the main interaction is a 'vertical' interaction between the researcher and the participant (Conradson, 2005; Kamberelis and Dimitriadis, 2005; Stewart and Shamdasani, 1990). This addresses the potential for the focus group moderator to influence the responses of participants (Stewart and Shamdasani, 1990). Some participants were initially reluctant to share in the large group discussion, so I asked each participant to share a favourite firefighting memory. This directed questioning helped to get everyone in the group involved in the discussion. Theoretical saturation was reached after the two focus groups, which is when I felt I had heard all the main views on the topics being discussed (Bryman and Teevan, 2005; Conradson, 2005).

Difficulties emerged in conducting the second focus group, due to the large number of participants. It was a concern that the large group interactions may bias participants' responses and that the views of some participants may not be heard (Peek and Fothergill, 2009; Bryman and Teevan, 2005; Conradson, 2005; Stewart and Shamdasani, 1990). It was also a concern that I as the moderator would have less control over participants in a large group setting (Peek and Fothergill, 2009; Bryman and Teevan, 2005). I was concerned that not every participant would be able to share as much as they wanted to, given the large number of participants (Peek and Fothergill, 2009). A few participants

tended to dominate most of the conversation, despite my best efforts as the moderator. This is often common in large focus groups (Peek and Fothergill, 2009). However, I found this dynamic interesting as the dominant participants in both focus groups tended to be Elders. This deference to let Elders speak as long as they want to by younger members of the focus group provided an interesting look at community values, which would not have been observed without the focus group setting.

I then transcribed all recorded focus group discussions. I kept a record in the transcripts not only of the text, but also details of interruptions, tone, and expressions during the group (Conradson, 2005).

3.3.4 Participant Observation

Participant observation was the third method used in this research study. Participant observation is a humanistic methodology that involves direct observation of participants' lives by the researcher and examining what people actually do, rather than what they say they do (Walsh, 2009; Jorgensen, 1989). In this study, it involved participating in the community by deliberately becoming involved in everyday activities and developing relationships with people, and observing the community by watching situations unfold (Cook, 2005). Participant observation is recommended for research questions, such as in this study, where little is known about the phenomenon in question, there are important differences between insiders and outsiders, and the study is exploratory or descriptive (Jorgensen, 1989). Participant observation was chosen because it is a useful method in Aboriginal communities because the participants are not exploited, manipulated, or controlled, they are simply observed (Jorgensen, 1989). Participant observation allowed me to add considerably to my data from the interviews and focus groups, as well as to verify if what was said by participants was actually what happened in the community. For example, I was able to visit participants' homes to verify if they had or had not conducted residential wildfire mitigation.

My relationship with the community began back in June 2007 and has continued to the present day (October 2010), which was expected as participant observation is extremely time consuming (Walsh, 2009). In total, I spent 12 weeks in Peavine during my research. During this time, I conducted interviews and focus groups, volunteered at the school, visited with community members, and worked out of an office in the settlement office building. Interactions took place between myself and members, including informal conversations which at times provided valuable data (Jorgensen, 1989). Although 12 weeks may not seem like a long time to conduct participant observation, Cook (2005) noted that participant observation does not have to involve living in a community for an extended amount of time.

The development of my relationship with Peavine is described in detail in Section 3.3.1. An important decision to make was whether my role in the community was overt or covert, and whether my research would be more participatory or more observational (Cook, 2005). My role in the community was overt. Everyone in the community knew me

as ‘Amy from the U of A’, as I was often introduced by my research advisory committee and friends in the community. Everyone came to quickly know that I was doing research on ‘wildfires’ and ‘firefighters’. It is generally recommended in the literature that during participant observation the researcher should simply observe the everyday interactions and relationships of participants. However it is rarely possible to remain uninvolved in the participants’ lives (Jorgensen, 1989). Originally, I wanted to maintain more of an observational position in the community; however, this quickly became unrealistic. I became heavily involved in the community, including attending community events, volunteering at the school in the Grade 5 classroom for an hour most afternoons, and going to lunch every day at various Elders’ homes. I spent a large amount of time attending community events, visiting with residents, and driving people to town and back to establish relationships with community members. However, I have to add that I enjoyed these experiences very much. I have to admit that there were days I found exhausting trying to please everyone. However, I also am an outgoing person and enjoyed being able to develop relationships with Peavine residents.

I made notes of important data at the end of the day. This can be controversial, as some argue that notes should be written during observation so the experience remains fresh. However I felt that constantly recording in a notebook was disruptive in participant observation (Walsh, 2009). Therefore, I wrote down my observations at the end of the day when I was alone.

It is said that knowing when to stop is not a straightforward matter in participant observation (Bryman and Teevan, 2005). I concluded my participant observation in the community when I felt that I had reached theoretical saturation. If I had spent any more time in the community, it would have been because of that fact that I wanted to, not because it was necessary for my research.

3.4 Data Analysis

Data analysis in this study consisted of three parallel activities: data reduction, data display, and conclusion drawing and verification (Miles and Huberman, 1994). Data analysis was an ongoing process through data collection, as initial data analysis was conducted during the course of fieldwork and used to develop further areas of research. The program NVivo was used to assist with coding. All interviews and focus group tapes were transcribed by myself, which enabled me to become very familiar with the data (Crang, 2005). Coding was the first step in analyzing the data, and occurred throughout the research process. Coding is an essential process in qualitative data analysis because it is about conceptualizing the data, raising questions, providing answers about the relationships within the data, as well as discovering new data (Strauss, 1987). Codes refer to “tags or labels for assigning units of meaning to the descriptive or inferential information compiled during a study...codes are usually attached to ‘chunks’ of varying size” (Miles and Huberman, 1994, p. 56).

The interview data was first open-coded for main themes, based on the research goal and objectives (Appendix 21). After the completion of data collection, the coding framework was further revised to address more specific themes, as well as relationships between themes and participants (Appendix 22). However, the initial coding framework was kept so that the data could be retrieved at a more general level, if needed (Coffey and Atkinson, 1996). The majority of codes were developed from the data, however a few were informed by existing literature (those relating to social capital such as social networks and dependency). Coding went beyond simply coding the data by separating the data into separate categories (data *reduction*) to thinking creatively about the data to generate new questions and levels of interpretation (data *complication*) (Coffey and Atkinson, 1996).

It is important to note that coding is not the same as interpreting (Crang, 2005). The move from coding to interpretation generally follows three steps identified by Coffey and Atkinson (1996): (1) the coded data needs to be retrieved; (2) the codes and categories must be played with and explored; and (3) the researcher should begin to look for pattern, themes, and regularities, as well as contrasts and irregularities. Although it is important for themes, commonalities, and patterns in the data, it is equally as important to look for themes that run counter to those that are emerging (Longhurst, 2009). I began to look for relationships between age, gender, time lived on the settlement, involvement in the community, reliance on the settlement, and experience in wildfires (such as personal experiences with wildfire, experience traditional burning practices, and experience in firefighting as employment). Matrices were developed to help think through the relationships in the data (Crang, 2005).

Analysis of the focus group data differed from the interview data. Some limitations about focus groups include that data is more difficult to analyze than interview data (Bryman and Teevan, 2005) and there is a limit of generalization of focus group data (Stewart and Shamdasani, 1990). In the focus group data, I was interested not only in the textual data, but also in the interactions between participants. For example, I was interested to examine the relationship between younger residents and Elders, and to see if this relationship influenced risk perception and mitigation activities. The following questions were considered when examining focus group data: (1) Are the participants in agreement?; (2) Do their views conflict?; (3) In what ways?; and (4) Is there any significant connection between the types of people and their points of view? (Conradson, 2005). Focus group transcripts were coded using the same coding framework as the interviews.

3.5 Dissemination of Results

The research results were disseminated via community presentations, presentations at academic conferences, and publications. Care was taken to ensure the research results were disseminated in culturally appropriate ways (Smith, 1999). After completing my fieldwork and my initial data analysis, I returned to Peavine for three separate trips, where I spoke informally to the participants and interested community members and asked for their comments and input on my initial results. For example, I asked some

participants if they agreed with my finding that they had high levels of trust in the forestry coordinator. I then attended one international and one national conference, where I presented the study results to audiences of wildfire social science researchers & managers and human geography researchers & graduate students, respectively. Although no one from the community was able to join me at these conferences, the Council prepared a video introducing their settlement and the wildfire risk which was played at each conference. I then returned to the community in September 2010, where I gave each participant a letter which contained a summary of the study results (Appendix 25). I helped to organize a school dance where the same brochures were also available for interested community members to pick up. A poster was placed in the settlement office which discussed the study results. I met with the majority of participants individually and showed them a copy of the initial draft of my thesis, with their comments highlighted so they could see how the information they gave me fit into my analysis (Appendix 24). A copy of this thesis will be given to Peavine Métis Settlement and the Métis Settlement General Council. Historical stories shared by participants during my interviews will be compiled into a story book that was given to Peavine Métis Settlement. Three articles from this thesis will be submitted to international journals to further disseminate the results to academic audiences, and copies will be given to Sustainable Resource Development and the Canadian Forest Service.

3.6 Study Limitations

Unfortunately, all research designs have limitations, including this study. The use of a case study research design presents several limitations. One limitation mentioned previously is that the results from a case study are not generalizable to other cases (Stake, 2008; Bryman and Teevan, 2005; Yin, 2003). However, case studies are generalizable to theoretical proposition (Yin, 2003) such as how certain types of wildfire experience influence risk perception and mitigation preferences. A second limitation is that case studies, particularly when using qualitative methods, tend to rely on subjective data (Stake, 2008). For example, what someone tells you in an interview may not be true. This risk was minimized through the use of multiple methods of data collection, including interviews, focus groups, and participant observation, which allowed for verification of data. However, there are numerous benefits to case study research that were applicable to this study. Conducting a case study allowed me to be involved in the community for 3 years and to examine how the dynamics of the community influenced individual members (Yin, 2003; Fitchen *et al.*, 1987). This was critical in analyzing the influence of culture in the community on wildfire risk perception and mitigation preferences. The use of multiple qualitative instruments of study, such as interviews, focus groups, and participant observation, was beneficial because it allowed me to verify that data obtained in the interviews and focus groups were in accordance with what I observed in the community (Yin, 2003).

Qualitative research methods can also present limitations. Qualitative methods, particularly interviewing, are charged with issues of power (Longhurst, 2009; Seidman, 2005; Valentine, 2005). Other critiques include that the results are often common sense

(Denzin and Lincoln, 2005) and that results can lack rigour (Silverman, 2006; Baxter and Eyles, 1999). The potential limitations of qualitative research were addressed throughout the research process. Techniques that were used to ensure validity of the research results included prolonged community involvement, involvement of a community research advisory group, triangulation, peer debriefing, and member-checking (Stake, 2008; Denzin and Lincoln, 1998; Baxter and Eyles, 1997; Lincoln and Guba, 1985).

There are various factors that affect the willingness of Aboriginal peoples to participate in interviews and focus groups (Smith, 1999), which might have been a limitation of my study as it may have biased the results as only participants interested in the study topic may have agreed to participate. Many participants were nervous about being tape-recorded or participating in the interviews by themselves. I attempted to reassure participants by sharing my ancestry with the participants, meeting with participants outside the interview, allowing participants to include a family member or friend in the interview, and spending a substantial amount of time in the community. In interviews and focus groups, the researcher may not see the 'full' picture of what is happening in the community, as participants may feel pressured to answer questions a certain way (Bryman and Teevan, 2005). These limitations were overcome in my research by using multiple qualitative instruments, including participant observation, to develop a broader picture of the participant's lives and their community.

A further limitation is that a few community members, particularly Elders, spoke fluent Cree but only broken English. Because I do not speak Cree, it would have been possible to overlook these community members as interview or focus group participants. To overcome this problem, a member of the research advisory group came with me to interviews where the advisory group thought those participants may have a hard time understanding questions. However, these interviews were much more difficult to conduct than other interviews due to the time taken for translation and the difficulty in translating some English words into Cree. Therefore, some community members who only spoke Cree may have been excluded from participating in an interview or a focus group. It is likely that these community members would have been Elders who had more experience with traditional burning practices.

A final limitation of this study is that it does have temporal and spatial bounds. Data collected produces a 'snapshot in time', rather than explaining how wildfire risk perception and mitigation have evolved over time on the settlement. The study is spatially-bound, as only members who currently live on the settlement were included in the study. However, there are members who reside in other communities and still have Métis title to land and property on the settlement who were not included in the study.

3.7 Ethical Issues

Ethical issues are very important to consider when conducting research with Aboriginal communities, due to a history of misappropriation of knowledge and unethical research practices conducted by community outsiders (Poupart *et al.*, 2009; Davidson-Hunt and

O'Flaherty, 2007; Schnarch, 2004; Smith, 1999; Herbert, 1996). I aimed to follow the CIHR Guidelines for Health Research Involving Aboriginal People (2007) and the Ownership, Control, Access and Possession (OCAP) guidelines developed by the National Aboriginal Health Organization (Schnarch, 2004). These guidelines include the following recommendations: (1) the researcher should develop an understanding and respect for the Aboriginal worldview; (2) a community should control the conduct of the research and the approval process of research conducted in the community; (3) communities should be given the option of being involved in a participatory-research approach; (4) the researcher should consult the community leaders to obtain their consent to the research before approaching participants; (5) an agreement should be negotiated that spells out the research relationship between the community and the researcher; (6) expectations regarding intellectual property rights of all involved parties should be made clear in the research agreement; (7) the researcher should support the education and training of community members in research methods and ethics; (8) the researcher should ensure there is adequate communication with the community throughout the entire research process; (9) the community should have an opportunity to review the conclusions drawn from the data; (10) the community should be able to decide how its contributions are recognized; (11) community members may participate in the dissemination of results; (12) seek advice and support from community Elders and leaders, and (13) the research should benefit not only the researcher, but the community as well.

The application of these ethical guidelines to my research was explained in detail in the preceding sections; however, I will give a brief summary here. An extended period of time was spent in the community to develop a relationship with community members and to gain an understanding of the worldview of the Métis of Peavine. Consent was gained from the Settlement Council before the study began, and a very general research agreement was developed, which included letters of confirmation from the Peavine Settlement Council of involvement and support for the research project. Intellectual property rights were discussed with the council; however their inexperience with the research process made it difficult for the council to make decisions about intellectual property rights such as data ownership and authorship. As stated above, they trusted me to 'do the right thing'. I relied on my community advisory group and my relationships with Council members to talk about intellectual property rights throughout the research process. Advice and support was sought from council members and Elders during the initial key informant interviews.

The community advisory group assisted in providing advice and feedback throughout the study. For example, I discussed initial findings individually with each member of the community advisory group and each gave their opinions on my initial conclusions. Community members were given two opportunities to view my initial interpretations of their interview data, first individually with their transcripts and my summary, and then at a final meeting where they were shown a final draft of the thesis where the context of their quotes was pointed out to each participant. A final community meeting will also be held upon conclusion of my PhD where settlement members will be able to come and

listen to a presentation of the study results. Cultural protocols and values of the Métis people were respected throughout this research (Smith, 1999), such as allowing Elders as much time as they needed to speak without interruption and maintaining relationships with participants after data collection was completed.

As well as these specific guidelines, the Tri-Council Ethical Guidelines were followed. Ethics approval was obtained from the Arts, Science, and Law Research Ethics Board at the University of Alberta (Appendices 6, 10, 17 & 21). Prior to the start of interviews or focus groups, participants were presented with an information sheet discussing the research project. Voluntariness of participation and confidentiality of data was also explained. Participants were informed the interviews would be tape-recorded with their consent, and the tapes and subsequent transcripts will be stored in a secure location. Participants were required to sign a consent form, agreeing to participate in the study. The consent form indicated that participants were free to withdraw from the study at any time and if they did their data would not be used. The consent form also stated that data collected in the interviews and focus groups would be used as data in my thesis.

3.8 Reliability and Validity

Baxter and Eyles (1997) suggest four criteria for establishing rigour in qualitative studies. They are: (1) *credibility* – did what I report actually happen? (from Lincoln and Guba, 1985); (2) *transferability* – can the findings be transferred?; (3) *dependability* – would another researcher find what I did? and (4) *confirmability* – To what extent did I influence the research process and interpretations? (Lincoln and Guba, 1985). For each of these criteria, there are strategies that can be used to ensure rigour. The strategies that I used in this study are described below.

Purposeful sampling – This type of sampling is most often used by qualitative researchers, particularly those wanting to find information-rich cases (Baxter and Eyles, 1997). Purposeful sampling was used in this study. First, key informants were selected in the community on advice from the community research advisory group. After this stage of the research was completed, interview participants were selected based on recommendations from the community advisory group, and fellow participants (snowball sampling). Focus group participants were selected from a group of former and current firefighters from the community based on recommendations from the community advisory group. The use of purposeful sampling increases credibility in the study because participants were knowledgeable on the research subject and were chosen to represent various groups in the community.

Prolonged engagement – Prolonged engagement involves spending an extended amount of time in the community in order to build relationships with the respondents, to witness and learn the culture of the community, and to keep an eye out for possible misinformation (Baxter and Eyles, 1997; Lincoln and Guba, 1985). I spent three years involved in the community and two and a half months actively participating in daily life. This prolonged engagement helped me to collect data and helps to increase the credibility

of the interview and focus group data, because I was able to verify through participant observation information that I had received in interviews and focus groups. Also, new data emerged during participant observation that I would not have been privy to if I had only spent a short time involved with the community.

Persistent observation – Persistent observation involves focusing on data collection that is relevant to the research questions being asked (Baxter and Eyles, 1997). During my time in the community, observing the social capital in the community was important to exploring the community characteristics that are influencing wildfire risk perception and mitigation. Therefore, I attended all the community events and school activities where this was likely to be displayed. The use of fire in the community was also important, so I went to observe brush burning in the community.

Triangulation – Triangulation is an important technique for increasing rigour. The use of triangulation indicates an attempt to view the phenomenon from various perspectives, providing richer and more in-depth data by verifying the repeatability of an interpretation or observation (Stake, 2008; Denzin and Lincoln, 2005). If the findings are similar, credibility is strengthened (Baxter and Eyles, 1997). Baxter and Eyles (1997) refer to different types of triangulation recommended by Denzin (1978). The first is *source triangulation*, which is when multiple sources from the data are used to corroborate the interpretation. I reported multiple quotations from several different sources to support my interpretations of the data. The second is *method triangulation*, when two or more methods are used and data from these various methods come together to support the same interpretations. I satisfied this criterion by using interviews, focus groups, and participant observation for data collection. The third is *investigator triangulation*. This involves having multiple investigators researching a phenomenon and comparing results. This was satisfied through the relationship with my supervisor, where we were both studying relatively similar phenomenon (wildfire risk perception and mitigation) although in different settings (Aboriginal versus Non-Aboriginal communities), and I discussed my results and interpretations with her throughout my research. I also discussed my research annually with my supervisory committee, which consisted of four experienced researchers.

Peer Debriefing – Peer debriefing involves sharing data and interpretations with a colleague to see if they agree or disagree (Baxter and Eyles, 1997). Check-coding was applied when my supervisor, a fellow graduate student, and I coded three interviews separately at the beginning of the second round of coding. We used the intercoder reliability formula recommended by Miles and Huberman (1994) according to the following formula: $\text{reliability} = (\text{number of agreements}) / (\text{total number of agreements} + \text{disagreements})$. We coded the first transcript separately, then came together to discuss our codes. On this first round we had 75% intercoder reliability. We then went and coded the second and third transcript, and when we came together we discovered we had 95% intercoder reliability.

Member checking – Member checking involves checking the original data and interpretations with research participants to make sure that their opinions and meanings were captured correctly (Baxter and Eyles, 1997). As described in Section 3.3.2, after conducting each interview, I returned to meet with each participant and gave them their transcript to review as well as a copy of my initial interpretations from the interview. Some participants asked me to remove controversial statements from their interview transcripts, which I did. Others wanted to add more information. The majority of participants felt happy with their transcripts and my initial interpretations. During a community visit in October 2010, I also showed participants my draft thesis chapters with their own quotes highlighted, allowing each participant to see how their comments fit into my analysis (Baxter and Eyles, 1997; Porteous, 1988).

Inquiry audit – The inquiry audit is conducted through the entire research process and involves an auditor looking at how every decision is made in the research project. The auditor must “maintain checks on the status of the research to ensure appropriate decisions are made along the way...and be someone intimately familiar with qualitative research and/or the topic area” (Baxter and Eyles, 1997, p.517). Baxter and Eyles (1997) mention that the graduate student – supervisor relationship is a convenient and implicit form of an auditee-auditor research relationship. I therefore satisfied this criterion through my relationship with my supervisor, who I discussed all of my research decisions with. She either agreed with my decisions or we discussed other options.

Autobiography – An autobiography of the researcher is important because it gives insight into how their biases, motivations, and interests shaped the research process, most specifically data collection and interpretation (Baxter and Eyles, 1997). I have included an autobiography of myself at the beginning of my thesis, to give insight into myself as a person and researcher. The research process aimed for reflexivity, as I was constantly aware of my positionality in regards to the project (Walsh, 2009; Kirby *et al.*, 2006). Positionality is used to describe a person’s position in a complex world, with political, economic, cultural, social, educational, sexual, racial and personal influences influencing the researcher’s worldview (Longhurst, 2009; Walsh, 2009). Reflexivity involves reflecting on one’s positionality and how it affects the research (Longhurst, 2009).

3.9 Summary

This chapter presented the methodology used for this study. The reasoning behind choosing to conduct the research using a qualitative, community-based case study was presented. Fieldwork was described in detail, including community entry, interviews, focus groups, and participant observation. The strengths and weaknesses of the various data collection methods were presented. Data analysis and dissemination of research results were also explained. To conclude, the ethical issues faced in the study and the strategies used for ensuring reliability and validity of the study were explored.

3.10 Tables & Figures

Table 3-1. Demographics of Participants

	Number of Participants	
	Interviews	Focus Groups
Age		
<i>18-29</i>	8	1
<i>30-39</i>	5	
<i>40-49</i>	12	7
<i>50-59</i>	7	3
<i>60-69</i>	1	1
<i>70-79</i>	3	4
<i>80-89</i>	2	
Sex		
<i>Male</i>	21	13
<i>Female</i>	17	3
Settlement Member		
<i>Yes</i>	37	16
<i>No</i>	1	0
Born in Peavine		
<i>Yes</i>	24	12
<i>No</i>	14	4
Métis Title		
<i>Yes</i>	27	14
<i>No</i>	11	2
Firefighting Experience		
<i><2 years</i>		3
<i>2 to 20 years</i>		6
<i>>20 years</i>		7

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Chapter 4: Community Support for Wildfire Mitigation at Peavine Métis Settlement¹

4.1 Introduction

Wildfires have impacted communities in Canada throughout history, taking lives, burning structures, and removing livelihoods (Pyne, 2007). An average of 8,600 wildfires have occurred each year in Canada since 1980, burning an average of approximately 2.5 million hectares (Taylor *et al.*, 2006). Some of these wildfires have affected communities, resulting in the evacuation of 136,000 people total between 1986 and 2003 (Taylor *et al.*, 2006). There are numerous communities in Canada that are at high risk of wildfire. Aboriginal² communities, which are generally located in remote, isolated areas of the wildland-urban interface³ and frequently experience wildfire, are at particular risk (Stocks and Wotton, 2006; Wotton and Stocks, 2006). Many of these Aboriginal communities also depend on the forests in their reserves and settlements for their livelihoods, so even a wildfire in a remote area can severely impact the community (Wotton and Stocks, 2006). In the province of Alberta, the Métis Settlements are the second largest landholder in the province after the government (crown land) (Weinstein, 2007), with eight settlements covering 1.25 million acres spread throughout the boreal forest (Métis Settlements General Council, 2005). The Métis settlements are therefore at risk of wildfire due to the high flammability of boreal forest vegetation located within or surrounding settlements (Pyne, 2007).

There has been an increasing call at both the provincial and federal level in Canada for wildfire research in Aboriginal communities (McFarlane, 2006). Recently, the Canadian Council of Forest Ministers released the Canadian Wildland Fire Strategy (Canadian Council of Forest Ministers, 2005) which calls for a new approach to wildfire which balances the social, ecological, and economic aspects of wildfire. The Canadian Wildland Fire Strategy recommends that future research should include a focus on Aboriginal communities and other local situations to determine if unique approaches to wildfire mitigation⁴ are necessary (McFarlane, 2006). To date, the factors that influence support for community wildfire mitigation programs in Aboriginal communities have not been examined.

This chapter presents results from a qualitative community-based study in Peavine Métis Settlement in Northern Alberta. This chapter will identify factors that have contributed to support for the community wildfire mitigation program, Peavine FireSmart Projects.

¹ A version of this chapter has been submitted for publication to *Environmental Hazards*.

² Aboriginal peoples refers directly to the First Nations, Inuit, and Métis of Canada who are identified by the Constitution of Canada as Aboriginal peoples (Department of Justice Canada, 1982).

³ The Wildland - Urban Interface (WUI) refers to "an area where various structures (most notably private homes) and other human developments meet or are intermingled with forest and other vegetative fuel types (Chisholm Fire Review Committee, 2001, p. 8)

⁴ Mitigation is defined as any action - collective or individual, private or public - taken to reduce the potential harm posed by an environmental hazard (Bogard, 1988).

4.2 Literature Review

4.2.1 Wildfire Mitigation

Wildfire mitigation is described in detail in Section 2.2.3. This chapter centres on support for mitigation activities implemented by the settlement at both the residential and community level.

The application of wildfire mitigation recommendations to Aboriginal communities is not straight-forward. Unlike the general population, all homes, structures, and land in Aboriginal communities are under federal (First Nations, Inuit, and territorial Métis) or provincial (provincial Métis) jurisdiction. In the Métis settlements of Alberta, each council owns all land and structures on each settlement. As a result, wildfire mitigation by residents may be less popular. For example, a settlement member may choose to change the siding on his house from vinyl to a fire-resistant option. However, because the member does not own the house, and therefore cannot use it as collateral or sell it, any of the costs of residing the house cannot be recovered by the resident. The member thus may argue that it is the responsibility of the settlement to pay for changes to the siding. A second example has to do with vegetation management. The forestry coordinator may determine that a certain property is at high risk of wildfire, and the Council may decide they want the member to thin or remove trees on the property to reduce the wildfire risk. However, there is no incentive for the settlement member to undertake the effort and cost to protect the house because it is not owned by the member. Therefore, the responsibility for reducing wildfire risk might instead fall on the settlement.

Existing research identifies what influences residents to adopt residential wildfire mitigation activities (Schulte and Miller, 2010; Faulkner *et al.*, 2009; Brenket-Smith *et al.*, 2006; McGee, 2005; McGee *et al.*, 2005; Nelson *et al.*, 2005; Nelson *et al.*, 2004). Studies have examined support for community-level wildfire mitigation completed by governments, with some studies examining factors that influence support for these programs. Support for community-level mitigation has been found to be higher when: (1) residents felt that mitigation activities would actually reduce the wildfire risk (McFarlane *et al.*, 2007; Vogt *et al.*, 2005), (2) residents had trust in those implementing the community-level activities (McFarlane *et al.*, 2007; Shindler, 2007; Winter and Cvetkovich, 2007; Vogt *et al.*, 2005; Jakes *et al.*, 2003), (3) residents had past experience with wildfire mitigation activities (Carroll *et al.*, 2010; Vogt *et al.*, 2005), (4) residents favoured community-level mitigation because it shifted responsibility off of individuals (Daniel, 2007; Gardner *et al.*, 1987), and (5) local capacity was used and expanded to implement wildfire mitigation activities (McFarlane *et al.*, 2007; Jakes *et al.*, 2003; Kruger *et al.*, 2003). However, none of these studies have examined support for a local wildfire mitigation program in an Aboriginal community.

In North America and Australia, the majority of studies involving Indigenous⁵ communities and wildfire center on traditional burning practices and their incorporation into land management strategies (Preece, 2007; Bird *et al.*, 2005; Gott, 2005; Stewart, 2002; Kimmerer and Lake, 2001; Dey and Guyette, 2000; Larsen, 1997; Clark and Royall, 1995; Gottesfeld, 1994; Lewis, 1989; Lewis, 1988; Reid, 1987; Arno, 1983; Gruell, 1983; Lewis, 1983; Phillips, 1983; Ferguson, 1979). Some of these studies focus on historical wildfire mitigation by Indigenous communities, however many of these activities are no longer practiced because of fire suppression policies and the loss of knowledge. Worldwide, there is a growing number of studies examining contemporary wildfire mitigation in Indigenous communities (Carroll *et al.*, 2010; Gonzalez-Caban *et al.*, 2007; Winter and Cvetkovich, 2007; McDaniel *et al.*, 2005; Carroll *et al.*, 2004; Monaghan, 2004), and more research is needed (Raish *et al.*, 2005; Spillman and Cottrell, 2004). This research is described in detail in Section 2.2.1 and 2.2.2, including a detailed discussion on research on wildfire mitigation in Indigenous communities.

The research presented here examined the socio-political aspects of wildfire mitigation in an Aboriginal community. However, this chapter not only examined ‘what’ wildfire mitigation activities are being conducted in an Aboriginal community, but also ‘why’ these activities are supported by community members.

4.3 Methods

The results presented in this chapter are from a community-based research project conducted with Peavine Métis Settlement. Peavine is located in northwestern Alberta in the boreal forest. The population was estimated by the Council to be approximately 1000 in 2010. The settlement resembles an acreage community due to the way land is allocated. Land is communally owned on all the Métis settlements, like land in other Aboriginal communities, but is distributed to members three ways: Métis Title, Provisional Title, and Allocations. These types of landholding are described in Section 1.2 (p. 6-7). A more detailed description of the community can be found in Section 1.2.

The methodology used for this study is presented in detail in Chapter 3. Data collection included informal semi-structured interviews (n=38), focus groups (n=2), and participant observation conducted over three years. The CIHR Guidelines for Health Research Involving Aboriginal People (2007) and the Ownership, Control, Access and Possession (OCAP) guidelines developed by the National Aboriginal Health Organization (Schnarch, 2004), were followed. The use of interviews and focus groups allowed for deeper exploration into the worldviews of participants, and therefore into factors that are influencing wildfire risk perception and mitigation activities amongst Peavine residents. During data collection, the interviews and focus groups transcripts were first coded for main themes and upon completion of data collection the coding framework was revised to explore more specific themes and relationships.

⁵ Indigenous refers to the original peoples internationally who have experienced colonization. The term emerged in the 1970s from the American Indian Movement and the Canadian Indian Brotherhood (Smith, 1999), and has enabled peoples from all over to come together “to learn, share, plan, organize, and struggle collectively for self-determination on the global and local stages” (Smith, 1999, p.7).

4.4 Findings

This section first describes Peavine FireSmart Projects detailing the specific wildfire mitigation activities in the community. Secondly, factors influencing settlement members' support of Peavine FireSmart Projects are explained.

4.4.1 Peavine FireSmart Projects

In 2004, the forestry coordinator at Peavine began a program called Peavine FireSmart Projects which involves wildfire mitigation activities conducted by the settlement on both residential properties and public land. This program has been funded primarily by the settlement. The majority of wildfire mitigation activities focus on vegetation management. Peavine FireSmart Projects mitigation activities include both year-round mitigation activities and “community projects”, which are described below.

Year-round activities

There are six year-round wildfire mitigation activities at Peavine. All of these provide assistance to settlement members, either through employment opportunities or financial reimbursements for mitigation carried out by individuals on their properties. The first is the lawn tractor program, where the settlement pays for half the cost of a lawnmower. This program was developed for three reasons: (1) to increase the affordability of lawnmowers to settlement residents; (2) encourage residents to mow the grass around their home rather than burn it in the spring; and (3) to make it easy for residents to maintain a groomed lawn in order to reduce the wildfire risk. The second program is Agriculture 50/50, where individuals are reimbursed for half the cost of reducing fuel load on their property by converting forest to agriculture land. Vegetation thinning is also covered in this program. This program provides members with a source of income from agriculture and has the added benefit of wildfire risk reduction. The third year-round program is the New Homes program. In this program, the settlement clears around the future site of new homes 20 to 30 metres from the building site and vegetation is thinned further out (30 to 100 metres). New homes being built in high hazard areas of Peavine are given priority.

Fire guards are a fourth mitigation activity in Peavine FireSmart Projects. Fire guards are present in some high hazard areas of the settlement, usually in areas where future roads are planned. Local settlement members are employed to do the clearing using their own equipment. The fifth wildfire mitigation activity involves the Aboriginal Junior Forest Rangers crew who contribute to Peavine FireSmart Projects each summer. The settlement covers half the cost of this crew. Students from the settlement are employed to complete vegetation management on the settlement, and they learn about wildfire and the implementation of wildfire mitigation activities. The final program is the volunteer fire department, which was being re-established at the time of this study. During this study, the settlement had a fire hall area for the fire truck and equipment, a new radio system, and new volunteers were being actively recruited. The volunteer fire department is the first response to wildfires in Peavine.

Community Projects

Community projects occur twice a year at Peavine, generally in the spring and winter, primarily to provide employment and training. Employment in community projects provides settlement members with temporary wages and work experience to increase the likelihood that they can find fulltime employment. Other benefits of community projects are the improvement of the aesthetics of the settlement and the implementation of four seasonal wildfire mitigation activities. These activities are chosen by the forestry coordinator, approved by the Settlement Council, and implemented by wildfire mitigation foreman (temporary leaders chosen by the forestry coordinator) and workers.

The main wildfire mitigation activity conducted during community projects is community-level vegetation management in the recreation areas which are located in mixed wood boreal forest. Some of these recreation areas are used by members for camping, socializing, and hunting. They were identified by the forestry coordinator as high wildfire risk, and have since been converted into permanent recreation areas with metal fire rings, gazebos, and picnic tables under the community projects program. During each community projects session, a different recreation area is picked by the forestry coordinator and vegetation is thinned, high hazard trees removed, and the resulting firewood is available to settlement members. Under this program, this work is completed in each recreation area approximately every three years, depending on the settlement budget. One participant described how the work that has been done in the recreation areas has increased pride in the community:

“We did FireSmart, we thinned around all the recreation areas, you know, and people let us build these gazebos...and it makes that recreation area, people are proud of that stuff. And they look after it more” (Participant 005).

However, one participant felt the vegetation management in the recreation areas was solely completed for aesthetic reasons, not to reduce wildfire risk:

“It’s just for aesthetics. I mean, [the Council] just want to make it so the people can have a place to come, and it’ll look nice for them. And that’s about it. It has nothing to do with preventing a fire. Originally, [fire prevention] was the plan. But plans change” (Participant 008).

It is interesting to note that this participant did not believe that aesthetic improvement and wildfire mitigation could be related.

A second wildfire mitigation activity conducted during community projects is the Elders Assistance program. Residents with disabilities may also qualify for this program. During this program, Elders (as well as those with disabilities) can apply for community project workers to complete various activities on their property, such as home cleaning, house-painting, construction, and yard clean-up. During yard clean-up, community projects workers conduct residential-level mitigation activities by cutting grass, remove dead vegetation and trees, and remove trees at high risk for windfall. Numerous participants described the services offered to Elders on the settlement.

“Like seniors are actually pretty good because they always get work done to their yards every year. They cut their grass, they trim their trees, they do all that good stuff for them” (Participant 029).

A third mitigation activity is the Yard Beautification program. The forestry coordinator conducts wildfire hazard assessments on individual properties in the community. He then approaches residents living in moderate to high risk areas, and asks if they would like to participate in the yard beautification program, which would involve workers thinning vegetation on the property where they live. One participant described:

“Ya, [the forestry coordinator] gets a bunch of people to go out and cut a bunch of trees down. Where people live, there’s a bunch of trees, we just thin them out. So that way, just in case a fire comes, that way they won’t burn” (Participant 002).

Residents can decline the service, but participants commented that it is extremely rare for someone to turn it down. The only negative comment received about this program was that one participant was upset that the workers had cut off the lower branches of a few spruce trees in the yard that had hidden a shed. Importantly, about half of the interview participants did not feel that the beautification program was part of wildfire mitigation. Their primary reason for participating in the program was to have their yard cleaned up for aesthetic reasons. One participant explained that she knew the primary reason for the clearing on her property was wildfire mitigation, but there were other benefits:

“I was all for it, because you know, you want to kind of protect your home from also catching on fire...They cleaned the underbrush and everything around there. It was really nice after. I mean, less work for me...And plus, I benefited...I got my land cleared free!” (Participant 031).

Finally, community-level wildfire mitigation activities are conducted around public settlement buildings and along roadways. Grass around public buildings, such as the settlement office and the water treatment plant, is cut in the spring. Ditches are mowed and deadfall is removed in the spring. Settlement grazing lands are burnt in the winter. These activities are all conducted primarily to reduce the high risk of grassfires at Peavine prior to green up in the late spring. Community projects used to run for approximately three weeks each session. However, due to recent budget constraints, the settlement had to reduce community projects to two one-week sessions in 2009. This limits the number of wildfire mitigation activities that can be conducted.

When this research was conducted, Peavine FireSmart Projects focused strictly on vegetation management. It is surmised that reasons for the preference of vegetation management may include cost and relative ease of implementing vegetation mitigation measures. At Peavine, the preference of vegetation management also likely comes from the experience of settlement employees and members in forestry and firefighting.

4.5 Factors Influencing Support of Peavine FireSmart Projects

Four key factors in the community have affected support for Peavine FireSmart Projects: (1) Local leadership; (2) Economics; (3) Community Capacity, and (4) Land and Home Ownership.

4.5.1 Local Leadership

The forestry coordinator at Peavine has been an essential component of the creation and success of Peavine FireSmart Projects. Although other Métis settlements also have forestry coordinators, the Peavine forestry coordinator has been able to significantly increase both residential and community-level wildfire mitigation activities since 2004. Experience, leadership, and creativity in wildfire mitigation have all had a positive influence on the ability of the forestry coordinator to develop and implement wildfire mitigation programs that garner high levels of community support.

During our interview, the forestry coordinator attributed his interest in wildfire mitigation to his 17 year history of firefighting with the Alberta Forest Service (now Alberta Sustainable Resource Development). As soon as he was hired as the forestry coordinator at Peavine, he knew wildfire mitigation would have to be tackled in the community. He explained:

“Why do I feel I need to do [wildfire mitigation] in Peavine? I’ve seen some houses burn before, and I never want to see that happen. I never want to see my neighbour lose one...And simple little things of thinning or moving your woodpile does make a difference”.

In addition to the role of forestry coordinator, this person is also the settlement safety officer and the unofficial head of the volunteer fire department. These other responsibilities, combined with his background experience led to him being the responsible for fire safety on the settlement.

The creativity of the forestry coordinator in developing unique wildfire mitigation activities situated in social programs has resulted in an increase in wildfire mitigation on the settlement. Every program in Peavine Métis Settlement was created with multiple benefits for the community to make it more likely for the program to be supported by both the Council and the community. In some of the activities, it is not obvious to settlement members that the activity reduces wildfire risk. For example, when the lawnmower program was introduced to Council, it was presented based on the potential improvement to settlement aesthetics, with wildfire mitigation as a secondary benefit. The forestry coordinator explains another example:

“They were building a hamlet area...So we said, ‘why don’t we do the clearing now’. It’ll be a perfect fireguard, because this is a high hazard area around our new hamlet area. And that was an easy sell... [because] they were planning to build a road [in the future] anyways”.

The forestry coordinator’s knowledge of community values directed the development and implementation of the program. Although there was no formal consultation with community members during the development of the program, the forestry coordinator’s

history at Peavine, including being a settlement member for over 40 years, made him aware of community values and dynamics. He knew many of the activities would be accepted by council and the community because they incorporate community values such as assisting Elders and providing employment for settlement members. A specific example is the yard beautification program. Because of his experience in the community, the forestry coordinator knew that members are proud of their settlement, particularly the aesthetics of the community. The research results indicate that residents supported the yard beautification program, partly because of the aesthetic benefits.

Trust in the forestry coordinator appeared to encourage support for wildfire mitigation. The majority of interview participants expressed their trust in the forestry coordinator to reduce wildfire risk in their community. Interestingly, some participants were unaware of the wildfire mitigation activities occurring in their community, but felt the forestry coordinator would have addressed the risk properly.

“I would say [people are knowledgeable about fire]. I would think they are because if you didn’t, [the forestry coordinator] would make you aware anyway. He’s pretty persistent” (Participant 028).

Although settlement members were not directly involved in the development of Peavine FireSmart Projects, members were able to approve programs before they were put in place. Each year, the settlement budget is written by settlement employees, which includes all programs ran by the settlement, and the budget is available to each member to review. Members then vote on the budget, and majority approval is needed before the budget can be passed. Therefore, members have approved every year the money that has been requested for wildfire mitigation programs. Settlement Elders also have frequent meetings throughout the year where they discuss issues associated with Peavine. During our interview, the forestry coordinator indicated that he feels the settlement Elders are very supportive of Peavine FireSmart Projects, particularly the Elders Assistance Program.

The presence of a leader who could create and implement a wildfire mitigation program is a testament to the human capital at Peavine. Human capital refers to investment in people, through education and training, that increases production (Becker, 1964). In terms of wildfire, increasing human capital could include increasing knowledge about wildfire and training in wildfire mitigation activities for settlement members to increase the amount of wildfire mitigation conducted on the settlement. The forestry coordinator’s leadership skills and expertise in firefighting and wildfire mitigation has combined with settlement members’ knowledge and interest in wildfire to create a perfect situation for a high level of support for Peavine FireSmart Projects. As well, the forestry coordinator has increased human capital at Peavine in either training other settlement members in wildfire mitigation or in helping those already knowledgeable about wildfire mitigation (the high proportion of wildland firefighters in the community) to become leaders in wildfire mitigation in the community, such as being employed as temporary wildfire mitigation foremen. Not only has this increased the amount of wildfire mitigation occurring on the settlement, but it also has increased settlement members’ exposure to wildfire mitigation

in other communities in the province through the work of Peavine wildfire mitigation crews (explained in Section 4.5.2.)

The potential problem associated with one individual developing and implementing a wildfire mitigation program is - what happens if that person leaves? In Peavine, the forestry coordinator has integrated the Peavine FireSmart Projects programs into other settlement departments, such as public works and agriculture, which are run by other employees. Therefore, others now take responsibility for those specific mitigation activities. Some of the mitigation activities have become a norm for settlement members, so many expect to be offered the services associated with wildfire mitigation every year. For example, in 2010, due to budget constraints, the council was unable to provide disabled residents with workers to assist with yard clean-up. Participants that relied on this service raised this as a concern during our interview. The forestry coordinator indicated he plans to reinstate this program when the local economy improves.

4.5.2 Economics

From 2004 to 2010, Peavine was in a better financial situation compared to many Aboriginal communities in Alberta. Much of the financial success at Peavine is attributed to profitable oilfield and lumber businesses owned by the settlement. However, the economic downturn of 2008 and the end of payments from the province of Alberta to the settlement in 2007⁶ have decreased some of this wealth. However, the community still provides many services to settlement members. One major resource is financial aid. Peavine owns several profitable businesses, which contribute to their budget and allow the development of various social programs. Many of these programs still exist, but have experienced recent cut-backs due to the economic downturn.

“We kind of got spoiled from when they had all that money. Like, we had all kind of programs, but now that our money is running low, it’s harder on the settlement people, because they were so used to having all these programs. But now they’re slowly, they’re really slowly getting cut” (Participant 033).

One program was a home renovation grant, where members could apply for money to add on to their existing homes. This was aimed at families who had outgrown their home. This has now changed to the 50/50 program, where members are reimbursed 50% of their home renovation costs. The settlement also used to have training programs for trades people. Programs that were operating at the time of my research were the lunch program, where parents are given money each month (\$5/day) to help them buy lunches for their children, and the attendance program, where parents and children are given \$75/month for good school attendance. The settlement also provides financial support for children to enroll in sports, such as minor hockey.

Economics have affected support for Peavine FireSmart Projects. The Council spends about \$500,000/year on forestry-related projects, including reforestation and wildfire

⁶ The signing of the 1990 Accord between the Provincial Government of Alberta and the Métis Settlements General Council required the province to pay \$310 million to the settlements over 17 years to settle existing lawsuits over land and resource ownership (Weinstein, 2007). The last of these payments was made in 2007.

mitigation. The forestry coordinator estimates that the settlement has spent \$100,000/year on wildfire mitigation over the last six years. Primary costs include wages to settlement workers and equipment rental. Money is drawn from budgets including fire protection, recreation, public works, and agriculture. The settlement has only received one \$5,000 grant from the provincial government's FireSmart Community Grants program for conducting wildfire mitigation at Peavine. Other communities in the region have not been as successful at implementing wildfire mitigation activities partly due to limited funds. Very few Aboriginal communities have financial resources available for wildfire mitigation like Peavine.

A major justification of spending a large amount of money annually on wildfire mitigation is the employment benefits for members, particularly during community projects. The employment benefits increase support for funding of wildfire mitigation activities as members vote each year to approve all programs included in the budget. About half of the interview participants said they participate in community projects for financial reasons.

"They get everybody involved trying to make them catch up on their bills. And the last community projects were a week and a half before Christmas" (Participant 018).

Local equipment owners and operators benefit from wildfire mitigation, since the settlement usually hires locally for equipment and operators needed for mitigation activities.

A concern in regards to wildfire management and economics in the community may be that wildfire mitigation may be deemed non-essential and programs may be eliminated to instead fund programs that deal with social issues in the settlement. While this may be true in some communities where wildfire mitigation is grouped as one entity, the integration of Peavine FireSmart Projects into multiple settlement departments under programs that provide additional benefits has reduced this risk. For example, there is no formal 'Peavine FireSmart Projects' in the settlement budget. Rather, wildfire mitigation activities are placed into programs that are dispersed through numerous settlement departments. For example, the Agriculture 50/50 program that encourages the complete removal or thinning of vegetation is in the agriculture program and provides various benefits to settlement members besides reducing wildfire risk, such as improving aesthetics and increasing member income through timber income and agriculture profits. Many programs that provide wildfire mitigation have become popular amongst settlement members for the other benefits they provide. For example, activities conducted during community projects are popular amongst settlement members for employment, assistance, and aesthetic improvements. Many members would object to the elimination of these activities. Therefore, although there are increasing social issues at Peavine, the integration of wildfire mitigation into various settlement departments has increased the likelihood of the long-term success of the program.

Wildfire has become an important economic stimulus for settlement members. In addition to employment opportunities in Peavine FireSmart Projects, some settlement members

are involved in wildland firefighting employment in the summer. To create employment opportunities during the winter, the forestry coordinator applied for and received Forest Resources Improvement Association (FRIA) grants, which he learned about from contacts at Alberta Sustainable Resource Development. These grants required crews trained in wildfire mitigation that could carry out vegetation management plans in other regions. The forestry coordinator then selected members specialized in wildfire mitigation through community projects and firefighting experience to form a wildfire mitigation contract crew. This crew was employed during November and December 2009 to conduct wildfire mitigation in four Alberta communities over a 3 week period.

4.5.3 Community Capacity

Community capacity has significantly influenced support for Peavine FireSmart Projects. Community capacity is defined as “the interaction of human capital, organizational resources, and social capital existing within a given community that can be leveraged to solve collective problems and improve or maintain the well-being of a given community. It may operate through informal social processes and /or organized effort” (Chaskin, 2001, p.295). The local capacity at Peavine Métis Settlement has led to the development and implementation of their wildfire mitigation program, and appears to have encouraged support for the program by members. One of the most important elements of community capacity is local leadership, including having local individuals employed as emergency managers in the community (Ellemor, 2005). This is clearly the case in Peavine. Strong leadership was present in the community for wildfire mitigation, starting with the forestry coordinator (see Section 4.5.1), the Council, and former firefighters who were wildfire mitigation foremen. Local settlement members were employed in roles associated with wildfire mitigation in the community. Participants felt confident in the ability of settlement employees and fellow members to mitigate and respond to wildfire. The majority of participants said that they felt wildfires and wildfire risk could be handled internally on the settlement.

“I think [the community] is prepared....Because we have a lot of experienced forest firefighters in this area. Lots of people used to always go firefighting from Peavine” (Participant 008).

This was also found by Monaghan (2004) in Northern Australia, where Aboriginal community members in his study communities felt that wildfire management had been dealt with adequately inside their community and that intervention by outsiders was unnecessary.

A local wildfire mitigation program developed by local residents is important for enhancing community capacity, as interference by outside managers can sometimes create a dependency on outside managers and resources (Gupta and Sharma, 2006; Rautela, 2005; Mitchell, 2003; Mohan and Mohan, 2002; Bankoff, 2001; Woolcock and Narayan, 2000; Newton, 1995). Outside wildfire managers, such as provincial employees, have not been involved in the development of Peavine FireSmart Projects, although the forestry coordinator credits his employment with the (then) Alberta Forest Service for his knowledge of wildfire mitigation. The ability of the forestry coordinator to draw on his

contacts in the provincial government further enhanced community capacity. Although advice, particularly on funding for wildfire mitigation, has sometimes been sought outside of the settlement, all decisions regarding wildfire mitigation are made within the settlement. The lack of outside involvement in wildfire mitigation is also likely due to the isolation of Peavine and its status as a Métis settlement with self-government. At Peavine, the forestry coordinator relies on other Council employees and himself to develop and implement the program.

An important element of community capacity is local knowledge. Local knowledge is important for wildfire mitigation because this knowledge is based on local environmental conditions and is specialized to the region. At Peavine, local knowledge was used in the development of Peavine FireSmart Projects, through the wildfire experiences of settlement members. For example, traditional burning practices that have occurred historically and still occur on the settlement led to the incorporation of burning of fields in the spring and winter during community projects. Firefighting experience gained by settlement members both on and off the settlement led to the knowledge of wildfire mitigation techniques, and this knowledge help implement wildfire activities (see Chapter 5).

Equipment is also available at Peavine for wildfire mitigation, increasing the community's capacity. This includes both settlement-owned equipment (such as the fire truck, fire-fighting equipment, saws, and heavy-duty machinery) and privately-owned equipment (mainly heavy-duty machinery). Therefore, any wildfire mitigation program can be implemented by Peavine without drawing upon outside resources.

4.5.4 Land and Home Ownership

Land and home ownership on the settlement has increased support for Peavine FireSmart Projects. As described earlier (Section 1.2), all land and structures are owned by the settlement; however members can receive title to certain pieces of land and the buildings on it. The Settlement Council takes responsibility for mitigation on public areas of Peavine, similar to other municipalities in the province. The difficulty lies in who is responsible for mitigation on land in which members hold the title but not ownership. The majority of participants felt that wildfire mitigation on their properties was the responsibility of the settlement, because the homes and land are owned by the settlement even though the participants held Métis title. These participants did not perform mitigation activities on their own property, although many had residential wildfire mitigation activities conducted through Peavine FireSmart Projects. Some of these participants felt responsibility for wildfire mitigation should be a joint partnership between the settlement and the member holding Métis title:

“It should be the settlement I guess, because they’re the ones that claim it’s their houses, so they should look after them. But if you go build your house in a bush like that, too, it should be your responsibility too to go thin out your brush and what not.” (Participant 033)

This system of land ownership at Peavine has helped increase support for Peavine FireSmart projects. Because the settlement owns each property and members are required to pay dues, some participants expected the settlement to offer them services on their properties at no cost. Therefore, when wildfire mitigation activities have been offered to residents, they are quick to accept them, particularly those involving clean-up of vegetation on their properties such as the yard beautification program.

Insurance also becomes an issue in this system of ownership. Because the member does not own their home or outbuildings, they can only insure the contents. The settlement does not carry insurance on all the individual homes. Therefore, if a home or multiple homes were burnt in a wildfire, the cost of rebuilding these homes would be paid by the settlement. A participant explained:

“Because the settlement owns every house in its boundaries, [wildfire mitigation] should be up to them. Because as people, we cannot get insurance on our houses, because we don’t own them. You can get fire and theft, whatever, for your contents, but that’s it. If your house burns down because of a wildfire or because your grass burns your house down, you don’t get nothing. It’s gone” (Participant 029).

This provides an incentive for the Settlement Council to implement wildfire mitigation and for members to support wildfire mitigation programs offered to them on their properties, as the financial cost associated with rebuilding multiple homes and the emotional toll on settlement members could be devastating to the settlement.

There are also issues on the settlement in regards to land ownership. At the time of my study, some settlement members (especially younger members) have not received title to any land. Older settlement members hold multiple pieces of land through both Métis title and allotments. As discussed in Section 5.5, younger members have lower risk perceptions of wildfire and tend to implement wildfire mitigation only for aesthetic reasons. Therefore, as these members are granted Métis title, the preferences behind wildfire mitigation may change.

4.6 Discussion

The findings presented in this chapter show that the unique characteristics of Peavine affect support for the settlement’s wildfire mitigation program. All participants supported the current wildfire mitigation program for reasons including trust, experience with wildfire mitigation, responsibility-shifting from the individual to the community, community capacity, and belief that wildfire mitigation would reduce wildfire risk. Importantly, Peavine has taken a postcolonial approach to wildfire mitigation by integrating local leadership, finances, community capacity, and a unique home/land ownership structure to develop a local wildfire mitigation program that is receiving high levels of community support.

The Métis Settlement structure of land and home ownership appeared to increase support for community-level mitigation. Participants favoured mitigation strategies implemented

by the settlement over individual mitigation activities because all land is communally owned by settlement members. In non-Aboriginal communities, studies have found that community-level mitigation programs are more acceptable than those that require personal effort and cost by residents, such as removing or de-limbing trees (Berrens *et al.*, 2007; Daniel, 2007; Gardner *et al.*, 1987). However, at Peavine, this responsibility-shifting from individual settlement members to the Settlement Council occurred because members expected the Settlement Council to do the majority of the work because it was the Council who ultimately owned the home and property. A second factor identified in this study is economics. Unlike other community-level mitigation strategies that require volunteer work from residents (McFarlane *et al.*, 2007), settlement members were employed by the Council to implement community-level mitigation activities. These two additional factors have increased support for community-level mitigation over residential mitigation activities that require residents' own money and effort.

The presence of a leader who could create and implement a wildfire mitigation program is a testament to the human capital at Peavine. Human capital refers to investment in people, through education and training, that increases production (Becker, 1964). In terms of wildfire, increasing human capital could include increasing knowledge about wildfire and training in wildfire mitigation activities for settlement members to increase the amount of wildfire mitigation conducted on the settlement. The forestry coordinator's leadership skills and expertise in firefighting and wildfire mitigation has combined with settlement members' knowledge and interest in wildfire to create a perfect situation for a high level of support for Peavine FireSmart Projects. The forestry coordinator has increased human capital at Peavine by either training other settlement members in wildfire mitigation or in helping those already knowledgeable about wildfire mitigation (the high proportion of wildland firefighters in the community) to become leaders in wildfire mitigation in the community, such as being employed as temporary wildfire mitigation foremen. Not only has this increased the amount of wildfire mitigation occurring on the settlement, but it also has increased settlement members' exposure to wildfire mitigation in other communities in the province through the work of Peavine wildfire mitigation crews.

The ability of one individual to influence wildfire mitigation in a community has been found in other studies involving non-Aboriginal communities. Harris *et al.* (2011) found that individuals within municipal governments play a key role in developing and implementing wildfire risk management. Many of these individuals had personal experience with wildfires, therefore they knew about wildfire mitigation measures and how to implement them (Harris *et al.*, 2011). Shindler (2007) also found that a lot of successful wildfire risk communication programs could often be traced to one individual with strong communication skills who is respected in the community. Other studies have found that individuals can act in communities as 'catalysts of change' for wildfire management and that interpersonal communication networks between individuals and their community members are critical to implementation of wildfire mitigation activities (McCaffrey and Kumagai, 2007; Sturtevant and Jakes, 2007; Lang *et al.*, 2006; Monroe and Nelson, 2004).

The results of this study indicate that land ownership at Peavine plays a significant role in mitigation preferences. It is not surprising that wildfire mitigation activities implemented by the settlement achieve high levels of support, as most members feel that the land is ultimately owned by the settlement and therefore it is the responsibility of the council to implement programs to reduce the wildfire risk. Also, support for community-implemented wildfire mitigation is likely influenced by the fact that the program requires no effort or direct cost to settlement members, unless members choose to be employed in wildfire mitigation activities. By conducting mitigation activities on private properties for members, the settlement is increasing the amount of land where mitigation has occurred. Land ownership has been found to affect wildfire risk perception and mitigation preferences in past research. However, these studies focus on: (1) property owners who live near public lands (McGee, 2005; Jakes *et al.*, 2003), (2) renters as compared to homeowners (Bushnell *et al.*, 2006), and (3) vacation/second home owners as compared to permanent residents (McFarlane *et al.*, 2007; Vogt, 2003). At Peavine, like most Aboriginal communities, the situation is different because properties are not owned privately.

Wildfire management, including mitigation activities, has been identified by Rasmussen (2007; 2005) as an excellent opportunity for stimulating rural economic development in Indigenous communities, as well as reducing wildfire risk and managing ecosystems and improving ecosystem health. She indicates that wildfire management can be used to provide jobs and small business opportunities for Indigenous peoples. The results in Peavine support Rasmussen's work by showing that economic benefits from wildfire mitigation activities can increase support for these programs. The financial benefits increase the likelihood that settlement members will participate in the program. However, such economic benefits are precarious and subject to budgetary cutbacks. Evidence from Peavine suggests the integration of wildfire mitigation programs into other social programs can help prevent the complete loss of wildfire mitigation programs during times of constraint.

This chapter provides evidence of the importance of locally developed wildfire mitigation program in an Aboriginal community. Other studies in non-Aboriginal communities have also identified the success of locally developed programs. Sturtevant and Jakes (2007) found that effective wildfire mitigation strategies developed at the community level were more likely to be accepted and adopted as they took into account specific ecological settings and social dynamics. Other studies have found that residential and community-level mitigation programs are most likely to be implemented when local residents and communities take responsibility for their own wildfire safety (Beringer, 2000; Cohen, 2000). Other authors have suggested that the participation of the community at risk is vital to ensuring that decisions regarding wildfire mitigation will align with residents' norms and values (Paton, 2007; Shindler, 2007). Because similar findings have been found in both Aboriginal and non-Aboriginal communities, it likely points to the inherent uniqueness in each type of community and the importance of incorporating information about the local context into local wildfire mitigation programs in order to increase acceptance and support. This case study has shown that it is important for wildfire

managers to allow local community leaders to take responsibility for wildfire mitigation. Although outside managers can offer resources and support, this case study has shown that the support of wildfire mitigation programs is increased if the programs are developed in communities by local leaders based on local values and conditions, with a reliance on existing community capacity.

4.7 Conclusion

This chapter examined support for a contemporary wildfire mitigation program in an Aboriginal community. Support for community-level wildfire mitigation was found to be high at Peavine for four reasons: local leadership, economics, community capacity, and ownership (Figure 4-1). Other studies have identified trust, past experience with wildfire mitigation, responsibility-shifting, community capacity development, and belief in mitigation efficacy as factors that influence support for community-level mitigation (Carroll et al., 2010; Daniel, 2007; McFarlane et al., 2007; Shindler, 2007; Winter and Cvetkovich, 2007; Vogt et al., 2005; Jakes et al., 2003; Kruger et al., 2003; Gardner et al., 1987). The results of this study also identify new factors that influenced support of wildfire mitigation in an Aboriginal community, including home and land ownership, presence of a local leader, and economics (including employment opportunities).

The findings presented in this chapter have several management implications. The findings show that due to land ownership within Métis communities, it is less likely that homeowners will be receptive to implementing wildfire mitigation on the property where they live. It is also clear that members of Aboriginal communities themselves will likely have more success at developing and implementing wildfire mitigation programs within their communities than outside managers because of the community members' experience and knowledge of their own community, shared values and culture. However, there is still an important role to be played by outside wildfire managers, including providing funding for wildfire mitigation to Aboriginal communities and training community leaders in wildfire mitigation. Therefore, the future success of wildfire mitigation programs in Aboriginal communities in Alberta can be enhanced by recognizing key local individuals and giving them support (both budgetary and mentoring) and integrating the combination of knowledge, wildfire experience, culture, and values in their community into mitigation programs.

It is likely that some of the characteristics that affected support for community wildfire mitigation in Peavine (local leadership, economics, community capacity, and ownership) will be present in other Aboriginal communities, but at different levels. For example, one Aboriginal community may not have money to put into mitigation activities, but may have high levels of local capacity. In this situation, outside funding would be required to help this community develop a wildfire mitigation program. Another Aboriginal community may not have a leader willing to step up to take responsibility for reducing that risk. In this case, individuals who have the potential to be leaders in this area should be identified and given support, including training. Not all Aboriginal communities may have the amount of community capacity present at Peavine. Outside wildfire managers

could work to improve local capacity by offering training programs in wildfire mitigation and response, grant programs so the community is able to buy resources for wildfire mitigation, and/or supporting local leaders at council meetings where wildfire mitigation programs are presented. Community capacity building in the community for wildfire mitigation will likely impact local capacity in other areas of the community, increasing the ability of the community to handle both routine and non-routine problems, such as hazards.

4.8 Figures

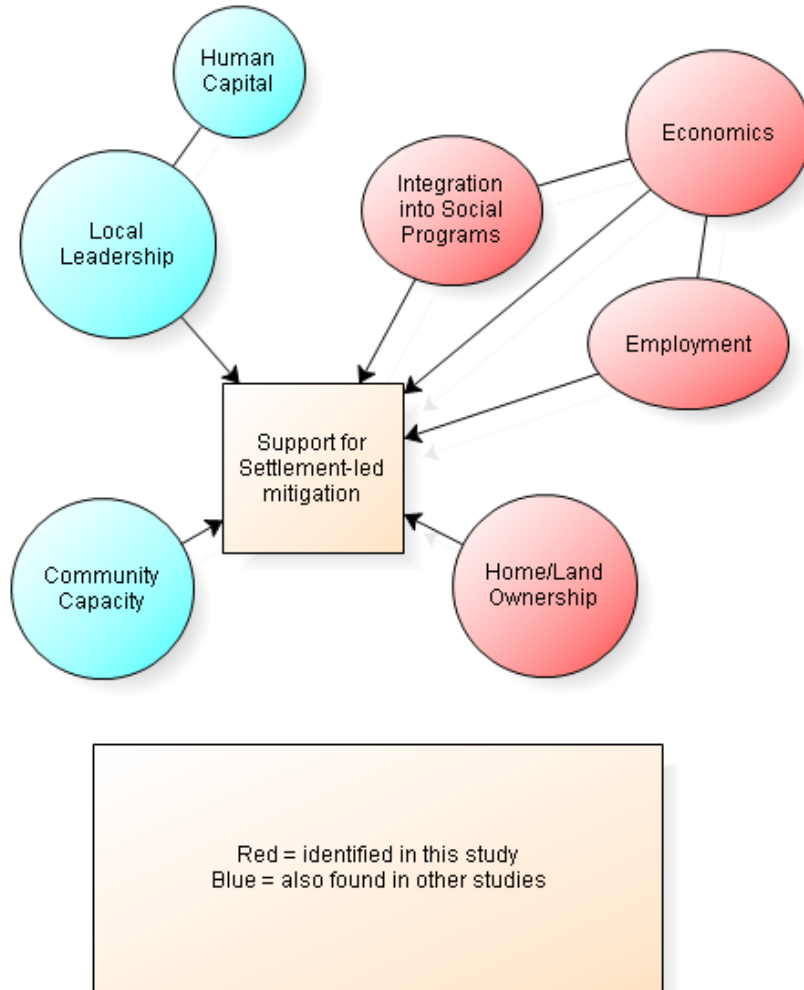


Figure 4-1. Summary of the factors that influenced support for Peavine FireSmart Projects amongst participants at Peavine Métis Settlement

4.9 References

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Chapter 5: A Culture of Fire: Influence of wildfire experience in an Aboriginal community on risk perception and mitigation preferences

5.1 Introduction

Aboriginal people¹ in Canada have an extensive history with wildfire². However, it is not clear how wildfire is currently perceived by Aboriginal communities in Canada, how Aboriginal communities and individuals mitigate their wildfire risk, and how risk perceptions affect acceptance and adoption of wildfire mitigation. Little is known about how wildfire is currently perceived and mitigated by other Indigenous³ communities worldwide (Carroll *et al.*, 2010; Arvai *et al.*, 2007; Sturtevant and Jakes, 2007; Huntington *et al.*, 2006; Raish *et al.*, 2005; Carroll *et al.*, 2004). This type of research is important today, as factors such as climate change (Tymstra *et al.*, 2007; Flannigan *et al.*, 2005; Gillett *et al.*, 2004), mountain pine beetle (Canadian Forest Service, 2005), and the build-up of fuel from a history of fire suppression have increased the wildfire risk to many communities, particularly remote, isolated Aboriginal communities.

In Canada, Aboriginal groups have a history of using traditional burning practices to manage the environment, and an extensive knowledge about fire behaviour (Pyne, 2007; Ghostkeeper, 1995; Lewis, 1982). In Alberta, traditional burning was officially banned in 1910 by the government in order to protect timber, watersheds, and communities (Pyne, 2007). This reduced the use of traditional burning, which was then considered illegal (Murphy, 1985). By the end of World War I, burning was restricted to the most remote and isolated areas of the province (Lewis, 1977). Records from 1942 are the first to document fines (\$25.00) and jail sentences (40 days) for burning without a permit (Ferguson, 1979). Some burning continued out of defiance, but not on the scale as it had before. Therefore, much of the knowledge regarding traditional burning practices was lost in Alberta by the 1970s (Lewis, 1982). There are few studies of traditional burning practices in Métis communities, and none have related traditional burning practices to contemporary perceptions of wildfire of the Métis. This is an important research area because how Métis people currently perceive fire, including perspectives of traditional burning practices, will have implications on their willingness to implement or support wildfire mitigation.

When traditional burning practices were banned, many Aboriginal people became forced into seasonal wildland firefighting as Fire Rangers in the province were given the authority to force men to go fight fire. Anyone unwilling was fined or sent to jail

¹ Aboriginal people in Canada are comprised of First Nations, Inuit, and Métis, as defined in the Constitution of Canada (Department of Justice Canada, 1982)

² Wildfire refers to all types of fire in natural fuels, including forest fires, grass fires, and bush fires.

³ Indigenous peoples refer to the original peoples internationally who have experienced colonization. It is a term that emerged in the 1970s from the American Indian Movement and the Canadian Indian Brotherhood (Smith, 1999). global and local stages" (Smith, 1999, p.7).

(Murphy, 1985). Aboriginal peoples fought wildfires alongside Mounties, surveyors, and settlers as volunteers or for a very low wage (Holt, 1998). Eventually, firefighters for the Forest Service in Alberta began to receive a more substantial wage and Aboriginal people began to consider firefighting as an acceptable type of employment (Driben, 1985; Ferguson, 1979). Active fire suppression was thoroughly conducted in Alberta by 1960 (Ferguson, 1979). “Job fires” were occasionally set by Aboriginal people to create employment opportunities (Ferguson, 1979), which shows that some Aboriginal people did not fear wildfire but instead wanted the employment benefits associated with it. A change to firefighting practices in the mid-1990s in Alberta, including an increase in wages and fitness requirements, meant that firefighting was becoming a sought after job opportunity for non-Aboriginal peoples. Some Aboriginal people then became unable to continue firefighting as they did not feel they could pass the fitness requirements and some did not want to sign up for new training. Most Aboriginal firefighting crews in Canada are now contract crews, which means they are on-call workers paid only then they are fighting a fire or on stand-by (Moseley, 2007). Because of this there is a long community history of firefighters in most Aboriginal communities in Alberta.

Aboriginal peoples have also experienced wildfire as bystanders (have seen or experienced a wildfire but have not been involved in either starting the fire or fighting it). Multiple Aboriginal communities are located in the boreal forest which are at high risk of wildfire (Pyne, 2007). In the summer of 2010 alone, wildfires affected Aboriginal communities in Canada, with reserves being evacuated due to wildfires in Quebec and one home being burnt on the St. Paul reserve in Alberta (Anonymous, 2010b; Anonymous, 2010a; CanWest News, 2010; Loyie et al., 2010; Sutherland, 2010).

Using data from a qualitative case study conducted with Peavine Métis Settlement in Northwestern Alberta, this chapter examines how wildfire experiences, including traditional burning, firefighting employment, and bystander experience, have influenced residents’ wildfire risk perceptions⁴, the implementation of residential wildfire mitigation activities and support for community-level wildfire mitigation.

5.2 Literature Review

Experience with a hazard has been identified by many authors as having an effect on risk perception and implementation of mitigation measures (Tierney *et al.*, 2001; Mileti, 1980; Kates, 1971). However, it is still uncertain whether experience increases or decreases risk perception, as experience with a risk could act as a risk amplifier (fear of being in a stressful situation again increases risk perception) or a risk attenuator (lightning does not strike the same spot twice so risk perception is decreased) (Kasperson *et al.*, 1988). It is also uncertain as to how experience affects implementation of mitigation measures, as some studies have identified experience with a hazard as encouraging implementation of mitigation measures (Grothmann and Reusswig, 2006; Lindell and Prater, 2000), discouraging implementation of mitigation measures (Paton *et*

⁴ In this paper, risk perception is defined as the intuitive judgments members of the public make about the probability or likelihood of risks affecting them (Slovic, 1987)

al., 2001; Johnston *et al.*, 1999), or having no influence on the implementation of mitigation measures (Tekeli-Yeşil *et al.*, 2010; Russell *et al.*, 1995).

In the context of wildfire, studies have been conducted on how wildfire experience affects risk perception in non-Aboriginal communities. The literature indicates that wildfire risk perception is often rooted in experiences with fire (Cohn *et al.*, 2007). In Australia, residents with past wildfire experience were found to have higher risk perceptions than those who had not experienced wildfire (Bushnell *et al.*, 2006). In Canada, varying direct experiences, such as evacuating or staying in the home when faced with a wildfire event, was found to have differing influences on risk perceptions (McGee *et al.*, 2009). For example, those participants who self-evacuated had similar wildfire risk perceptions to those they had before they experienced a wildfire. Those who stayed in their homes or were forced to evacuate during a wildfire in the same community had increased risk perceptions after the fire event. Therefore, it is important to examine if Aboriginal peoples' risk perceptions of fire are affected by experience, as studies have found with non-Aboriginal participants.

Researchers have examined the influence of fire experience on the implementation of residential wildfire mitigation and support for community wildfire implementation in non-Aboriginal communities (Martin *et al.*, 2009; McGee *et al.*, 2009; Martin *et al.*, 2007; Vogt *et al.*, 2005; Nelson *et al.*, 2004; Weinstein, 1989). Direct and indirect experiences with fire have been found to form the base of a person's knowledge about fire (Martin *et al.*, 2007; Weinstein, 1989). It has been found that fire experience did not influence the acceptance of prescribed burning, mechanical fuel reduction, and defensive space ordinances in communities in California, Florida, or Michigan (Vogt *et al.*, 2005). In Minnesota and Florida, participants who had experienced wildfire were no more willing to implement residential mitigation activities because they either did not believe their personal risk was high or they valued aesthetic features of their properties more than reducing wildfire risk (Nelson *et al.*, 2004). In communities in Oregon and Colorado, experience with wildfire did not directly affect risk perception or risk mitigation (Martin *et al.*, 2009). In Alberta, differences in fire experience resulted in varying acceptance and adoption of mitigation activities (McGee *et al.*, 2009). Participants who had remained at home during a wildfire had implemented an average of two new mitigation measures following the fire, as they explained the experience had motivated them to reduce the wildfire risk to their home (McGee *et al.*, 2009). Participants who had evacuated during the same wildfire had completed an average of one new mitigation measure on their property, and participants who had lost their homes in the wildfire had not completed any new mitigation measures post-fire (McGee *et al.*, 2009). The varying results of these studies show that the influence of fire experience on residential wildfire mitigation and support for community-level mitigation is complex and requires further study. As well, Aboriginal communities have unique experiences with fire that may encourage residents to support certain mitigation activities, such as prescribed burning.

Only two studies have examined how experience with wildfire has affected wildfire risk perceptions and mitigation strategies in Indigenous communities. Carroll *et al.* (2010) examined how Indigenous burning practices and firefighting experience has impacted wildfire risk perception and community-level wildfire mitigation amongst the Nez Perce tribe of the Pacific Northwest (US). They found that knowledge from both traditional burning and firefighting has resulted in a hybridization of knowledge which has increased support for prescribed burning, a community-level wildfire mitigation strategy. Some participants had high risk perceptions due to fire suppression activities, which they felt increased the wildfire risk by increasing the amount of vegetation. Participants supported re-implementing traditional burning practices, which would mimic prescribed burning, to mitigate the increased risk. Monaghan (2004) studied contemporary wildfire mitigation in two Aboriginal communities in Northern Australia and found that Aboriginal residents were experienced with fire, through both traditional burning practices and experiencing bushfires around their communities. Aboriginal residents of these communities were knowledgeable about wildfire mitigation, and were conducting mitigation activities such as prescribed burning and removing high risk vegetation as a normal part of life. In this chapter I examine how varying fire experiences (traditional burning practices, firefighting employment, direct fire experience) influence risk perception and mitigation preferences in a Métis community in Canada.

5.3 Methods

In order to examine how wildfire experience has affected wildfire risk perception and mitigation in Aboriginal communities, a community-based research project was developed with Peavine Métis Settlement located in North-western Alberta in the boreal forest (Appendix 3). A complete description of the community can be found in Section 1.2. Important to this chapter, the settlement has an extensive history with wildfire, described in Section 1.3. By taking into account vegetative type and values at risk, the forestry coordinator at Peavine has established that the current wildfire risk varies within the settlement, with 40% of the settlement at low risk, 30% at medium risk, and 30% at high risk (see Section 1.3). The settlement currently has a wildfire mitigation program in place which includes year round programs (such as financial assistance to purchase lawn tractors) and seasonal activities (such as vegetation management) on both residential properties and public lands (Table 5-1). A more detailed description of these programs can be found in Section 4.4.1.

A collaborative, community-based research approach was used for this qualitative study, which is described in detail in Chapter 3. Qualitative methods used for this study included semi-structured interviews (n=38), focus groups (n=2), and participant observation. Importantly, all study participants had some experience with wildfire, including traditional burning, firefighting, and experiencing a wildfire as a bystander (see Section 5.4.1 below for a complete description). This was expected in the focus group, as only former or current firefighters were recruited. However, all interview participants also had some experience with wildfire. The data was analyzed qualitatively by coding the transcripts to look for specific themes and relationships. Methods, such as prolonged

community involvement, involvement of community research assistants, triangulation, peer debriefing, and member-checking, were followed to ensure validity of the research results (Stake, 2008; Denzin and Lincoln, 1998; Baxter and Eyles, 1997; Lincoln and Guba, 1985).

5.4 Findings

This findings section will first present the history of fires on Peavine Métis Settlement. Secondly, traditional burning practices of settlement members will be described. Thirdly, the firefighting history of Peavine members will be explored, including wildfire recruitment, experiences, and knowledge obtained from firefighting. Finally, the influence of these fire experiences on wildfire risk perception, implementation of residential wildfire mitigation, and support for community-level mitigation amongst settlement members will be discussed.

As stated in the previous section, all participants in this study had experience with wildfire. The considerable fire experience in Peavine is common for many Aboriginal communities in Northern Alberta for three reasons: traditional burning practices that were and sometimes are still practiced in the communities, firefighting employment, and experiencing wildfires as bystanders.

5.4.1 The Peavine fire experience

The Métis of Peavine have a long history with fire (Appendix 5), resulting in the majority of their members having had an experience with a wildfire. Just prior to the establishment of the settlement, a large wildfire swept through the settlement area and burned most of the forest in the 1930s. Older interview participants commented that the settlement used to be full of timber, but wildfires as well as logging, removed most of the timber in the settlement between the 1930s and 1970s. One participant described the landscape after the 1930s wildfire:

“When we were just kids... it was almost like clear here. You could see everybody’s house. You could yell. You [didn’t] need a phone” (Participant 001, Elder).

Participants recalled numerous fires in the early years of the settlement. In the 1940s, two fires went through the main part of the settlement, where some study participants were living. A participant who experienced the fires noted:

“There were lots of [fires]. Lots more than one. When we were living in here, there were two fires going through here. They cleaned the whole damn works” (Participant 003, Elder)

The Pelican Lake fire was another large fire that occurred on the northeast section of the settlement in the 1980s in a large spruce stand which some participants witnessed.

“We [saw] a big huge fire just east of us. Right from your home, you seen the big huge fire, flames were shooting out into the air” (Participant 040, Elder).

In more recent years, there have been wildfires in the Lesser Slave Lake region that settlement members have also experienced. Participants recalled witnessing the Chisholm

Lake fire of 2001 and smaller fires near the community of Slave Lake. Many participants experienced the ‘Jackpine’ wildfire, which burned north of High Prairie resulting in the closure of the highway to Peavine.

Fires are now relatively rare on the settlement. This is due to strict fire control including the provincial government requirement of permits for burning and the reduction in fuel load due to past fires. However small wildfires still occur. For example, in 2009, two grass fires were large enough they had to be fought by settlement members. One participant noted that there is usually an average of six fires a year at Peavine, but they are generally small enough to be put out by a few settlement members and are not reported. Only two fires in the last 4 years have required help from an outside fire crew to be extinguished.

Settlement members’ experience with fire both on and around their settlement creates a unique situation, as there are few non-Aboriginal communities in Canada with the same extent of wildfire experience.

5.4.1.1 Métis traditional burning practices at Peavine

To begin to understand the complex risk perceptions of fire, as well as current acceptance of wildfire mitigation at Peavine, it is important to understand traditional burning practices⁵ in the community. Historically, fire was used at Peavine to clear land and fields. This was done either by setting fire to the land, which was more common in the early years of the settlement (prior to 1950), or by slashing brush by hand, piling it into large windrows, and burning these piles. This historical practice seems to have been lost at Peavine as younger participants said that the burning of fields to clear land was not currently practiced at Peavine. However, the majority of Elders interviewed indicated this practice still did occur. This was also verified during participant observation. They noted:

“We always [burned]. We all do. Like, nobody could say they didn’t...I mean, we don’t go and set fire during the summer time to burn and clear...winter time, we would burn them” (Participant 007, Elder).

“A lot of [fires] were caused by people burning all hay land. We usually burned out those. But them days, it didn’t matter where you burned. There was no forestry then. It was just free-go” (Participant 006, Elder).

A few Elders commented that fire was used to clear all the land in the central area of the settlement. Some participants associated the burning of fields with ‘cleaning’ the land. For example, hay was burned off of fields in the spring. The result was that when it came time to cut the hay in the fall, old hay was not mixed with the new hay. In terms of management, these fires were left to burn out on their own.

⁵ It should be noted that there are distinct differences in Alberta regarding wildfire and traditional burning practices. Wildfires generally occur in high hazard months due to a variety of natural and human causes, and result in high intensity, dangerous fires. Traditional burning practices consist of starting low intensity fires during periods of reduced fire risk, such as the spring month or late fall, with some sort of purpose in mind.

In addition to using fire to clear fields, fire has been used both historically and currently for grass burning. Grass is generally burnt in the spring or fall. Almost all participants had an experience with grass burning, even the younger participants. Participants commented that grass burning was conducted to burn off dead grass, so the new grass grew in faster, thicker, and greener. Burning grass also helped to reduce pests. This type of burning was conducted around buildings, as well as in fields. Participants noted that sometimes these fires got away, but they tended to be small and easy to put out. Most participants were not worried about an out-of-control grass fire, but they emphasized the need to constantly keep the fire under control. A few younger female participants did not see the benefits to grass burning.

“I was wondering what the reasons [are], because it always just looked black to me... My uncle used to do that. They used to get away on him quite often, and all of us kids would have to be hauling pails of water. I just hated that...I was like ‘I am never doing this’” (Participant 037).

Grass burning is not conducted in Peavine primarily to reduce wildfire risk, which appears to have been the case in other Aboriginal communities (Lewis, 1982; Lewis, 1978). Instead, burning in Peavine is conducted mainly for aesthetic purposes, such as removing dead grass from around houses, as well as improving the yield of crops with the additional benefit that wildfire risk was reduced.

It appears that the Métis in Peavine did not use fire to assist in hunting or to drive game, as has been found have been a common practice in other Aboriginal communities (Pyne, 2007; Carter, 1999; Lewis, 1982; Ferguson, 1979). Participants reported that burning of the forest did not occur, and was in fact discouraged. A few Elders mentioned that they remember that their parents used to work hard to prevent forest fires.

“All the fires my dad would build, when we were camping, he always dug a hole, and if there’s rock anywhere around, he would always put rock all the way around it so there wasn’t going to be any fire getting away. He was always protective of, I don’t know, he didn’t want to burn the forest because if you burn the forest all the animals are gonna be gone. There ain’t gonna be nothing left to eat or hunt. So he kind of protected it” (Participant 001, Elder).

Therefore, it appears that the Métis used traditional burning practices primarily to clear fields and burn grass. However, there may be gaps to the knowledge on traditional burning currently present in the community as settlement members who would have had extensive knowledge of traditional burning practices may have already passed away. Certainly, it can be concluded that fire was a regular part of early settlement life, with some traditional burning practices continuing to today.

5.4.1.2 Fire-fighting

Twenty-seven participants had experience with firefighting. It is estimated by the forestry coordinator that 95% of men over 40 and 50% of men under 40 in Peavine have experience with firefighting (L. L’Hirondelle, Forestry Coordinator, Peavine Métis Settlement, personal communication 2010). Many participants commented that members of their family took part in firefighting. Participants were employed in firefighting

anywhere from 1 year to 50 years. Some only fought fires near the settlement, and others were sent as far away as British Columbia, Ontario, and California. Multiple participants recounted the danger in firefighting:

“There was a lot of danger in it...There was falling snags or trees could fall on you. You wouldn’t even hear them. And if you go walking...a lot of time we would find carcasses of animals that had been burnt...” (Participant 039).

These experiences with fire throughout North America have had significant impact on the recognition of risk from wildfire for Peavine firefighters.

The common thread from most participants was that firefighting was fun. When participants were asked during the focus groups to describe their favourite firefighting memories, all involved the social aspects of firefighting.

“Probably one of the best memories I have is, after the day’s all done, you go back to camp, you eat, and you get to talk with everybody there. You make friends, play cards, get to know people” (Participant 047).

Other participants commented on how they enjoyed protecting the forest, which they felt was necessary for animal habitat and oxygen production. Others found the idea of being able to control a fire exciting. Others enjoyed the freedom of being in the bush. Some enjoyed travelling as part of firefighting. Excitement and adrenalin was also a draw for many participants.

“I liked firefighting because it was dangerous” (Participant 039).

“There’s just something there, it’s more thrilling to be out there. I was right in front of a fire, you could just see it rumble and smoke about half a mile ahead of the fire. But the rumble, it was incredible” (Participant 007, Elder).

The main complaint from participants was that firefighting was dirty, and often involved camping in unwanted places, such as the muskeg or burnt over areas participants referred to as ‘the black’.

Strategies for recruitment of wildland firefighters on the settlement have changed over the years. Participants reported that before 1975, fire rangers from the Alberta Forest Service would come onto the settlement and take men to go firefighting. The provincial government legislation at that time indicated that men were required to go to fight a fire if they lived within 10 miles of a prairie fire or 15 miles of a grass fire (Stewart, 1906). The fine for refusal was \$5. Although the legislation did not target a specific group, several participants felt that Aboriginal people were singled out to fight fires.

“As long as you were a Métis person, or an Indian person, it doesn’t matter what you’re doing, they pick you up just like you’re committing a crime. They’ll pick you up even if you’re shopping groceries in the store...If you’re enjoying yourself having a beer, -they used to look for people in the bar. Haul them out from there, at home, where they’re working. They just take them all...I was 14, I was just trying to go to school. And they took me off school to go firefighting” (Participant 034, Elder).

One participant explained:

“Nobody wanted to work for 15 cents an hour, that’s not very much money. But they ask you first if you wanna go firefighting or else do you want to go to jail

until the fire is out. So that's what the deal was. You better be firefighting instead of in jail" (Participant 004, Elder).

People used to hide on the settlement because they didn't want to be picked up to go firefighting. Pay was extremely low, however Elder participants expressed that sometimes it was the only employment available.

"When I first started, that's the only opportunity there was...there was hardly anything else in earlier times for survival, for jobs" (Participant 040, Elder).

By 1975, the fire rangers were no longer forcing residents to volunteer. The early firefighting recruits from Peavine, prior to 1975, received training by the Forest Service to be crew bosses, and it became their responsibility to recruit and lead a firefighting crew of 28 from the settlement when called by the Forest Service. This practice substantially increased the number of firefighters on the settlement. Firefighting wages also increased. One participant commented that he started firefighting because he:

"Needed money and it was a bad fire season. They were picking anybody. There were no requirements" (Participant 029).

Employment in firefighting during the summer could bring financial gains. Because of this, people used to intentionally set fires to gain employment. A participant commented:

"It's a sad thing when a person has to go start a fire for employment. But that was one of the big things of those characters in those days...They kind of knew where to start it. Around a lake or something that would be stopped by a river. But it had to be put out, and men had to go to work. They had their job for two weeks and that's all they needed to survive another six months. Because [it was] just a matter of survival in Peavine" (Participant 008).

Several settlement members received training and education in forestry from local colleges, and were recruited into firefighting through this training. Participants reported that Peavine fire crews quickly gained a reputation for being good firefighters.

"One of the best crews for firefighting used to always come from Peavine. I'm not gonna say this young generation today now, but if you go back to people who were born in the 50s and earlier than that, they were good firefighters" (Participant 007, Elder).

It was about this time that women on the settlement also became involved. One female participant was actively involved in firefighting. The other female participants were employed as cooks or cooks helpers, who travelled with the firefighting crews and supplied the meals.

A change to firefighting practices in 1990 by the Alberta Forest Service caused a substantial reduction in the number of firefighters on the settlement. All firefighters were required to complete fitness requirements before they were able to firefight, and crews were downsized from 28 firefighters with 4 straw bosses and 1 crew boss to contract crews with 8 firefighters with 1 crew leader. One woman commented

"When I quit, it was the year they started doing that fitness walk with carrying those bags. I knew I couldn't do it, so that was it" (Participant 001, Elder).

Some participants commented that this policy substantially reduced the number of fires on the settlement, as firefighting employment could not be gained unless an individual held the proper training and certification:

“They had a policy then that fires in your community, they wouldn’t send you out there because it would stop people from lighting fires close by to where you live” (Participant 005).

Because of the new training and try-out requirements, most of the younger generation (30 and younger) in Peavine do not firefight. In addition, participants commented that now residents had a choice of careers and other opportunities to make money. Currently at Peavine, there are three crew leaders that are trained to lead contract crews from Peavine. In the summer of 2010, two contract crews were used, involving 21 community members.

Participants felt they were very knowledgeable about fire behaviour and firefighting practices and some attributed their knowledge to experience in the bush.

“I’m a trapper, huh, I know the bush, no matter where” (Participant 004, Elder).

One participant described how knowledge of wildfire was transferred amongst settlement firefighters:

“When you go firefighting, even when we came home and had a beer together, we’d still be talking about firefighting. We were all doing it, my friends were doing it, my uncles were doing it. Even at the table, they’d be talking about how to work. By the time I went, I already knew the gist of it. I knew what I had to do and what’s expected of me before I even went out, because they were always talking about it” (Participant 005).

When Elders were asked how they learned how to fight wildfires, participants said it was a combination of common sense and instinct.

“Give me an answer. If I put you on a fire line, and there’s a fire coming towards you, what are you doing to do? Fight back! That’s the only thing you have to do is fight back” (Participant 040, Elder).

Firefighters from Peavine had a detailed knowledge of fire behaviour, such as which vegetation and soil types are the riskiest for wildfire and the different types of wildfire. These participants discussed firefighting methods at length.

“Ok, say a fire started over here [draws]...That fire is coming towards me, it’s gonna burn me unless I meet that fire. So I start making a fire towards that fire. It’s not gonna burn over here anymore. That’s fighting fire with fire” (Participant 001, Elder).

They also knew how weather influences fire. Most attributed this knowledge to training and experience.

“I can burn for myself, with the expertise I have, I can burn in any weather. ‘Cause I’ll know the ground situation, what kind of fuel is available around there. You gotta stop and make sure it’s not black spruce around there...or big, tall, brown grass...Probably the safest is when it’s a cloudy, a little bit of rain, type of thing. But then ain’t nothing gonna burn the way you want it...A hot day is just as good too .The fire burns faster, you get your work done fast. But you gotta know” (Participant 007, Elder).

Taken together, the results of this study show that the community of Peavine has considerable experience with firefighting. Historical use of fire and bystander wildfire experience, combined with firefighting experience have helped to structure perceptions of wildfire risk and preference and support for mitigation activities, which will be discussed in the following section.

5.5 Influences of Experience on Risk Perception

The findings of this study show that risk perceptions varied depending on the participant's fire experience (Table 5-2). These experiences can be broken down into three categories: (1) traditional burning experience, (2) wildland firefighting experience, and (3) bystander experience with wildfire. All participants described having some experience with wildfire, which is common amongst residents in many Aboriginal communities in the Boreal forest.

Traditional Burning Experience

Four participants, all community Elders (three men and one woman), had experience with both traditional burning and firefighting. Each of these participants perceived the risk of wildfire at Peavine was low (Table 5.2). These participants mentioned that most of the settlement area had been logged out or burnt over in the last 70 years, reducing the fuel load and therefore lowering the wildfire risk. The participants had noticed that since the government had stopped hiring people to fight fires in their community, purposeful fire starts had decreased; they felt this reduced the risk of fire in the community. Participants with this experience, most of whom were community Elders, felt confident in being able to stop a fire with firefighting efforts.

“...Any fuel, old dry limbs, any dead logs that have been blown down and stuff like that...in those area, with tall grass, you might have a fire that will take off on you. But they're really always controllable” (Participant 007, Elder).

Participating Elders in Peavine still saw the benefits of using fire around the settlement, and were not afraid to use fire to burn grass around their homes and clear fields. A few felt that government restrictions on burning were too tight.

“They don't even allow me to make a damn puff of smoke in my smoke house [laughs]. I'm not kidding!” (Participant 040, Elder).

Many of the participants with traditional burning experience perceived a low risk associated with grass fires. This is because they have experienced and controlled grass fires, thus they feel they could do the same again. Interestingly, although Peavine participants with this experience felt the risk was low, most of these participants were still reluctant to use traditional burning practices. The fear of getting in trouble from either the Forest Service or the settlement for an out-of-control grass fire has been high enough that the number of people who conduct spring grass burning on the settlement is now low. A few participants said that they were nervous about fires getting away from them.

“They even give me a permit if I want to burn something outside, an open fire. I never use it. It’s too risky” (Participant 006, Elder).

Firefighting Experience

Fourteen interview participants and nine focus group participants had experience with firefighting and said they had no traditional burning experience. Participants in this group ranged in age from 18 to 70 and consisted of nineteen men and four women. The majority of participants in this group felt there was a moderate to high wildfire risk in Peavine (Table 5.2). Participants in this group with two or more years of experience perceived the risk as high. When one participant was asked about the likelihood of wildfire in the region, he commented:

“There’s not one year that I’ve seen where there’s no fires. There’s always a fire. Every year” (Participant 039).

In the words of one participant:

“Because what are settlements? They’re just about all bush! And everybody lets their grass grow tall, so one lightning strike, we could lose a whole hamlet” (Participant 029).

Those with firefighting experience felt the fire risk at Peavine was highest in the spring. There are usually small spring fires on the settlement started by settlement members for grass clearing that get out-of-control. One participant thought this was due to overconfidence by those starting the fires:

“In the spring, it’s high, because there’s a lot of people [that think] ‘It’s low risk and there’s farmland’. There’s a lot of over confidence there. Like the last few ground fires just started with matches ‘well you know what I never thought it could ever get away’. A lot of fires I’ve been on, we get a man calling us saying ‘in 50 years I’ve never had a fire get away on me but I can’t say that now’ [laughs]. It’s overconfidence. A lot of people underestimate a little grass fire.” (Participant 005).

Certain areas of Peavine were described by these participants as being at high risk, such as the ‘young hamlet’ area of the community where there is an abundance of spruce, and Big Foot Park which is a recreation area in a pine forest that has numerous dead trees from pine beetles.

Participants with less than two years of firefighting experience felt the risk of wildfire at Peavine was low to moderate. They noted that the firefighting knowledge and experience of Peavine members lowered the wildfire risk. They also said that the type of vegetation surrounding many of the homes (grass and aspen trees), the availability of water, and the work of the forestry coordinator on the settlement lowered the risk. The only risk they mentioned was in people being careless with fire.

The majority of participants in with firefighting experience mentioned that Peavine was very dry from 2008 to 2010 compared to the past:

“We had a dry summer, a dry fall, and yet, we’re having a dry winter. Our fuel is getting drier all the time...If you study out in the forest, a spruce, the tips of them are just brown... [There’s] just no moisture for the spruce. That’s why there’s

more risk now for fire. It's easy to flare-up any size of fire. Small to big"
(Participant 040, Elder).

These observations are supported by annual climate data from Environment Canada (2011), which indicates that 2010 was the warmest year in Canada on record and that Northern Alberta received 20% less precipitation than usual. Some participants in this group felt that forests on the settlement were growing out of control, increasing the wildfire risk.

"[Before] you could walk through the bush, it wasn't a god-danged jungle. If you had a fire, that would clear that up. Now, you can't even hardly go through the bush, it's like fighting through a jungle" (Participant 009).

A few of these participants said that current prescribed burning efforts by the government were not burning enough forest to reduce the wildfire risk. Therefore, a few participants directly linked wildfire to improving forest health and reducing wildfire risk. This was also found in a study conducted with tribal landowners in Washington State (Carroll *et al.*, 2004) and Northern Idaho (Carroll *et al.*, 2010). Lewis (1982) also found in the late 1970s that Aboriginal groups in Northern Alberta were already commenting on how the landscape was changing due to the suppression of wildfire. Aboriginal participants in Lewis' study felt that current fires were much more dangerous because of the buildup of fuel in the forest, which would not have occurred had they been allowed to continue their burning practices (Lewis, 1983).

Bystander Fire Experience

Twenty participants had only bystander fire experience, thirteen of which were women from all age ranges and six of the men were under 30. These participants did not have experience with traditional burning or firefighting, but had directly experienced a wildfire. A few had memories of their parents or grandparents using traditional burning, but they themselves were not involved. The majority of these participants were found to have a low to moderate wildfire risk perception (Table 5.2). The majority only thought a fire could start if settlement members were careless with fire and let it get away. Many participants relied on the knowledge of firefighters for help with preventing a wildfire or putting out a fire.

"If it was kind of small, I'd try to do something about it myself. But if it was anything serious, then I would get people that know more about it than I do"
(Participant 014).

Participants with bystander experience commented on the fact that there are lots of lakes and streams in Peavine, reducing the risk. They commented that they felt their risk was reduced because they had large grass areas around their homes. Others were surrounded by muskeg, which they also felt substantially reduced the risk of fire. However one participant noted that there is only one major road into Peavine. She was concerned about the ability to evacuate and subsequent relocation should there be a fire. She commented:

"I hope we don't have a wildfire because we have a nice community. And it would be scary because we have nowhere to run, nowhere to go. It's nice too that all the homes are well-spread out, because then you could warn other people"
(Participant 026).

All participants in this experience group commented that they felt that Peavine was drier now than it had been in recent years, which increased some participants' risk perception but had no impact on other participants' risk perception.

However two female participants in this group perceived there to be a moderate wildfire risk. They said they felt this way because their husbands had taken steps to mitigate wildfire risk, which indicated to them that the risk was high enough that something had to be done about it.

“That’s why [my husband] keeps our place just, you know plowed and whatever around our home. He’s always worried about fires” (Participant 023).

Both women's husbands had extensive firefighting experience, which seems to have influenced their risk perceptions.

5.6 Influence of Experience on Wildfire Mitigation

The results of this study indicate that most residents with fire experience (traditional burning, firefighting, bystander) implemented wildfire mitigation on their property and supported wildfire mitigation efforts by the settlement at both the residential and community levels. However, experience type influenced why wildfire mitigation was implemented and/or supported (Table 5.2).

Traditional Burning & Firefighting Experience

All of the participants with traditional burning and/or firefighting experience undertook wildfire mitigation activities on their properties or had allowed the settlement to do so even though they described the wildfire risk as low. Fuel reduction was the most common type of wildfire mitigation undertaken by all participants. Some participants mentioned that they cut back brush and other vegetation from their homes, mowed their lawns, removed dead vegetation around their homes, and thinned trees in the forest around their homes. This was verified during trips to the majority of the participants' homes. A few firefighters with multiple years of firefighting experience were worried that not enough was being done by members to reduce the wildfire risk, and felt there were easy steps that could be taken to significantly reduce wildfire risk:

“Most residents could probably clear all the underbrush around their home...Like, if you take all that underbrush out of there, it will kind of reduce getting the house on fire, because it will only come so far and that’s it. And anybody could start a grass fire [accidentally]” (Participant 039).

When asked if these activities were undertaken strictly for wildfire mitigation, the majority indicated that vegetation management also had an aesthetic benefit.

Experience with firefighting appeared to encourage support for wildfire mitigation programs implemented by the settlement. When wildfire crews are on stand-by when working for the provincial government, they are given wildfire mitigation tasks around the area where they are based. Therefore, firefighters obtain information about mitigation activities, including the knowledge and skill acquired to implement them. The firefighters

are also able to see how wildfire mitigation activities affect fire behaviour and reduce risks to communities and homes. The forestry coordinator felt that extensive firefighting experience in the community made wildfire mitigation easily accepted on the settlement:

“Three out of the five [Councilors] are firefighters, ex-firefighters, so it was an easy sell. And a lot of the people that were doing the labour jobs were firefighters, and they understood what the FireSmart program was”.

Most participants in this experience group seemed to see taking such steps in their community as common sense.

“I mean, sure we clean brush and put anything back away from the house. And I do know about fire prevention, we did a bit of that last week [on community projects]. It’s minor stuff. I thought all that was common sense, right?”
(Participant 009).

Participants with firefighting and/or traditional burning experience felt that wildfire risk had been significantly reduced in the recreation areas of the settlement through community-level mitigation programs. They noted that the clearing of underbrush, the spacing and pruning of trees, the provision of firewood, and the building of fire-pits and gazebos now meant that a fire was less likely in these areas. However, many in this group were knowledgeable about mountain pine beetle and the impact it has already caused on settlement forests. Participants felt that to keep the wildfire risk to recreation areas lower, dead beetle-killed trees must be cut down and burned.

Prescribed burning is not currently included in the wildfire mitigation program at Peavine. Mechanical vegetation management, such as removing deadfall and pruning trees, was preferred by traditional burners and firefighters over prescribed burning of forests. Although participants acknowledged the benefits of fire, including cleaning up the forests and increasing berry growth, most acknowledged they would be nervous to implement a prescribed burning program because of fears that a fire could get out-of-control and burn down the settlement. They also were worried about reducing animal habitat. Some expressed that burning a pine forest would result in a poplar forest, an early succession species, and it would take decades for the pine to come back. However, some traditional burners in the community would still use grassfires in the spring to ‘clean’ the land and some members would burn the grass around their home. Therefore, there seemed to be a distinction in participants’ perceptions of the acceptability of grass fires as opposed to prescribed burning of the forest. Structural mitigation options⁶ were not brought up by any participants with firefighting/traditional burning experience. It is unknown whether this was because they felt that structural mitigation was already in place on most settlement buildings or because they were unaware of structural mitigation options.

Participants with traditional burning and/or firefighting experience were most aware of vegetation management occurring on the settlement. However, most were unaware of any of the other mitigation programs occurring on the settlement. Most did not relate the lawn

⁶ Examples of structural mitigation options include using fire-resistant siding, using triple plan windows, screening soffits, and using metal roofing material.

tractor or the Agriculture 50/50 programs (see Section 4.4.1 for a detailed description of these programs) to reducing wildfire risk.

Participants in this group also expressed that one of the most important ways to reduce wildfire risk was through the re-establishment of the Peavine Volunteer Fire Department. Most firefighters felt that wildfire was not 100% preventable and that there would always be a human-caused grass fire or a lightning-caused wildfire annually on the settlement. They felt that having a fire truck and trained firefighters would help to stop a wildfire from causing major damage on the settlement.

Bystander Experience

Those participants with bystander fire experience undertook wildfire mitigation activities on their properties primarily for reasons other than wildfire mitigation, but acknowledged that the activities also helped to reduce their wildfire risk. A participant explained they cut the grass around their home:

“Mostly for looks, but it helps for fire” (Participant 020).

Other participants in this group commented that they cut back trees to reduce the risk from windfall, with the secondary benefit of reducing potential fuel for a wildfire.

“My father-in-law actually went and took out a lot. He was thinking, well not only for fire, but the windfall and all those too. It was just getting a little too close to our home. So he bucked up all the trees and took out a lot, so we’re pretty open up now” (Participant 037).

Some participants in this experience group commented that their extended family members who were firefighters had initiated vegetation management on their properties, because the former firefighters were concerned about wildfire risk. Therefore the social influence of family members encouraged the implementation of wildfire mitigation.

All participants had agreed to participate in the settlement mitigation programs by allowing the settlement to clear vegetation on their properties. These participants said that they agreed to the program for reasons related to general property maintenance, not reducing wildfire risk:

“Actually I did [agree to participate]. But it wasn’t because of [wildfire], it was just ‘I agree, go clean it up’.” (Participant 030)

In terms of community-level mitigation, many in this group were unaware of specific wildfire mitigation activities occurring in their community other than vegetation management. Most participants in this group seemed nervous about implementing prescribed burning on the settlement because they felt a fire could become out-of-control.

5.7 Discussion

The results of this chapter show that a culture of fire exists at Peavine due to wildfire experiences of settlement members that have occurred over an extended period of time. These experiences were shown to affect wildfire risk perception and mitigation preferences in different ways. The fact that every participant had experienced wildfire in

some way speaks to the pervasiveness of wildfire in settlement life. This is a primary difference between Aboriginal and non-Aboriginal communities. This culture of fire has resulted in current settlement members being aware of the risk associated with wildfire and the importance of mitigation. Participants associated wildfire mitigation with common sense, making it easier to implement risk reduction programs. Also, the fire culture means that Aboriginal participants realize that fire is a natural part of the boreal forest, making them more likely to support prescribed burning.

The results of this study help to clarify how wildfire experience influences risk perception. As suggested by Cohn *et al.* (2007), wildfire risk perception was heavily affected by the fire culture at Peavine. Similar to McGee *et al.*'s (2009) findings, the different types of wildfire experiences amongst study participants in Peavine either appeared to increase or decrease risk perception. These findings show that the culture of fire at Peavine had a significant influence on the construction of risk perceptions in the community. For example, firefighters in the community have seen the power of wildfire and the negative consequences, which influences their high wildfire risk perception. Bystanders also have substantial fire experience and although they have been many wildfires in Peavine and the surrounding area, the consequences have not been severe. This experience may cause them to construct a lower risk perception of fire than firefighters in the community. Those with traditional burning experience in the community tended to have low wildfire risk perceptions because they feel that wildfire can be controlled. Therefore, different experiences have been found to influence the construction of risk perception in different ways. As noted earlier, regardless of risk perception, all participants support the implementation of wildfire mitigation at Peavine at both the residential and community-level.

All participants had implemented residential wildfire mitigation activities on their properties or allowed the settlement to conduct wildfire mitigation on their property, for varying reasons. Those with traditional burning and/or firefighting experience conducted or allowed wildfire mitigation on their properties for the primary purpose of reducing wildfire risk. Those with bystander wildfire experience conducted or allow wildfire mitigation on their property, but for the primary reason of aesthetic benefits. These results show that even in one community, reasons for undertaking residential wildfire mitigation vary significantly amongst residents. It is likely awareness and acceptance for the wildfire mitigation programs would never have occurred if not for the diverse wildfire experiences of settlement members.

As mentioned in the findings section, participants had different views about implementing a prescribed burning program on the settlement as a means of mitigating wildfire risk. All participants expressed fears about a prescribed burn becoming out-of-control and affecting the settlement. However, traditional burners with firefighting experience seemed more willing to support such a program because of the benefits that could be achieved in terms of reducing wildfire risk. These participants were more comfortable with using and controlling fire to achieve a certain purpose. Other studies have found that Indigenous peoples with traditional burning experience support re-

implement traditional burning practices such as prescribed burning for wildfire mitigation (Carroll *et al.*, 2010; McDaniel *et al.*, 2005; Raish *et al.*, 2005).

A common problem in wildfire management (including mitigation) is the devaluation of the wildfire knowledge present in many Indigenous communities by wildfire managers. It has been shown in other studies that hazard managers should recognize the competence and knowledge of local individuals in communities and work to support this local leadership, rather than try to replace it (Arvai *et al.*, 2007; Becker *et al.*, 2007; Murphy, 2007; Raish *et al.*, 2007; Newton *et al.*, 2005; Newman and Smith, 2004; Kruger *et al.*, 2003; Dynes, 2002). As has been shown in Peavine, taking a postcolonial approach to wildfire mitigation by letting the community use their own knowledge, values, and ideas to implement a local wildfire mitigation is more likely to gain support from community members. This recognition that Aboriginal communities have successfully mitigated wildfire risk to their communities in the past and still have the knowledge to develop and implement their own mitigation strategies in the future is critical.

5.8 Conclusion

This study has shown that different types of wildfire experience affect risk perception and mitigation preferences in different ways (Figure 5-1). Aboriginal communities in Canada have a higher percentage of their population with wildfire experience as compared to non-Aboriginal communities. This is because some Aboriginal people have participated in traditional burning practices, high numbers of Aboriginal peoples have and are being employed in firefighting, and many Aboriginal communities are located in remote, forested locations. Therefore, many in these communities are experienced and knowledgeable about wildfire and wildfire risk. Wildfire mitigation programs must be developed to take into account this existing knowledge.

The results of this study differ from the findings of Vogt *et al.* (2005), Nelson *et al.* (2004) and Martin *et al.* (2009) who found that fire experience did not affect implementation of residential mitigation activities or support for community-level mitigation. However, the findings of this study are similar to Vogt (2003) and McGee *et al.* (2009) in non-Aboriginal communities who found that risk perception and mitigation preferences differ depending on type of wildfire experience. Although the findings are similar, the type of fire experiences between residents of Peavine Métis Settlement and the communities in Vogt's and McGee *et al.*'s studies are very different. In the above studies, participants were from non-Aboriginal communities and had only directly experienced fire which threatened their communities. In contrast, participants from Peavine have experienced fire in many ways over an extended period of time, including traditional burning and firefighting experience.

There are similarities between the findings of this study and those found by Carroll *et al.* (2010) amongst Native Americans in the Pacific Northwest and by Monaghan (2004) amongst Aborigines in Northern Australia where a culture of fire was also found to be present. Peavine residents indicated they found implementing residential wildfire

mitigation activities to be common sense, similar to Monaghan's findings that wildfire mitigation activities were a normal part of life in the two Aboriginal communities he observed. Participants from Peavine had experience with traditional burning and firefighting that have combined to result in a new wildfire knowledge base for the community that increased support for community-level mitigation, similar to the hybridization of knowledge found by Carroll *et al.* (2010).

This study has important management implications for the creation and implementation of wildfire mitigation programs in Aboriginal communities. The results of this study show that the fire culture present in Aboriginal communities has sensitized residents to the importance of wildfire mitigation, which makes it easier to gain support for residential and community-level mitigation programs implemented by the community. The type of wildfire experiences in an Aboriginal community should have significant impact on the development and implementation of wildfire mitigation strategies. For example, a community still heavily influenced by traditional burning may favour mitigation strategies that incorporate traditional burning practices to mimic natural fire, such as prescribed burns (Carroll *et al.*, 2004). An Aboriginal community with a high number of firefighters may prefer vegetation management as a wildfire mitigation strategy, as was the case at Peavine where many of the community leaders were former and current firefighters. An Aboriginal community where the majority of residents have only experienced fire as bystanders may favour mitigation strategies that focus on the other benefits of wildfire mitigation, such as forest health and aesthetic benefits.

5.9 Tables & Figures

Table 5-1. Peavine FireSmart Projects

	Year-round Activities	Community Projects
Peavine FireSmart Projects	<ul style="list-style-type: none"> • Agriculture 50/50 • Lawn Tractor • New Homes • Aboriginal Junior Forest Rangers • Fire Guards • Volunteer Fire Department 	<ul style="list-style-type: none"> • Community fuel management • Yard Beautification • Senior & Disability Assistance • Recreation areas

Table 5-2. Summary of how wildfire experience type influenced risk perception and support for wildfire mitigation at Peavine Métis Settlement

Experience Type	Risk Perception⁷	Implementation of Residential Mitigation	Support of Settlement Mitigation Programs	Primary reason implementing and/or supporting mitigation
Traditional burning & Firefighting	Low	Yes	Yes	Aesthetics & Wildfire mitigation
Firefighting	Moderate - High	Yes	Yes	Wildfire mitigation
Bystander	Low - Moderate	Yes	Yes	Aesthetics

⁷ The risk perception rating was based on participants' responses to the question "What do you think is the likelihood that Peavine will be affected by a wildfire?". The response of each participant to this question (low, moderate, or high) was recorded in a matrix based on experience type. The risk perception of the majority of the participants in each experience group is presented here.

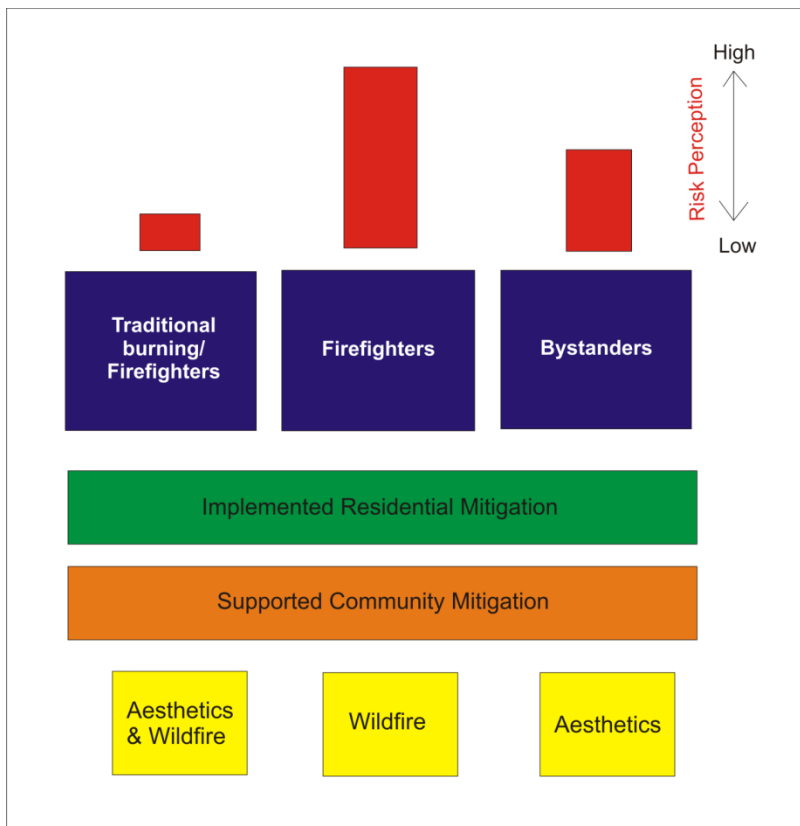


Figure 5-1. Model of how different types of wildfire experience at Peavine Métis Settlement influenced study participants' wildfire risk perceptions, implementation of residential mitigation activities, support for community-level mitigation activities, and reasons behind support of mitigation activities.

5.10 References

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CHAPTER 6: The Influence of Culture on Wildfire Mitigation at Peavine Métis Settlement

6.1 Introduction

Like the other Aboriginal groups in Canada (First Nations and Inuit), the Métis have a unique culture. The word Métis is French and when translated means a child of different races (Purich, 1988). Métis refers to a person of mixed Indian and Euro-Canadian ancestry (Sawchuk, 1998). The Métis are now recognized as a distinct group due to their cultural uniqueness (Weinstein, 2007; Thomas, 1985). The Métis people have a “shared history, a common culture (song, dance, dress, national symbols, etc.), a unique language, extensive kinship connections from Ontario westward, a distinct way of life, a traditional territory, and a collective consciousness” (Métis National Council, 2007, p.1). These people drew on Aboriginal and European cultures to create their own traditions¹ (Weinstein, 2007; Berry and Brink, 2004). The Métis developed their own language called Michif, which was a blend of Cree, Ojibway and French (Weinstein, 2007) and developed courts of justice similar to their French ancestors (Friesen and Friesen, 2004). However, little is known about the contemporary culture of the Métis, especially on the Métis settlements of Alberta. Only a few studies exist (Ghostkeeper, 1995; Pocklington, 1991; Driben, 1985), and most were conducted before the 1990 Métis Settlements Accord and/or focus on historical practices.

Wildfires have always been a part of life for the Métis. The majority of Métis people live in the Canadian Prairie Provinces (Alberta, Saskatchewan, and Manitoba), where wildfires on the prairies and in the forests occur annually. Historically, fire had a more central role in the day to day life in Métis communities. Fires were lit to attract wild game to the resulting early succession forests or prairies (Murphy, 1985; Lewis, 1982). One of the Métis community laws was to prevent lighting fires on the prairie in the high summer (Woodcock, 1975). The Métis historically used prairie fire in warfare, such as in a battle with the Dominion of Canada in 1885 (Woodcock, 1975); fires from this time are still referred to as the ‘Riel Burn’ (Murphy, 1985). The Métis were also accused at the turn of the century of firing the prairies so they could see the buffalo bones more clearly against the blackened land, which they turned in for a profit (Holt, 1998). Fire was used in land clearing in Métis communities. Trees and bush were cut down to open up the land, and the vegetation was piled in large brush piles, which were later burned in the winter (Belcourt, 2006). Fire was also a common risk in many Métis communities, such as East Prairie Settlement, when a vicious wildfire occurred in 1949 (Driben, 1985), and the Métis Village of Wood Mountain, where a huge prairie fire caused residents to abandon the village (Holt, 1998). Currently, spring fires are lit in many Métis communities, though less frequently than in historical times, to clean up dead willows, poplars, and grasses,

¹ For example, historically at Buffalo Lake, the Métis wore tailored cloth outfits and made moccasins; they hunted on horseback but put horseshoes on their horses; they used traditional healing along with European medicines; they ate traditional Aboriginal foods such as pemmican (dried buffalo meat mixed with fat and berries) and European foods such as canned fruit; and they drew their spiritual ways from both First Nation and Roman Catholic traditions (Berry and Brink, 2004).

and allow young willows and poplar trees to grow (Ghostkeeper, 1995). Fire is still used for spiritual reasons (Ghostkeeper, 1995). Numerous Aboriginal² communities in Canada are still at elevated risk due to their isolated, remote locations in forests prone to wildfire (Stocks and Wotton, 2006; Wotton and Stocks, 2006). In particular, the Métis Settlements of Alberta are located in remote areas of the boreal forest that are at high risk of wildfire (Appendix 2).

Researchers have identified that wildfire risk perception and mitigation preferences are influenced by social factors and studies have examined the effect of culture, ethnicity, and race on contemporary risk perception and mitigation (for examples, see: MacGregor *et al.*, 2007; Martin *et al.*, 2007; Raish *et al.*, 2007). Culture, including norms and values, appears to have a significant influence on what members of a non-Aboriginal communities deem an acceptable amount of risk and the activities they are willing to implement and/or support to reduce risks that they deem unacceptable (Paton *et al.*, 2010; Daniel, 2007; Martin *et al.*, 2007; McCaffrey, 2007; Boeck *et al.*, 2006; Brenket-Smith *et al.*, 2006; Jakes *et al.*, 2003; Dake, 1991; Wildavsky and Dake, 1990). Few studies have explored how Indigenous³ cultures affect contemporary risk perception and mitigation preferences (Carroll *et al.*, 2010; Raish *et al.*, 2007; Collins, 2005; Raish *et al.*, 2005; Spillman and Cottrell, 2004). In North America and Australia, the majority of studies involving Indigenous communities and wildfire focus on traditional burning practices and incorporation of traditional burning knowledge into current land management strategies (For examples, see Preece, 2007; Bird *et al.*, 2005; Gott, 2005; Raish *et al.*, 2005; Whitehead *et al.*, 2003; Gottesfeld, 1994; Arno, 1983; Phillips, 1983) and the resulting preference for prescribed burning as a contemporary wildfire mitigation strategy (Carroll *et al.*, 2010; Winter and Cvetkovich, 2007; McDaniel *et al.*, 2005; Carroll *et al.*, 2004; Monaghan, 2004; Lewis, 1982). However, research on how other aspects of Indigenous cultures wildfire risk perception and mitigation preferences is lacking (such as place attachment and social capital). No studies have focused on how aspects of Aboriginal cultures in Canada influence current wildfire risk perceptions and mitigation preferences.

This chapter presents results from a research project conducted in collaboration with Peavine Métis Settlement, a Northern Aboriginal community in Alberta, Canada. The aim of this chapter is twofold: (1) to describe culture in the community, and (2) to examine how culture influences wildfire risk perception and mitigation preferences at both the residential and community levels in Peavine.

² Aboriginal peoples refers to three groups who are identified by the Constitution of Canada as Canada's Aboriginal peoples: First Nations, Inuit, and Métis (Department of Justice Canada, 1982).

³ Indigenous refers to the original peoples internationally who have experienced colonization. It is a term that emerged in the 1970s from the American Indian Movement and the Canadian Indian Brotherhood (Smith, 1999). This term has allowed peoples from all over to come together "to learn, share, plan, organize, and struggle collectively for self-determination on the global and local stages" (Smith, 1999, p.7).

6.2 Context

6.2.1 Culture

It is common to think that Aboriginal peoples in Canada share one culture. However, each Aboriginal community has their own distinct culture although some common values are shared in the majority of communities (McAvoy *et al.*, 2003; Brown, 1976). Culture can be defined as a way of life for a certain group of people, influenced by values, beliefs, languages, meanings, and practices (Anderson *et al.*, 2003). Those with the same culture share a common set of meanings about their environment (Low, 1992); their culture directs their actions, thoughts, behaviours, and feelings, and defines their worldview (Dake, 1992; Haralambos and Holborn, 1991). Two important components of culture are norms and values, which are present in every society (Haralambos and Holborn, 1991) and may change over time (Inglehart and Baker, 2000). Norms are specific directions for conduct that govern appropriate behaviour, whereas values provide general guidelines of what is good, desirable, and worth striving for (Haralambos and Holborn, 1991). A detailed discussion of the cultural theory of risk can be found in Section 1.1 in the *Risk* subsection.

Culture determines how a society perceives and responds to problems, as certain solutions may be acceptable in one society and not acceptable in another (McAvoy *et al.*, 2003; Dake, 1992; Haralambos and Holborn, 1991). Therefore, culture affects the context in which a hazard is perceived, which in turn influences risk perceptions. This context will have an important influence on hazard management (Huntington *et al.*, 2006), because individuals and communities perceive and mitigate risk out of these strongly held beliefs (Paton *et al.*, 2010; Newton, 1995). A detailed discussion of factors that influence risk perception can be found in Section 1.1 in the *Risk Perception* subsection.

An important component of Aboriginal cultures particularly relevant to this study is place attachment. Place attachment is defined as: “a positive affective bond between an individual and a specific place, the main characteristic of which is the tendency of an individual to maintain closeness to such a place” (Hidalgo and Hernandez, 2001, p. 274). In these places, people share familial, communal, and /or cultural bonds with neighbours (Fried, 2000). Shared values, norms, meanings, and experiences of a group of people, in other words their culture, create the framework for developing a place attachment (Brandenburg and Carroll, 1995; Riley, 1992). The attachment can also be to the social and/or physical dimensions of a place, however studies have found that social attachment is generally greater than physical attachment (Hidalgo and Hernandez, 2001). Place attachment increases with age (Hidalgo and Hernandez, 2001) as well as with length of residence (Beckley, 2003). Profound place attachments are found where ethnic, racial, class, or cultural bonds are present (Fried, 2000; Giuliani, 1991). Place attachment is likely greater in Indigenous communities where residents have a deep connection with their culture and the land (Beckley, 2003).

Beckley (2003) describes place attachment as being composed of both ‘magnets’ and ‘anchors’ to help to explain why people remain in certain areas although there may seem to be no benefits in remaining there. For example, many Indigenous people remain on reserves where they are poverty-stricken, unemployed, and/or in abusive relationships (Beckley, 2003). Socio-cultural magnets in Indigenous communities may include social relationships and networks; ecological magnets may include good hunting grounds and fishing areas. Anchors in Indigenous communities include genealogical and cultural ties to a certain area and traditional/local knowledge (including how to obtain goods needed for subsistence) (Beckley, 2003; Low, 1992). Anchors are critical in being able to understand why people remain in certain areas (Beckley, 2003). The concepts of ‘magnets’ and ‘anchors’ are important to this study, because they help to explain the deep levels of place attachment that Indigenous people develop through genealogical and cultural ties.

Influence of Culture on Responses to Hazards

Existing research indicates that aspects of culture influences human responses to hazards because individuals develop their risk perceptions, and preferred mitigation activities through social networks and processes (Paton et al., 2010; Daniel, 2007; McCaffrey, 2007; Murphy, 2007; Paton, 2007; Sturtevant and Jakes, 2007; McComas, 2006; Ford and Smit, 2004; McGee and Russell, 2003; Dynes, 2002; Lupton, 1999; Hofferth and Iceland, 1998; Pelling, 1998; Mitchell *et al.*, 1989; Bachrach and Zautra, 1985). For example, Campbell (2006) discovered that cooperation amongst residents of Pacific Island communities was instrumental in implementing mitigation activities for climatological hazards. Gaillard (2006) found in a study of traditional societies in the Philippines that the most resilient to volcanic eruptions had strong elements of culture present. A study by Gupta and Sharma (2006) and another by McAdoo *et al.* (2006) concluded that a major factor affecting the response and recovery of Indian island communities affected by the Indian Ocean tsunami was had a social context. Research has shown that in traditional societies, community norms will enhance a community’s ability to deal with hazards (Paton *et al.*, 2010). Therefore, aspects of culture have been found to be a key component in influencing hazard management strategies in Indigenous communities. The study presented here will contribute to the literature by examining cultural factors in a Métis community that influence risk perception and mitigation preferences in regards to wildfire.

Cultural factors in non-Indigenous communities have been found to influence the implementation of wildfire mitigation activities⁴ (Bushnell *et al.*, 2006; McFarlane, 2006;

⁴ Activities that residents or communities can implement to reduce wildfire risk have been developed. A complete description of these activities can be found in Section 2.2.3. Most programs separate wildfire mitigation into two types: resident level and community-level activities. In resident level mitigation, activities are suggested for residents to implement on their properties including vegetation management (such as removing high hazard trees surrounding the home and spacing and pruning trees) and structural changes (such as installing fire resistant siding and closing in the undersides of decks). Community-level mitigation focuses on wildfire mitigation activities conducted on public lands such as fire guards or vegetation management and are generally the responsibility of the municipality. In Alberta, the wildfire mitigation program that details these activities to homeowners and communities is called ‘FireSmart’ (Partners in Protection, 2003a; Partners in Protection, 2003b).

McGee *et al.*, 2005; Jakes *et al.*, 2003; Kruger *et al.*, 2003). A community's social context has been found to affect wildfire mitigation decision-making because it influences community expectations, informal social interaction (particularly with neighbours), and within household negotiations (Brenket-Smith *et al.*, 2006). McGee (2005) found that in an urban community social bonds were not significantly related to completion of the recommended wildfire mitigation activities. However, studies in rural communities have pointed to elements of culture as having an important influence on the adoption and acceptance of wildfire mitigation (Paton, 2007; Sturtevant and Jakes, 2007; Jakes *et al.*, 2003; Kruger *et al.*, 2003; McGee and Russell, 2003). Schulte and Miller (2010) found that whether or not an individual would undertake mitigation efforts on their own property was dependent on social factors, such as whether mitigation had been conducted on neighbouring lands or the level of community involvement in mitigation. However, there have been no studies conducted on how Aboriginal culture influences wildfire risk perception and mitigation preferences in Aboriginal communities.

6.3 Methods

Peavine Métis Settlement is located in northwestern Alberta in the boreal forest (Appendix 3 & 4). An in-depth description of the community can be found in Section 1.2. A community-based research project was developed in 2007 with Peavine Métis Settlement to explore factors that were influencing the acceptance and support of their wildfire mitigation program. Interviews, focus groups, and participant observations were used to collect data in the community following specific ethical guidelines⁵. A detailed explanation of the methodology used for this chapter can be found in Chapter 3. Data analysis consisted of initially coding the data throughout the research process for broad themes, and then developing a more specific coding framework upon completion of data collection to explore key themes and relationships.

6.4 Findings

This section first describes culture in Peavine Métis Settlement. Secondly, this section explains how three different elements of culture (traditional/local knowledge, place attachment, and social capital) influence wildfire risk perception and both residential and community-level wildfire mitigation strategies on the settlement.

6.4.1 Culture at Peavine Métis Settlement

Peavine Métis Settlement opened in 1938. Therefore, members do not have an ancestral connection to the particular piece of land where the settlement is located. Many of the ancestors of the original settlers of Peavine were from Manitoba and Saskatchewan, and migrated west due to pressure from European settlers. This is typical of the majority of

⁵ These included the CIHR Guidelines for Health Research Involving Aboriginal People (2007) and the Ownership, Control, Access and Possession (OCAP) guidelines developed by the National Aboriginal Health Organization (Schnarch, 2004).

Métis communities in Alberta, unlike most First Nations communities which are located on their ancestral homeland (or part of it). However, the culture of the Métis has made groups of people want to remain together despite having to move to different land bases.

Like most Aboriginal communities, many members of Peavine are long-time residents. Participants had lived on the settlement for an average of 32 years, with the majority growing up in Peavine. The community is composed of eight main families, who have historically competed for leadership of the Settlement Council. However, the families have now become heavily inter-related, decreasing tensions. Family relations are an important part of life at Peavine. One participant explained:

“All the grandkids, all my kids, know who they’re related to. And they respect them; they call them Uncle, because Native ways, we’re Auntie and Uncle, that type of thing” (Participant 007).

These large extended families rely largely on their family Elders for cohesion. Almost all participants discussed going to their parent’s or Elder’s homes for family events.

“You’re always welcome... You know, my grandmother always had something cooked on the stove. If somebody comes in, ‘go and help yourself’ she’d say in Cree. Whether you were hungry or not, have something. She was always cooking lots” Participant 031).

The unique way land is granted on the Métis settlements (described in Section 1.2) keeps extended family together, increasing social relationships amongst extended family members. Elders often sign over their land to a child, even if the child has their own land title. The result is that most extended families live close together.

All participants indicated that they knew a majority of residents in the community. Most explained that they knew all the older residents, but did not know all of the younger members and children. Participants felt that it was important for people to know other members of their community.

”There’s nothing wrong in knowing everybody in your community because that’s what community is all about. If you don’t know everybody in your community then that’s not a community. You’re just more or less yourself” (Participant 007, Elder)

Community events are also held regularly on the settlement which further increases social relationships and networks. Many participants indicated that they felt they were very involved in the community, particularly in activities involving children.

An important characteristic of the community is how residents assist one another in times of difficulty. Participants discussed how community members support each other in times of need including a death in the community or an illness requiring financial support. The majority of the community will attend fundraising events in the community and large amounts of money are generally donated relative to the small population base. One participant explained her experience when a family member was diagnosed with cancer:

“I still remember the night they had a big event here, where people had their heads shaved for cancer, and getting donations. And I remember my husband calling me, because we were already in Edmonton...and I could tell, he was

overwhelmed with emotion. And I was over there crying...It was just amazing. And you know what that just did for us. It just made us that much stronger. Knowing all these people were there to support us” (Participant 028).

Events like this are held regularly in the community to support settlement members. One reason for the high levels of support may be the fact that most families on the settlement are inter-related.

Strong place attachment was found in the community. Particularly, the number of unemployed members that remain on the settlement is striking (approximately 30% of the adult population). Although many people leave Peavine (generally in their 20s) the majority return, which speaks to the high levels of place attachment in the community. Out of thirty-eight interview participants, thirty-two (84%) had spent time living off the settlement and had returned to live in Peavine. Family connections were the primary reasons participants said they had returned to Peavine as many missed their family too much to remain off of the settlement. Participants of all ages felt they had strong ties to Peavine, through socio-cultural connections.

“We’re rooted here. This is my roots, this is my home.... I belong here I guess...That’s the only way I can describe it. You belong here. We can move, we’re not confined to this place, you know. ... We’re free to roam wherever we want, go reside wherever. But this is where I wanted to raise my family. I was raised here and I had a good upbringing with my folks, there was no hardships that I could remember. Sure, there was times where it was hard to make a living, but we didn’t starve. There’s people that help each other here. No one went without” (Participant 001, Elder).

The majority of participants said that they planned to spend the rest of their lives living in Peavine. Some participants felt that family togetherness was the most important value on the settlement.

As with any culture, social norms are present in Peavine. The extensiveness of and obedience to social norms and values in Peavine is similar to other Aboriginal communities, where strong culture and ties to the land dominate worldviews (Castleden and Garvin, 2009; McAvoy *et al.*, 2003). One established social norm in the community is providing assistance to community Elders or those with disabilities. In Peavine, similar to other Aboriginal communities, Elders are highly respected. Two programs in the community deal exclusively with providing assistance for Elders, including yard and home maintenance work crews and financial assistance for medical-related travel expenses. Some participants said that they volunteer in order to help local Elders. There were programs in the settlement for assisting residents with disabilities. One participant with a disability explained:

“They were really good when I first moved here. They’d come in and help people with disabilities. They’d come mow my lawn, they’d come help with whatever needed fixing” (Participant 035).

A second social norm is providing help to neighbours. This occurred historically on the settlement, as poverty was rampant due to the isolation of the settlement and members

had to rely on one another for subsistence goods. Many participants provided examples of giving or receiving assistance by a friend or neighbor.

“These guys last year were actually doing projects on each others’ houses, like building sheds or whatever. So say there’s a group of 5 guys. You go and help this guy put up his shed, and then the next weekend the same group would come help you put up a shed or do some work around your house...They do things together a lot like that” (Participant 016).

The settlement provides numerous social programs to members. These include offering financial assistance by helping members to pay their utility bills, providing workers to deal with housing issues (such as plumbing problems), and reimbursing members up to half the cost of renovations. There are also programs that deal exclusively with children, including one that offers children a financial incentive for good school attendance and grades, and a hot breakfast and lunch program. The settlement will also cover half the cost of enrolling a child in amateur sports, such as minor hockey.

A third social norm is participating in traditional Métis subsistence activities, which have increased ecological place attachment. Participants described fishing, trapping, and hunting trips as well as berry-picking expeditions all over the settlement. The result of these traditional activities is that family get-togethers to obtain food, hides, and fur have become a normal part of settlement life. These trips are held annually on certain parts of the settlement.

“Last summer, when it started getting nice, we’d go cook out [at Myer’s Lake]. That’s a thing for us. Our family tradition. We go there, we fish, and we cook the fish, and we have outdoor picnics and visit. And sometimes, my Uncle...he said ‘tell me when you’re going out there’, because when we go out, he comes out there and we just sit and talk about old times and we laugh and we visit really good, eh. I really enjoy it, that part of living in the settlement. I get to bond with my family and stuff like that. And we’re a pretty close knit family, we are” (Participant 035).

Knowledge about subsistence activities is shared amongst settlement members, such as good hunting grounds and trapping techniques, and has been passed down by settlement Elders. Traditional medicine use is still common amongst some members, particularly Elders. One participant described specific memories of going to the bush to find roots and plants with her *Kookum* (grandmother). These types of experiences have raised the value settlement members place on the land.

A common value shared at Peavine, which may be different from First Nations and Inuit communities where properties and land are federally owned, is the pride in home and land aesthetics on the settlement. The majority of homes and yards on the settlement are extremely well maintained. Residents take great pride in looking after the home they have title to, and the settlement helps them in this task through home and yard maintenance programs. Participants explained:

“Peavine is different from a lot of other communities. Just by looking at our yards, you can tell the difference. We’re very proud people” (Participant 005).

This pride extends to the entire community.

“No matter if [members are] fighting one another, they’ll still stand up and talk proudly about Peavine. I’ve seen that, I’ve heard that. I mean, in sports, it’s always Peavine no matter what. In politics, it’s always Peavine. You go to all 8 settlement, all Settlement Council meetings, it’s always Peavine that seems to be up there in front” (Participant 006).

While conducting data collection at Peavine, it became quickly obvious how extensive the social relationships were at Peavine and how important these relationships were to settlement members. All participants mentioned that they had people on the settlement they could trust. These trusted relationships were developed over a long period and have been transferred to newer members through reputation. Some participants felt that the familiarity and closeness of settlement members contributed to the high level of trust in the community. Elders held particularly high levels of trust amongst settlement members. Participants expressed that although they were most likely to trust members of their extended family, they also trusted other community members.

“A lot of these guys, they’re not related, but they’re like family...They’re people that you know, you can always count on for stuff” (Participant 028).

All settlement members did not get along, as one would expect in any community. However, most participants expressed that when hard times occurred in the settlement, they could depend upon and trust other settlement members for assistance.

Settlement members were found to have high levels of distrust of ‘outsiders’. This is common in isolated Aboriginal communities such as Peavine, particularly when there are cultural differences between Aboriginal and non-Aboriginal people and a history of devaluation and disrespect for Aboriginal knowledge and ideas. A few participants commented about the distrust of outsiders bringing programs on to the settlement, particularly in programs involving their children.

“They want to bring in, I don’t like to say it, but the white way of doing things...They bring in other people to come in and do these things. And you have people that don’t even understand the Métis culture running our settlement” (Participant 022).

Therefore, this could be perceived as a negative aspect of culture in the community as it has contributed to a level of distrust and exclusion of outsiders from decisions related to the settlement. However, this makes the community more self sufficient because they tend to rely less on help from outside.

6.4.2 Influence of Socio-economic Changes on Culture

A common theme that emerged in the interviews was about the socio-economic changes that have occurred on the settlement, particularly in the last twenty years since the signing of the Métis Settlements Accord with the province of Alberta. The Accord required the province to pay \$310 million to the settlements over 17 years to settle existing lawsuits (Weinstein, 2007). This resulted in increased services provided to members. Peavine has many business-minded members who instigated business deals, such as the purchase of an oilfield company, that also made the settlement quite wealthy compared to other

Aboriginal communities in the region. However some participants felt that with this wealth came significant changes to values on the settlement because of an influx of people to the settlement from the mid-1990s to 2008, both for jobs and those wanting to settle in the community for the improved quality of life.

Many participants who had lived on the settlement before the signing of this Accord in the 1990s frequently reminisced about the past. Some participants described the old community values that were being lost, such as eating large meals regularly with their extended family.

“A lot of people don’t have time to visit each other, not like years ago when I was growing up. People would come, a day of driving with horses, to come visit you, spend time all day. Today, they could drive up 5 minutes, they’re there... [But] they don’t come. Everything’s going too fast...that’s what’s hurting the people. All this new, new things that have come up...” (Participant 034, Elder).

Participants mainly expressed concerns that these people were bringing in outside values and priorities. This influx of residents worried some participants because they felt they did not know, and therefore did not trust, these new residents. Participants were concerned about the increase in drug use on the settlement, a problem that is affecting numerous other northern communities. Some participants also spoke about their frustrations with how social relationships, specifically family loyalties, still influenced politics on the settlement.

Interview participants said that younger participants did not seem to value living on the settlement as much as older members. For example, several interview participants said that younger participants felt it was a right, not a privilege, to be provided with Métis Title to both a home and land. However, despite the complaints younger participants had about living on the settlement, many still had a profound place attachment to Peavine. Younger interview participants expressed interest in one day leaving the settlement, but admitted they would always return to Peavine and would always consider the community their home.

This section has explored culture at Peavine Métis Settlement. Culture at Peavine is unique from non-Aboriginal communities due to the traditional subsistence use of the land, the deep place attachment to the community and connection to the land, and the level of assistance offered by members to one another, currently and historically. Peavine is different from other Aboriginal communities due to unique home and land ownership, community wealth, provision of social programs to all community members by the settlement, and aesthetic community norms. Next, the influence of this unique culture on wildfire risk perception and mitigation strategies will be explored.

6.4.3 Influences of Culture on Wildfire Risk Perception and Mitigation Preferences

6.4.3.1 Risk Perception

At Peavine, culture appeared to influence wildfire risk perception. In particular, four factors were found to influence the construction of wildfire risk by settlement members: local knowledge, place attachment, social relationships, and norms & values. In this section I will examine how these specific components of culture affect wildfire risk perceptions on the settlement.

Local knowledge created from the culture of fire at Peavine, resulting from experiences in traditional burning, firefighting, and being a bystander during wildfires (see Chapter 5), appeared to influence wildfire risk perceptions. Settlement Elders were particularly knowledgeable about wildfire. Knowledge of fire behaviour has influenced risk perceptions. Participants were particularly knowledgeable of differing fire risks associated with different types of vegetation. Participants were aware that early succession forests covering the centre of the settlement were of little risk for wildfire. Participants who had title on land in this area (about 70% of homes on the settlement) perceived little risk of their homes being affected by a wildfire. The majority of participants explained that certain areas of the settlement were at high wildfire risk, such as many of the recreation areas located in predominantly pine forests. Participants with homes in the pine/spruce forests expressed moderate concern about their homes being burnt in a wildfire, however they were more concerned with the potential ‘destruction’ of settlement forests in a wildfire. Members who have lived on the settlement for a long time were very knowledgeable about the climate in the region. Most participants felt it was substantially drier on the settlement in the last 4 years (2006-2010), which in turn they felt increased wildfire risk. For example, participants felt that the wildfire risk was highest prior to spring rains which they thought were coming later and later each year following the snow melt. Therefore, each participant had different wildfire risk perceptions associated with their knowledge of wildfire, which was based on looking at wildfire risk in different scales, at different times of the year, and with different vegetative types.

The extensive wildfire knowledge of participants resulted in different wildfire risk perceptions dependent on whether a fire was natural or human-caused. Settlement members felt there was a low risk of human-caused wildfires. Participants felt that they could trust other members to take care not to let a fire get out-of-control.

“I think everybody around here is already knowledgeable about fires and putting them out properly, like their campfire... I know that people wouldn’t let their fires get away” (Participant 030).

Community norms of being careful with fire have existed since the formation of the settlement.

“[My father] never used to go out to make fire in the bush there. No way. He saved the animals. ‘Cause he’s got enough sense that you don’t make fire when you’re in the bush there. It’ll burn out the animals. They were quite, he was quite

careful with out when he was out in the bush there not to set any fire, 'cause that's their hunting areas" (Participant 006, Elder).

Most participants mentioned the risk on the settlement associated with lightning-caused wildfires. One participant mentioned that they happened every year on or around the settlement. The majority of participants were not concerned about the risk of a wildfire that started in their own settlement, as they felt they had enough resources and knowledge to fight the fire quickly before it became out-of-control. Participants were very confident about the ability of their members to stop a fire:

"We have a lot of experienced forest firefighters in this area. Lots of people used to always go firefighting from Peavine". (Participant 008) and

"There's lots of firefighters, they know what to do. There's the water trucks, there's two of them. It won't be so bad" (Participant 003, Elder).

However, some participants expressed concern about a fire starting outside of their settlement, quickly growing out-of-control, and moving into the settlement. Because of firefighting policy in the province, members of Peavine would not be allowed to fight a fire off of their settlement. These participants felt it would take a provincial wildfire crew a long time to respond to a fire in this location due to the remoteness of the area and by the time the crews responded the fire would be out-of-control. They felt that the resources in Peavine were able to better handle a fire than those outside of the settlement.

Numerous participants indicated they gained information about wildfire from social relationships. Half of the participants mentioned that their perceptions of the local wildfire risk had been influenced by another settlement member, usually the forestry coordinator or a family member. This seemed to have differing affects on participants' risk perceptions. On one hand, some participant explained they had high risk perceptions due to conversations with others about wildfire. For example, one participant explained she thought the risk was high at Peavine because her husband was always worried about fires. On the other hand, the reputation and work of the forestry/safety coordinator in the community also reduced risk perceptions for some in the community:

"[The forestry coordinator's] been looking after that for a few years now... So when it gets dry and stuff, he puts up flyers or puts out warnings in the newsletters and stuff, and 'make sure your campfire's out' and stuff. So he watches pretty good" (Participant 032).

As described above, participants trusted their fellow settlement members to be careful with fire and trusted in certain members abilities to put out a wildfire once it had started. However, some participants expressed distrust of 'outsiders', particularly of the oilfield workers who had come onto the settlement recently for oil exploration and harvesting. They felt that these 'outsiders' would not be as careful with fire as settlement members were, and did not have the experience that members had in quickly fighting a fire before it became out-of-control.

As described above (Section 6.4.1), participants felt a significant attachment to Peavine through cultural and genealogical bonds. The resulting place attachment has had an effect

on wildfire risk perception amongst participants. Although participants had varying risk perceptions, almost all expressed concerns about the impact an out-of-control wildfire would have on the settlement. Although these participants did not express concern about their own house or property being affected, they felt the impact of a wildfire would be difficult for the settlement to overcome. Another was worried about the ability of Peavine to rebuild if a fire burned multiple homes or certain settlement infrastructure. Most participants seemed especially concerned over the high wildfire risk to many of the recreation areas on the settlement. Participants felt very attached to those areas and expressed concern about how annual traditional activities would be impacted by a wildfire. These worries and concerns about the impact of a wildfire may reflect high levels of place attachment amongst participants, as participants seemed to believe that a large out-of-control wildfire would result in significant changes to the community they valued which they felt was extremely worrying.

6.4.3.2 Mitigation

The culture at Peavine Métis Settlement appeared to affect wildfire mitigation preferences of members. It was found that mitigation activities implemented by the settlement were preferred by participants over individual mitigation activities at Peavine. However, most participants had still implemented residential wildfire mitigation. Participants had a variety of reasons for implementing residential wildfire mitigation activities either by themselves or by participating in mitigation activities offered by the settlement. Some participants said that they completed wildfire mitigation measures on their property mainly to reduce wildfire risk, but secondly for other benefits such as improving the aesthetics and improving the wildlife habitat. Other participants conducted or supported residential wildfire mitigation activities principally for aesthetics, general property maintenance, and to reduce the windfall danger, and did not necessarily consider the reduction in wildfire risk. Norms were found to exist in the community where pressure existed for residents to maintain their property so that they were aesthetically pleasing. Participants often indicated that they took pride in how their settlement looked, and they worked to ensure that their property was well maintained. This likely contributed to the implementation of residential wildfire mitigation activities as many of the activities have the added effect of a clean and orderly yard. For example, some of the recommended wildfire mitigation measures, such as keeping grass mowed and watered and removing dead tree limbs had the additional benefit of improving the aesthetics of a yard.

Other studies have been found that participants were unwilling to implement residential wildfire implementation because of a desire to maintain the ‘naturalness’ of their surroundings (Westhaver *et al.*, 2007; Nelson *et al.*, 2005). This was not found at Peavine. No participants said that vegetation management on their properties or in their community disrupted the ‘naturalness’ of their surroundings. Instead, a few participants discussed the use of wildfire as a tool to ‘clean’ the forest.

“Instead of having two feet of rotten soil or something like that, that would come and get cleaned up and you would get fresh green trees, fresh green grass, and

everything else, right? It would clean up the old stuff that was rotten which was no good anymore except for maybe compost” (Participant 009).

Other participants were aware of the ecological role of fire in the boreal forest. This concept of using fire to maintain a healthy forest has been passed on through social networks in the community, as participants indicated they learned this from their Elders.

High levels of support were found for the settlement mitigation program, which incorporates both residential and community-level mitigation. Community-level wildfire mitigation activities at Peavine were developed by integrating the norms and social structures that exist in the community, which increased the acceptance and adoption of the program. For example, many of these programs are developed around the social norm of providing assistance to one another in the community. One such program is the Elders assistance program, where Elders in the community are able to apply to have a settlement work crew to help them with wildfire mitigation on their properties a few times in the year. A participant commented:

“[Elders] are actually pretty good because they always get work done to their yards every year. [Settlement employees] cut their grass, they trim their trees, they do all that good stuff for them” (Participant 029).

The integration of residential community-level wildfire mitigation activities into social programs increased support. For example, community projects employ numerous settlement members temporarily, providing them with a wage and training. The activities conducted by these temporary employees include many wildfire mitigation activities such as vegetation management. Support for community projects is high, not because these activities decrease wildfire risk in the community but because the program employs settlement members (see Section 4.5.2).

Local knowledge gained from wildfire experience (see Section 5.4.2 and 5.4.3) also influenced residential and community-level wildfire mitigation. The creator of the settlement mitigation program is a former wildland firefighter, the council who passed the program is made up of a majority of former seasonal firefighters, and the labourers who carry out the work on the settlement are former or current seasonal firefighters. This firefighting experience brought increased knowledge and skills to the community which has been useful in the implementation of Peavine FireSmart Projects. Participants who are former or current firefighters were found to have higher risk perceptions of wildfire occurring on the settlement, which influenced their support of wildfire mitigation in the community. Through social relationships and networks in the community, the support former and current firefighters showed for community-level mitigation encouraged family members and friends to also support mitigation.

Trust amongst settlement members appeared to increase support for the settlement wildfire mitigation program because participants trusted the members running the program and allowed the settlement to conduct wildfire mitigation on their own property. Some participants mentioned that they were not sure which programs were occurring in the community, but felt that the forestry/safety coordinator had programs in place. Some

participants mentioned that they depended on and trusted extended family members to help them to complete wildfire mitigation measures on their own properties, particularly those with fire experience.

“Actually the trees that I was talking about, my father-in-law actually went and took out a lot. He was thinking not only for fire, but the windfall... [The trees were] just getting a little too close to our home. So he backed up all the trees and took out a lot, so we’re pretty open up now” (Participant 037).

Therefore, these residents are dependent on their social relationships when implementing wildfire mitigation activities on their own properties. Other participants relied on the settlement wildfire mitigation program, such as the yard beautification program where work crews conducted wildfire mitigation activities on their properties.

“Um they were doing, I think it was FireSmart or something like that at the time. They went around the homes, and then of course, if they saw that you needed this clearing done, then they would contact you and let you know that ‘we’d like to send a crew out there, we need to clear that tree out of there’..And I was all for it, because you know, you want to kind of protect your home from also catching on fire. Like, get it away from those main trees. And plus, I benefited, like I said, I got my land cleared free! [laughs]” (Participant 031).

Resources that existed for other community improvement projects, such as road construction, were transitioned easily into performing wildfire mitigation tasks. Members were also allowed to decide if they wanted the settlement to conduct wildfire mitigation on the land to which they held title. This type of collaboration between the settlement and members improved trust relationships and willingness to allow the settlement to implement residential mitigation activities on their properties, as each member knew that activities would not be performed on their property without their permission.

Social relationships have increased the acceptance of settlement mitigation programs. Many members were aware when wildfire mitigation activities were being performed on their neighbours’ properties, either through speaking with their neighbours or observing the work on their properties. Because this work was funded by the settlement, some members wanted to receive the same assistance as was being given to their neighbours. One participant involved in Peavine FireSmart Projects explained how this worked:

“No it was basically ‘if they got it, how come I didn’t get it’. [laughs]. You know, and then that was easier that way. I played that card, and I played it lots. Like ‘why don’t you go look at his yard’. And I knew after they went and looked at his yard, they’d be going to council saying why don’t I get that. Works for me. There’s another home I got” (Participant 005).

Culture also influenced the areas of the settlement in which members felt it was important to mitigate wildfire risk. Participants were very supportive of community-level wildfire mitigation being conducted in recreation areas on the settlement which are commonly used for cultural purposes. These mitigation activities consisted of vegetation management, including the cutting of dead trees, pruning and spacing of high hazard trees such as pine and spruce, and removal of dead-fall. Some participants expressed the importance of reducing wildfire risk so the recreation areas could continue to be used in the future by members of the settlement for hunting, fishing, camping, and berry picking.

A few participants mentioned that the clearing of deadfall had slightly increased berry production, particularly in BigFoot Park. The majority of participants were pleased with the resultant aesthetic improvements to the recreation areas.

Finally, place attachment played an important role in support for and implementation of wildfire mitigation activities. As described above, some participants were worried about the impact an out-of-control wildfire would have on the settlement. Therefore, participants seemed willing to support any wildfire mitigation the settlement deemed to be necessary, both on their properties and on shared settlement land. It appears that participants wanted to reduce the potential risk of a wildfire causing unfavourable changes to Peavine that would negatively affect their place attachment.

6.5 Discussion

The influence of culture on both risk perception and mitigation preferences shows that Indigeneity matters in decision-making regarding wildfire mitigation in Peavine Métis Settlement. The culture of the community has been socially constructed by both past and current members through their life experiences. At Peavine, the rich culture may have an even stronger effect on risk perception and mitigation preferences than in non-Aboriginal communities because of the pervasiveness of Métis culture in all aspects of a member's life. Although the length of time members have resided on the particular piece of land Peavine is located on is relatively short, it has been long enough for residents to develop local knowledge unique to the area and to also create a profound place attachment to the community. Members are well aware of local ecological changes occurring on the settlement, particularly the drought conditions occurring on the settlement over the last four years. Social relationships, norms, values, and trust in other members of the community exist because of the culture and history of the settlement. The number of longstanding residents at Peavine as well as the expressed commitment to the community through good and bad times is a characteristic common in Aboriginal communities, but rare in non-Aboriginal communities.

The culture at Peavine has also contributed to the social construction of knowledge in the community. From the culture of fire (see Chapter 5) to the reliance on opinions, advice, and assistance from other members of the community, decisions about risk perception and mitigation are not made by individuals in isolation. Members of Peavine are very knowledgeable about wildfire and aware that there are different wildfire risks to the community which depend on numerous factors such as time of year and vegetative type. Risk perceptions of members are socially constructed, with social relationships and settlement norms both increasing and decreasing risk perceptions. Place attachment to the community has created a fear in some participants of losing the settlement to a wildfire.

Sharing of knowledge and information about wildfires is significant at Peavine. The reliance on social relationships for information about hazard risk and mitigation activities has been found in studies with non-Aboriginal communities (Paton *et al.*, 2010; Murphy, 2007; Paton, 2007; Brenket-Smith *et al.*, 2006; Dynes, 2002). In regards to wildfire, the

reliance of social relationships for information about wildfire and risk reduction activities has been found in rural non-Aboriginal communities (Paton, 2007; Sturtevant and Jakes, 2007; Jakes *et al.*, 2003; Kruger *et al.*, 2003; McGee and Russell, 2003).

Social norms and values at Peavine have had an effect on mitigation preferences of members. The norm of having well maintained homes has meant that mitigation activities such as keeping lawns short, removing dead-fall, and spacing and pruning trees are regularly implemented on the settlement. Members gain pride in their community by setting themselves apart for the expectation of being what participants describe as a 'typical' Aboriginal community by having aesthetically pleasing properties. There exists a pressure in the community not to be the title holder to one of the poorly maintained properties. Studies in non-Aboriginal communities have shown that some residents adopt wildfire mitigation because they want their property to reflect themselves and their values (Brenket-Smith *et al.*, 2006; Nelson *et al.*, 2005). Research on other hazards has shown that established social norms create an obligation to perform certain mitigation activities, as residents in communities with high social capital feel an obligation to participate in activities that will reduce hazard threat (Dynes, 2002).

This study found that settlement members preferred to have residential mitigation activities to be implemented by the settlement as opposed to having to conduct the activities by themselves. What may seem like a similar finding has been found in some non-Aboriginal communities, as residents favoured community-level wildfire mitigation because it removed the responsibility to reduce wildfire risk off of individuals (Daniel, 2007; Gardner *et al.*, 1987). However, at Peavine residents do not prefer community-level mitigation activities over residential mitigation activities. Rather, participants supported both residential and community-level activities but felt both types of activities should be carried out by the settlement and not by individuals. The custom of collective action pervasive in Indigenous cultures worldwide (McAvoy *et al.*, 2003) likely influences preference for settlement-implemented wildfire mitigation over individual mitigation activities. Members preferred to handle problems in the settlement collectively, including wildfire mitigation. Those who supported residential and community-level wildfire mitigation were often the ones who ended up being employed to do the work. This preference for collective problem-solving and communal action works in opposition to colonial values of individualism and capitalism. At Peavine, the settlement is shared amongst all members. As mentioned in Section 1.2, all members vote annually on settlement issues including the budget to approve programs such as those that involve wildfire mitigation. In non-Aboriginal communities, land is broken up into privately-owned segments and public areas which are owned by the municipality or town/city, not the general public (for example, go try to cut down a tree in a public park behind your home). Therefore, the preference of settlement members for the settlement to take responsibility for all wildfire mitigation occurring in the community is not surprising in Aboriginal communities.

This study found that participants preferred mitigation activities developed by members of their own community. This is because participants trusted in the expertise of these community leaders and also knew them in other aspects of life. For example, participants felt the forestry coordinator had the same values as they did. Social programs brought into the community by ‘outsiders’ generally received little support from settlement members. The tendency to distrust outsiders is common in Aboriginal communities, and relates to a history of contentious relations between all levels of government in Canada and Aboriginal peoples. In particular, the implementation of outside programs may be seen by Aboriginal peoples as a move to eliminate the cultural uniqueness of Aboriginal communities, similar to the disaster of residential schools (Milloy, 1999). Therefore, a postcolonial approach to wildfire mitigation has been taken in Peavine, where community members use their local knowledge and culture to create a program unique to their community.

6.6 Conclusion

The findings of this study indicate that culture in Peavine Métis Settlement has influenced wildfire risk perceptions and mitigation preferences. Local knowledge, place attachment, social relationships, and norms & values have all affected wildfire risk perceptions in the settlement and preferred strategies for reducing that risk (Figure 6-1). Aboriginal communities have distinct culture differences compared to non-Aboriginal communities, which are important to consider when trying to reduce wildfire risk in Aboriginal communities. These include high levels of traditional and local knowledge about wildfire, significant place attachment for genealogical and cultural reasons, numerous social relationships, and cultural norms & values. Most important to consider is the preference for mitigation activities that can be implemented collectively, which helps to explain the preference for mitigation strategies completed by the settlement at Peavine.

This study supports previous findings that culture has a significant influence on wildfire risk perception and mitigation preferences (Paton et al., 2010; Daniel, 2007; Martin et al., 2007; McCaffrey, 2007; Brenket-Smith et al., 2006; Jakes et al., 2003). However, this study adds to the literature because it examines culture in a Canadian Aboriginal community. The culture of the Métis people of Peavine Métis Settlement affected wildfire risk perception and mitigation preferences through local knowledge, place attachment, social relationships, and norms & values. Although studies in other Indigenous communities and different hazards have also identified traditional/local knowledge (Woodward, 2008; Becker *et al.*, 2007; Gaillard, 2007; Mercer *et al.*, 2007; Campbell, 2006; Gaillard, 2006; Gupta and Sharma, 2006; Ellemor, 2005; Mitchell, 2003; Woolcock and Narayan, 2000; Pelling, 1998; Perry, 1979; Torry, 1978), place attachment (Paton et al., 2001; Tierney et al., 2001; Paton et al., 2000; Mileti, 1999; Russell et al., 1995), and social capital (Paton *et al.*, 2010; Campbell, 2006; Gupta and Sharma, 2006; McAdoo *et al.*, 2006) as factors affecting hazard risk perception and mitigation preferences, this is the first study to explore these components regarding wildfire risk. Another unique finding of this study was that the local culture promoted

collective action for problem solving, which increased support for community-level mitigation instead of individual activities.

This study has several management implications. Peavine FireSmart Projects was created by settlement members who already understood the cultural context of their community, and focused mitigation on activities carried out by the settlement on both residential properties and public lands. This case study has shown the importance of allowing local individuals to take more responsibility for wildfire mitigation. Although outside managers are still needed in some cases to provide financial support and training on wildfire mitigation for community leaders, this case study has shown that mitigation programs based on local culture are more likely to be implemented. It is important that programs to mitigate wildfire in Aboriginal communities be different from programs in non-Aboriginal communities due to distinct cultural difference. Cultural values also have other implications that wildfire managers may not think of. As explained earlier, members were concerned about the wildfire risk to recreation areas and other areas used for traditional land-use. The application of mitigation activities to these traditional areas on the settlement is something that may not have been considered by an outside wildfire manager developing a mitigation strategy for the community. However, to settlement members, reducing the risk of wildfire to these particular areas was important. This reflects the value residents in Peavine place on their traditional and recreational lands, something that is not often considered by outside managers who often only consider wildfire risk to structures and develop mitigation activities accordingly.

There is a need for future research to further examine the relationship between culture and wildfire risk perception and mitigation preferences. This is an important area of study concerning Aboriginal communities, as many have existing social structures and values that outside wildfire managers may be unaware of. In particular, research must be conducted in First Nations and Inuit communities, some of which are at high risk of wildfires based on their remote locations in the boreal forest, to identify factors that contribute to wildfire risk perception and mitigation preferences, and to examine the similarities and differences between different types of Aboriginal communities.

6.7 Figures

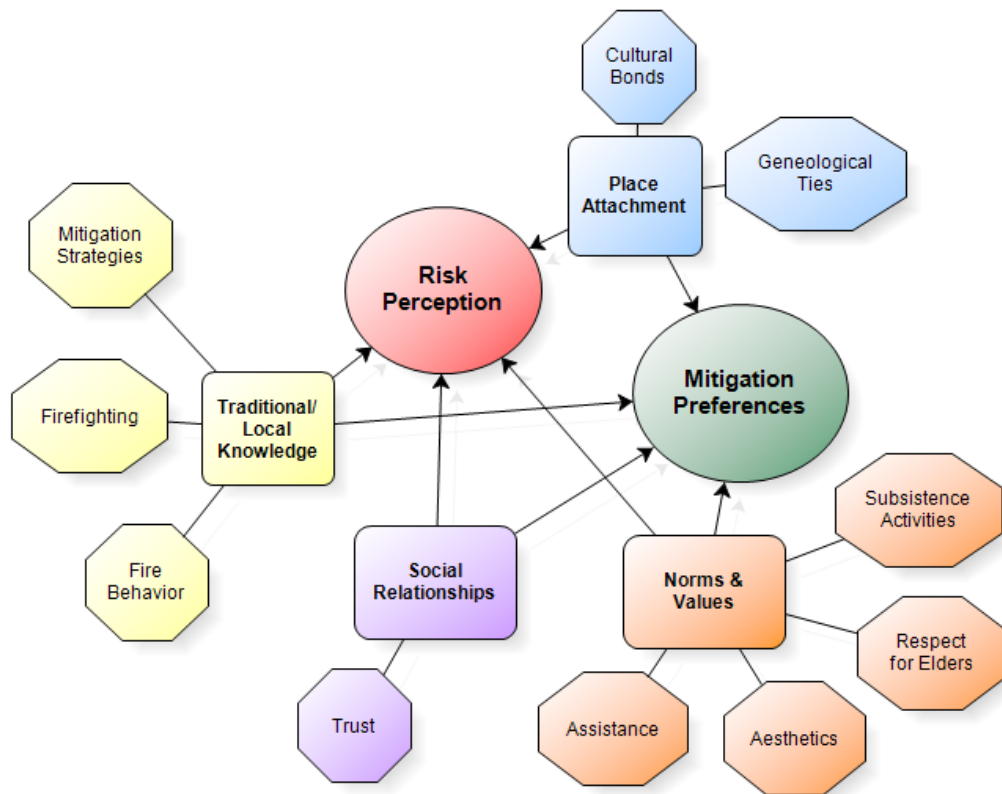


Figure 6-1. Model of the cultural factors that affect participants' risk perceptions and wildfire mitigation preferences at Peavine Métis Settlement

6.8 References

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CHAPTER 7: Conclusions

7.1 Introduction

This dissertation has addressed themes of cultural geography and hazard management. It has examined factors influencing risk perceptions and mitigation of wildfire in an Aboriginal community in Canada. This study has been the first in Canada, and one of the first internationally to answer calls for research in the area of Indigenous communities and contemporary wildfire mitigation (Raish *et al.*, 2007; McFarlane, 2006; Stocks and Wotton, 2006; Spillman and Cottrell, 2004). The goal of this research was to explore local characteristics that were influencing the creation and adoption of a local wildfire mitigation program at Peavine Métis Settlement. The objectives of the research which were to:

1. Identify wildfire risk perceptions at Peavine Métis Settlement.
2. Identify the wildfire mitigation methods used in the community.
3. Explore how community characteristics of Peavine Métis Settlement affect local residents' risk perceptions and mitigation preferences.

Specifically, this thesis has examined: (1) a unique wildfire mitigation program in an Aboriginal community and factors that contributed to implementation (Chapter 4); (2) how wildfire experience in a Métis community has affected wildfire risk perception and mitigation (Chapter 5); and (3) culture in a Métis community and the influences of Métis culture on wildfire risk perception and mitigation (Chapter 6). The study results show that community characteristics affect wildfire risk perception and implementation of residential and community-level mitigation activities.

7.2 Contributions

The results of this research, as presented in this thesis, aim to contribute to knowledge in the field of cultural geography by using a hazards approach to examine wildfire risk perceptions and mitigation strategies in an Aboriginal community. This project has focused on Aboriginal peoples and natural hazards, an area that has received very limited attention in Canada (Cruikshank, 2001; Newton, 1995). This study is particularly unique by not only observing which wildfire mitigation measures are being conducted in an Aboriginal community (Monaghan, 2004), but in examining which factors are influencing risk perception and exploring why community members are implementing wildfire mitigation on their own properties and/or supporting wildfire mitigation in their community. This research is the first to study an Indigenous community wildfire mitigation program supported by community members. Peavine FireSmart Projects is detailed in Chapter 3, presenting the first detailed look into contemporary wildfire mitigation in an Aboriginal community. It is important to document successful wildfire mitigation programs so that wildfire managers can examine these programs and apply some of the ideas to developing and implementing their own wildfire mitigation programs.

This thesis makes six significant contributions. The first contribution of this dissertation is a detailed description of a local wildfire mitigation program that has been supported and implemented by local community members, of which there are few examples in the academic literature (McFarlane *et al.*, 2007; Jakes *et al.*, 2003; Kruger *et al.*, 2003). This study is also the first to examine a local wildfire mitigation program in an Aboriginal community. Findings indicate that the uniqueness of Peavine Métis Settlement had important implications on the ability of a community to implement wildfire mitigation, both at the residential and community-levels. The community has taken a postcolonial approach to reducing wildfire risk by engaging local knowledge, relationships, culture values, and community decision-making to implement a successful community-level wildfire mitigation program with high levels of support from members, as well as encouraging individual mitigation by members on their properties. The process of collaborative decision-making and collective action is especially unique to Aboriginal communities, and increases the likelihood of community-level programs achieving success over individual behavior change.

The second contribution of this thesis is to identify factors that encourage support for a local wildfire mitigation program. Support of Peavine FireSmart Projects was found to be influenced by four main factors: local leadership, economics, community capacity, and land and home ownership. This study also identified additional factors, such as land and home ownership and economics, found at Peavine Métis Settlement that have encouraged support for a community-level wildfire mitigation program (Chapter 4). These factors have not been identified as influencing community support for local wildfire mitigation programs in either Aboriginal (Carroll *et al.*, 2010; Winter and Cvetkovich, 2007) or non-Aboriginal communities studied by other researchers (Daniel, 2007; McFarlane *et al.*, 2007; Shindler, 2007; Winter and Cvetkovich, 2007; Vogt *et al.*, 2005; Jakes *et al.*, 2003; Kruger *et al.*, 2003; Gardner *et al.*, 1987). This study identifies the difficulties in applying 'one-size-fits-all' wildfire mitigation programs to the community, particularly in an Aboriginal community due to complexities regarding land and home ownership

The third contribution is that the success of the wildfire mitigation program at Peavine is partly due to the integration of wildfire mitigation into social programs, a finding that has not been presented in any academic literature to date. This strategy has increased community support for wildfire mitigation and has created an expectation that these programs will be available to settlement members annually. This strategy also addresses how wildfire mitigation programs can obtain funding when competing with other priorities. This finding can be applied to other communities, both Aboriginal and non-Aboriginal, as integrating wildfire mitigation activities into other social programs, such as to assist seniors or to clean-up the community, increases the likelihood of both obtaining funding and community support for wildfire mitigation activities.

The fourth contribution is the finding that Peavine Métis Settlement has a culture of fire that influences wildfire risk perception and mitigation preferences. The results of this study explain how fire experience in an Aboriginal community has affected wildfire risk perception and mitigation preferences in different ways (Chapter 5). This research

identified three types of fire experience in Peavine: traditional burning practices, firefighting employment, and bystander experience. This study has shown that knowledge of traditional burning practices is still held by the Métis in northwestern Alberta and influences their wildfire risk perception and mitigation preferences. Local knowledge of wildfire is supplemented in other ways, including firefighting experience, bystander fire experience, and sharing stories with one another. These types of experiences were found to influence risk perception and mitigation preferences. Those in the community with traditional burning or bystander fire experience were found to have low risk perceptions. Those with firefighting experience were found to have high wildfire risk perceptions. Firefighting experience in the community was found to significantly increase knowledge of and support for mitigation activities. Therefore the type of wildfire experience affected risk perception and mitigation preferences. This finding differs from the findings of Vogt *et al.* (2005), Nelson *et al.* (2004), and Martin *et al.* (2009) who found that fire experience did not affect mitigation preferences. However, the findings of this study are similar to the results of Vogt (2003) and McGee *et al.* (2009) studies in non-Aboriginal communities. These latter studies found that varying fire experience have different effects on wildfire risk perception and mitigation preferences. However, participants in these communities only had experience with wildfire as bystanders, whereas participants from Peavine had experience with fire as bystanders, traditional burners, and firefighters. Therefore, the types of fire experience examined in this study make a unique contribution to the literature.

This finding also has management implications. Aboriginal communities in Canada have a higher percentage of their population that have experienced wildfire than non-Aboriginal communities. Residents in Northern Alberta Aboriginal communities were found to be very knowledgeable about fire behaviour and wildfire risk from a history of traditional burning practices (Lewis, 1988; Lewis, 1983; Lewis, 1982; Ferguson, 1979; Lewis, 1978; Lewis, 1977), similar to the results from this study. Aboriginal crews from across Canada have also made up a significant percentage of wildland firefighters, again increasing their exposure to wildfires and wildfire risk. Therefore, any sort of wildfire management or education program aimed at Aboriginal communities must take into account the existing high levels of knowledge about wildfire. For example, instead of providing basic information about wildfires and mitigation in the form of brochures, information could be provided to the forestry coordinator at Peavine about writing grant proposals to obtain funding for wildfire mitigation activities. Community Elders could also meet with SRD wildfire managers about wildfire concerns on the settlement. However, as new residents move to Aboriginal communities, firefighting employment decreases, and Elders with traditional knowledge pass away, the type of education needed may change.

The fifth contribution is that culture in an Aboriginal community has important impacts on wildfire risk perception and mitigation preferences, supporting previous findings in non-Aboriginal communities (Daniel, 2007; Martin *et al.*, 2007; McCaffrey, 2007; Brenket-Smith *et al.*, 2006; Jakes *et al.*, 2003). Traditional/local knowledge gained from experience living off the land and the culture of fire in the community has made

participants aware of fire behavior and mitigation strategies. Place attachment was also found to be extremely high amongst participants, which was surprising given the fact that the area is not the ancestral homeland of settlement members. However, place attachment was shown to increase support for wildfire mitigation because members wanted to protect their community (including both private properties and public land) from the impacts of a large wildfire. Social capital was also influential on wildfire risk perception and mitigation in numerous ways. Social relationships and networks were found to affect wildfire risk perception, as many based their risk perception on what they had heard from others. Most participants drew upon these social relationships and networks for help in implementing residential wildfire mitigation activities. Norms & values that were present in the community had impact on which areas of the settlement participants supported community-level mitigation, such as the recreation areas. Trust of settlement employees who developed the community-level wildfire mitigation program had a large influence on the support participants had for community-level mitigation.

The influence of culture was found at Peavine to cause residents to favour wildfire mitigation strategies that were implemented by the community, not by individual members. This has also been found in other non-Aboriginal communities in studies by Daniel (2007) and Gardner *et al.* (1987) because it shifted the responsibility of wildfire mitigation to the community and off of individuals. However, at Peavine, the preference for wildfire mitigation implemented by the settlement at both the residential and community scale was found to be due to a custom of collective action. Another unique influence of culture in the community was the finding that participants wanted to protect both private properties and public settlement land from devastating wildfires has important implications for wildfire management. It is likely that in other Aboriginal communities this value of protecting land that is used for traditional practices will also be found. Therefore, mitigation strategies must not only focus on protecting buildings and infrastructure but on reducing the risk to land that holds important cultural value for community members.

Finally, there is a lack of work in Aboriginal communities by Aboriginal geographers (Peters, 2000) as well as few studies on the Métis, a group of Aboriginal peoples in Canada who are typically ignored by Canadian geographers (Peters, 2000). The presentation of contemporary life on a Métis settlement also makes a significant academic contribution, particularly life on the Métis settlements of Alberta. This thesis takes an important step in exploring life at Peavine. The results may be of interest for other Métis groups across Canada looking to establish their own permanent communities governed by self government.

This case study examined a successful wildfire mitigation program at Peavine, which provides a successful example for other communities. The results of this study will hopefully give wildfire managers guidance in creating wildfire mitigation programs in their own communities that achieve high levels of support. The contributions of this study indicate that a post-colonial approach to wildfire mitigation in Aboriginal communities involves each community taking responsibility for wildfire mitigation by developing and

implementing unique wildfire mitigation programs. There is also a role for regional and provincial wildfire managers in assisting those responsible for wildfire mitigation in each community, such as the forestry coordinator at Peavine. Provincial wildfire managers can help local wildfire managers by providing funding for wildfire mitigation programs and assisting local managers in obtaining those funds, particularly in cases where significant paperwork is involved. Provincial wildfire managers also have a unique opportunity to train Aboriginal peoples in wildfire mitigation, particularly seasonal wildland firefighters. Although this is already done in some areas of the province when Aboriginal contract crews are on stand-by, there is also an opportunity for expanding this training to include how these firefighters can implement these activities in their own communities, as it is likely that Aboriginal wildland firefighters will also be involved in volunteer firefighting and/or forestry in their own communities.

7.3 Future Directions

There are several future research possibilities related to this dissertation. One potential research study could include a longitudinal study of wildfire risk perceptions and mitigation at Peavine Métis Settlement. For example, traditional burning is not commonly practiced in Aboriginal communities compared to 70 years ago. Community Elders that carry knowledge about traditional burning will pass away over the next few decades. Therefore, the influence of traditional burning on wildfire risk perception and mitigation will decrease, which may result in increasing wildfire risk perceptions, a decrease in residential wildfire mitigation, and a decrease in support for community-level wildfire mitigation. Also, firefighting experience is becoming less common in the community as not as many younger members are involved in firefighting. There is potential that wildfire risk perception and support for community-level mitigation may decrease as a result (see Chapter 4). It is likely a study of this type could be easily developed with the community, due to their interest in participating in the current study.

Importantly, this type of research should be expanded to include more Aboriginal communities in Canada. It is likely that there are significant regional differences in wildfire risk perception and mitigation amongst Aboriginal peoples, as cultural practices, wildfire experiences, wildfire risk, and community characteristics will be different in each community. It would be interesting to examine similarities and differences between communities, as well as between the three Aboriginal groups in Canada, the First Nations, the Métis, and the Inuit. I would expect that implementation and support of wildfire mitigation would be different on First Nations reserves because the homes and land are under federal jurisdiction and are governed by reserve councils. Therefore, residents may feel it is the responsibility of the federal government to reduce wildfire risk in their community. Qualitative community-based research strategies should be used for these types of studies. It would also be interesting to incorporate other instruments of study, such as PhotoVoice or DigiStories, which are becoming more popular for data collection with Aboriginal peoples (Castleden *et al.*, 2008). These methods may be useful for increasing participation, as well as giving Aboriginal people a different way to tell ‘their’ story.

The relationship between provincial wildfire managers responsible for the region in which Peavine is located and the forestry coordinator and Council at Peavine could be examined further. For example, while conducting preliminary interviews for this study with wildfire managers, I found that wildfire managers tend to let some Aboriginal communities handle wildfire mitigation internally, such as at Peavine. However, these wildfire managers have a significant role in wildfire mitigation in other Aboriginal communities. For example, in the Clearwater region of Sustainable Resource Development, provincial wildfire managers have conducted wildfire mitigation activities on only one of three reserves in the district. It would be interesting to know how these relationships are developed and how decisions regarding wildfire mitigation are made in local municipal and provincial government.

7.4 Conclusion

On a final note, wildfire mitigation at Peavine Métis Settlement continues to be a work in progress. As in most Aboriginal communities, council elections are held every three years in Peavine. Therefore, political turnover is high and one council may support programs another council may not. Also, significant financial pressures on the settlement in 2010/2011, as well as the election of a new council in 2010, resulted in the layoffs of numerous settlement staff members, including the forestry coordinator who developed Peavine FireSmart Projects.

7.5 References

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Epilogue

*“All of your scholarship, all your study...would be in vain
if at the same time you did not build your character”*

-Mahatma Gandhi

The above quote sums up my experience pursuing my PhD. As I had never even taken a human geography course before, there were hard times along the road where I felt the end would never come. There were also hard times in my personal life, with my sister and mom both having hospital stays and being diagnosed myself with a genetic illness. However, there were also great times at school, as well as with family and friends (both new and old). To see my thesis come together at the end has been amazing.

The best way to sum up my experience in Peavine is through something a young boy told me. During my final year conducting data collection in Peavine, I was on the settlement a lot. I volunteered at the settlement school almost every afternoon. I spent most of my time in the Mr. Mason's Grade 5 class, working with students on their math and reading. Most of these students were 11 years old. One afternoon at recess, Lorne's son Braedan ran up to me and announced *“I've known you since I was 6 years old”*, laughed, and then ran away. I don't think he could have known how much this shocked me. It was at this moment I realized the amount of time I had spend with Peavine, which to me had seemed like a blur, but to Braedan had been almost half his life.

I have learned so much from Peavine. What it means to be Métis. What it means to be an extended family. What it means to have land and the ability to have a home. What it means to be part of a community. This isn't to say that every experience I've had in the community has been wonderful. There have been hard times and frustration, but I feel that is a normal part of community life that members of Peavine allowed me to experience with them.

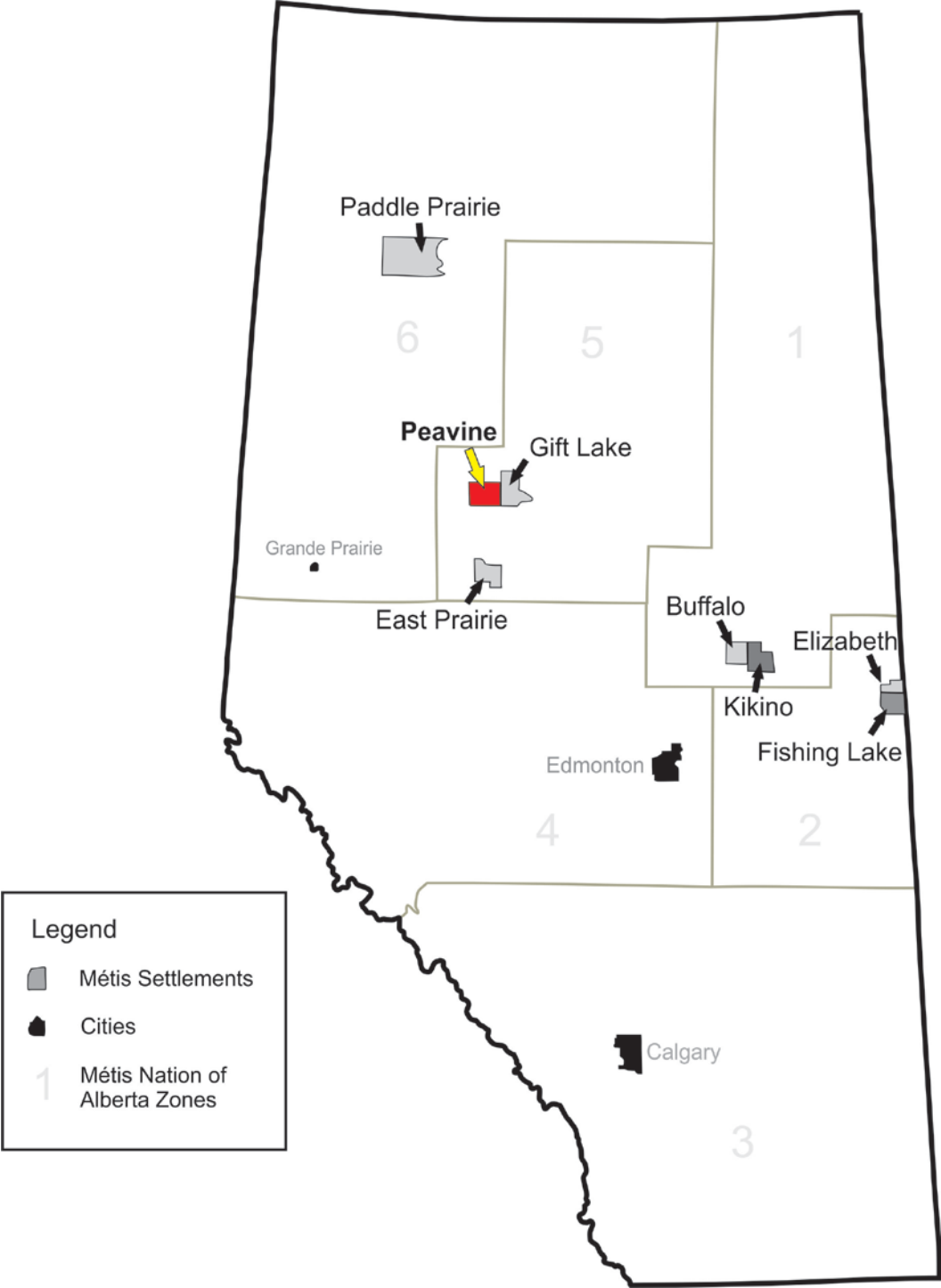
When I finished my data collection, I cried leaving the community. Although I have been back to visit quite a few times and keep in touch with friends over the phone and email, I knew things would never be the same. But I wouldn't change my experience for anything.

Appendices

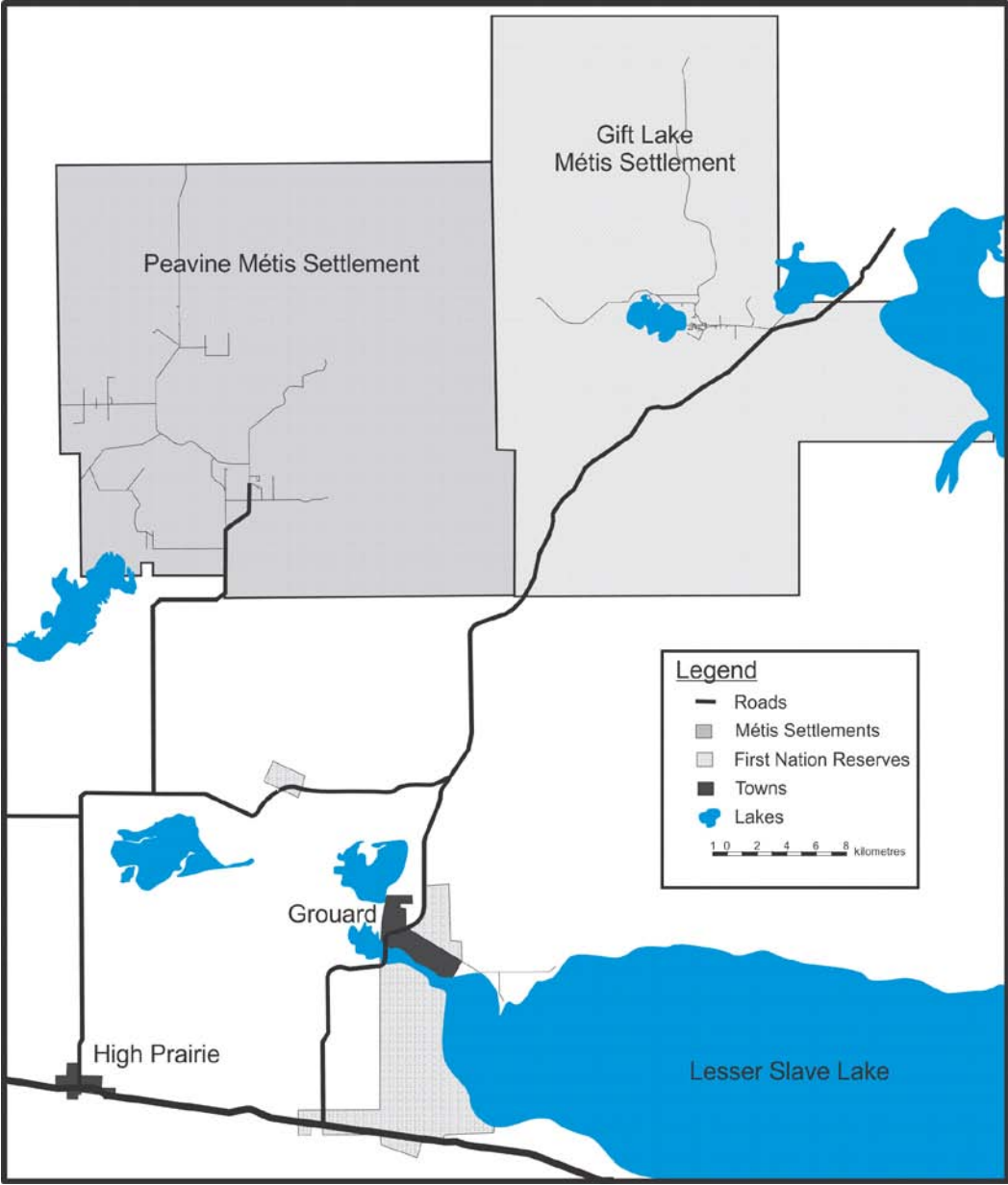
Appendix 1: Location of the province of Alberta



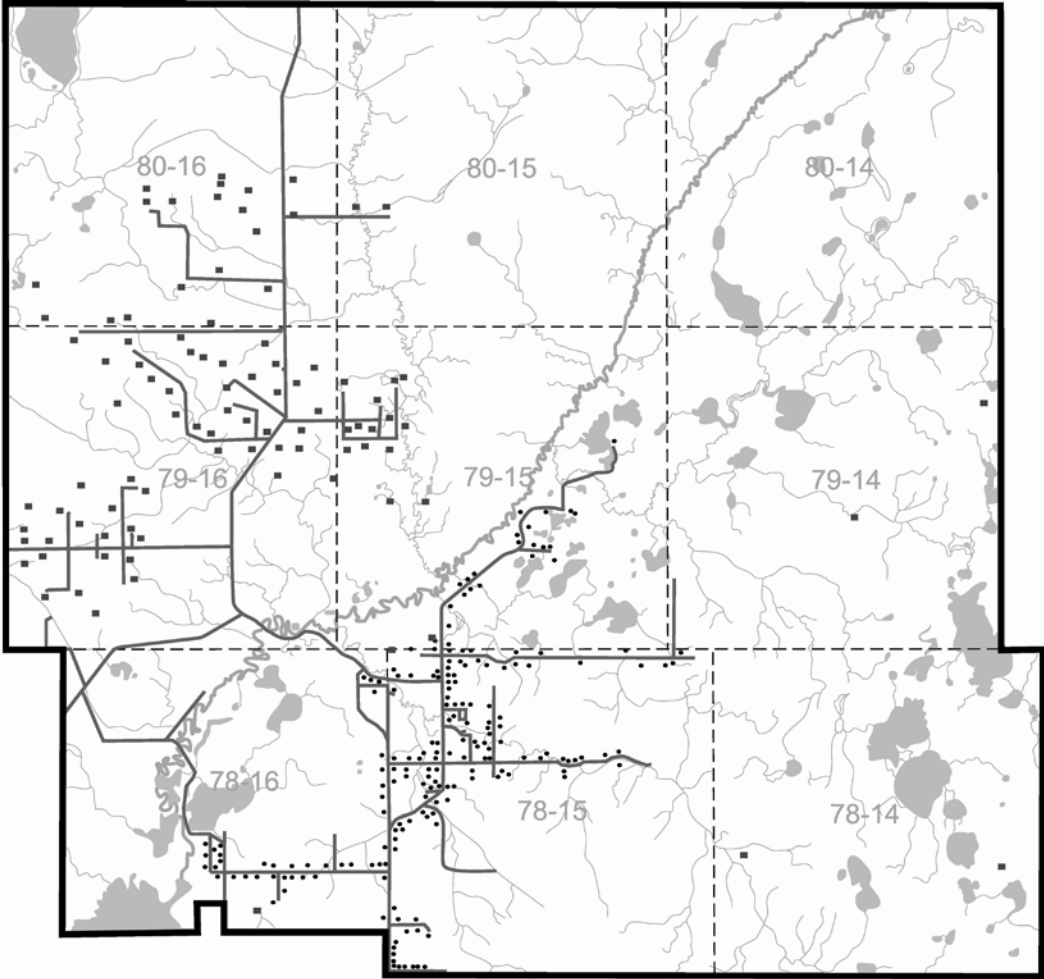
Appendix 2: Location of Peavine Métis Settlement in the province of Alberta



Appendix 3: Location of Peavine Métis Settlement



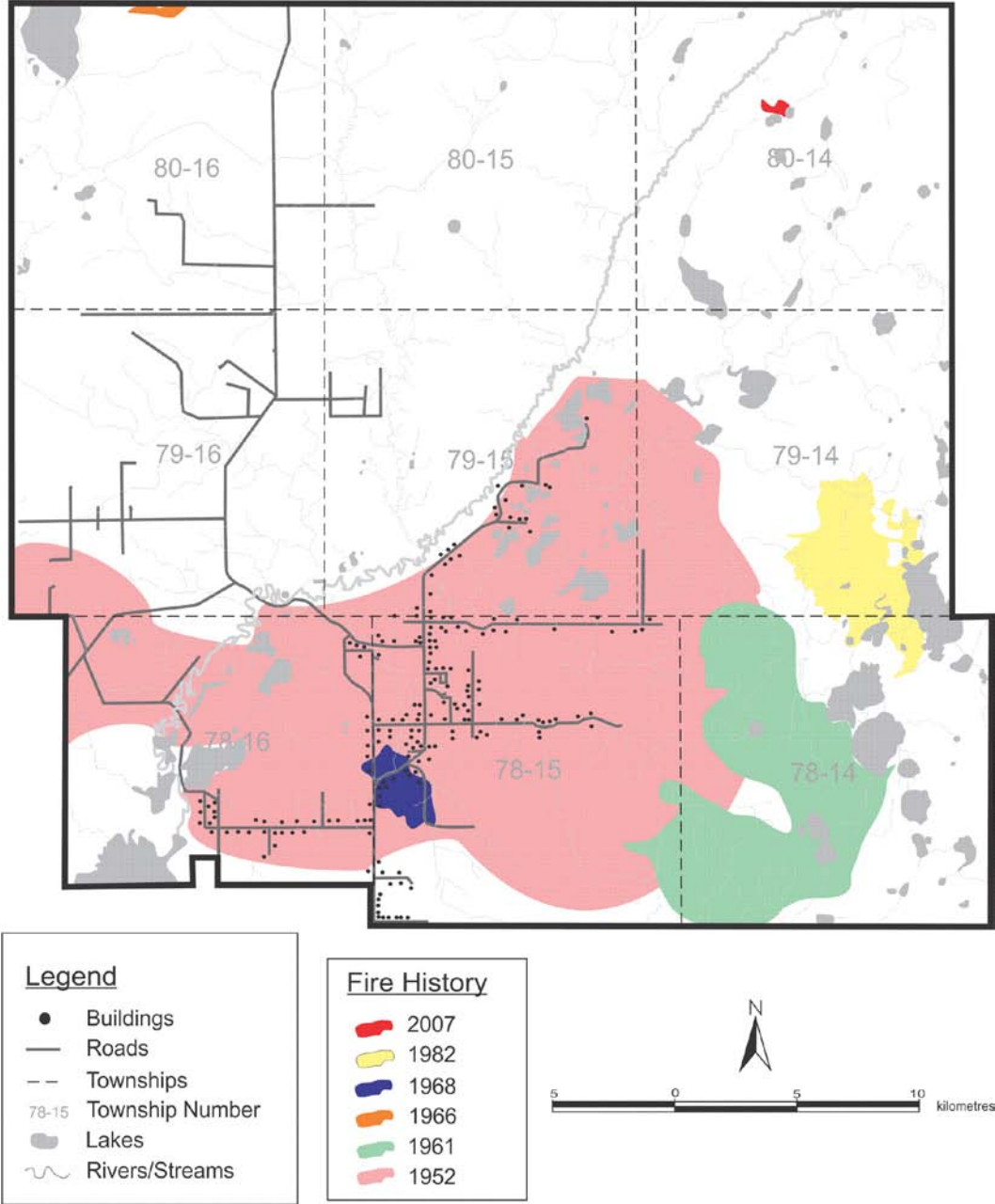
Appendix 4: Detailed Map of Peavine Métis Settlement



Legend

- Buildings
- Roads
- - Townships
- 78-15 Township Number
- Lakes
- ~ Rivers/Streams
- Oilfield Development

Appendix 5: Historic Fires in Peavine Métis Settlement, 1950 to 2010



Modified from Government of Alberta (2010). Historic Fires in Peavine Métis Settlement. Sustainable Resource Development, Slave Lake, AB

Appendix 6: Photos of Peavine Métis Settlement

(Note: All photos taken by author between 2007 and 2010)



Typical home at Peavine



Typical mixed wood boreal forest



Typical aspen forest



Agricultural land prior to green-up



Mountain pine beetle-killed trees in BigFoot Park



Encroaching vegetation on the settlement



Wildfire mitigation around a new house



Fire guard at Peavine near Myer's Lake



Wildfire mitigation conducted in recreation area



Workers conducting hazard reduction burning during community projects

Appendix 7: Photos of Peavine firefighters

(Note: All photos taken by Paul Carifelle)



Cook and her helper, Peavine fire camp



Métis fire camp



Firefighter tent with helicopter in background



Peavine fire crew on the High Prairie jackpine fire

Appendix 8: Ethics Approval July 3, 2007 to July 3, 2008



UNIVERSITY OF ALBERTA

Arts, Science & Law Research Ethics Board (ASL REB) Certificate of REB Approval for Fully-Detailed Research Project

Applicant: _____ Ms. Amy Christianson _____
Supervisor (if applicable): _____ Dr. Tara McGee _____
Department / Faculty: Earth and Atmospheric Sciences / Faculty of Science
Project Title: Wildfires and Aboriginal Communities in Alberta
Grant / Contract Agency (and number): _____ C-Bar _____
Application number (ASL REB member) # 1524 (TJ-0607-452)
Approval Expiry Date: _____ July 3, 2008 _____

CERTIFICATION of ASL REB Approval

I have reviewed your application for ethics review of your human subjects research project and conclude that your project meets the University of Alberta standards for research involving human participants (GFC Policy Section 66). On behalf of the *Arts, Science & Law Research Ethics Board* (ASL REB), I am providing expedited approval for your project.

Expedited research ethics approval allows you to continue your research with human participants, but is conditional on the full ASL REB approving my decision at its next meeting (*September 17, 2007*). If the full ASL REB reaches a different decision, requests additional information, or imposes additional research ethics requirements on your study, I will contact you immediately.

If the full ASL REB reverses my decision, and if your research is grant or contract funded, the Research Services Office (RSO) will also be informed immediately. The RSO will then withhold further funding for that portion of your research involving human participants until it has been informed by the ASL REB that research ethics approval for your project has been granted.

This research ethics approval is valid for one year. To request a renewal after *July 3, 2008*, please contact me and explain the circumstances, making reference to the research ethics review number assigned to this project. Also, if there are significant changes to the project that need to be reviewed, or if any adverse effects to human participants are encountered in your research, please contact me immediately.

ASL REB member (name & signature): _____ Dr. T. E. Johnson  _____

Date: _____ July 3, 2007 _____

Appendix 9: Informal letter of community support



Alberta ACADRE Network
1059 Research Transition Facility
University of Alberta
Edmonton, AB
T6G 2V2

February 29, 2008

To Whom It May Concern:

I am writing this letter as a means of informal support for the *Métis Communities and Wildfire* research study to be conducted by Amy Christianson from the University of Alberta. Amy will be making a formal presentation to our Council at Peavine Métis Settlement in mid-March, where it is highly likely that our community will give formal support to participating in this study. We feel that a program of this nature in our community would make our community safer by increasing the local capacity to reduce the risk of wildfire in our area.

We look forward to this opportunity with great enthusiasm. If I can be of further assistance, please feel free to contact me at (780) 523-2557.

Sincerely,

A handwritten signature in black ink, appearing to read "Dale LeClair", written over a horizontal line.

Mr. Dale LeClair

Settlement Administrator

Peavine Metis Settlement P.O Box 238 High Prairie, Alberta T0G 1E0
PH: (780) 523-2557 Fax: (780) 523-2626
Toll Free Number 1-877-523-1410

Appendix 10: PhD research proposal presented at council meeting

Amy Christianson
Department of Earth & Atmospheric Sciences
1-26 Earth Sciences Building
University of Alberta
Edmonton, Alberta T6E 2E3
Office: T3-91
Phone: (780) 492-5879
Email: anc@ualberta.ca

May 9, 2008

To: Chairman and Elected Council of Peavine Métis Settlement

Re: PhD Research Proposal

Thank you for your invitation to attend the Council meeting on May 13th, 2008. I am looking forward to presenting my PhD research proposal to you and discussing the possibility of developing a research partnership that would document the successful reduction of wildfire risk at Peavine Métis Settlement. The goal of this study is to examine local community characteristics in Peavine Métis Settlement that are influencing the successful creation and adoption of a unique wildfire risk reduction program. The results of this study will be useful for improving local capacity in other Métis communities for reducing wildfire risk and increasing community safety.

I became interested in creating this research partnership after meeting with various government officials who would always discuss the success of Peavine in reducing their wildfire risk compared to other Aboriginal communities in the area. I then met with Lorne L'Hirondelle at Peavine to take a tour of all the wildfire risk reduction work on the settlement last June. Since then, I have been applying for funding for a potential research project with Peavine. I have been able to obtain funding from the following sources:

- Circumpolar/ Boreal Alberta Research Grant (C/Bar) - \$5,000
- Alberta Sustainable Resource Development - \$1,000
- Social Science and Humanities Research Council of Canada - \$40,000
- International, Intergovernmental, and Aboriginal Relations - \$50,000 (still negotiating)

Lorne and I also presented with Iain Johnston (Sustainable Resource Development – Slave Lake) at the FireSmart Community Series on Peavine's unique program. Many participants were very interested to learn what Peavine has been doing and how they can apply these strategies to their own community.

I have included a copy of my full PhD research proposal to Lorne L'Hirondelle as well as a research summary to each Council member so that you may have an opportunity to read and discuss it. I have included a research timeline in the proposal. **If this proposal receives your approval, I would like to request the following in-kind support from Peavine Métis Settlement in order to carry out the research:**

1. A small work space in the local Administration office (beginning Feb 2009 for one year).
2. Access to the internet
3. Waive any booking fees for meeting space to conduct research meetings, advisory council meetings, and research presentations to the community.
4. Help with accommodation expenses
5. A letter of support from Council, approving my request to conduct the study (addressed to me and copied to my academic supervisor, Dr Tara McGee)

In addition, I will need a Community Advisory Committee to assist in the research project. This will consist of two to three people from Peavine meeting with me once a month for one year. I will also be hiring two Community Research Assistants to assist me during the data collection phase of the research study. These would be paid positions at \$35/hr. Help may be needed from the Council to select appropriate candidates to fill these positions.

Peavine will likely receive the following benefits from participating in this study

1. Experience in the research process
2. Increased research skills in the community
3. Increased potential for future studies
4. Improved understanding between Métis settlements and the Government of Alberta in relation to wildfire management
5. Presentation of results at provincial, federal, and international conferences
6. Increased ties to university and government
7. Knowledge that the results of this study will benefit other Métis and Aboriginal communities

It would be my intention to live in or near the community for the duration of the data collection period next year. I am estimating that this will take anywhere from 3-6 months. I do plan, however, to go back and forth to Edmonton periodically to fulfill my commitments with the University of Alberta.

Thank you very much for the opportunity to make this presentation and for considering this proposal. While my academic goal in doing this research is to complete the requirements for my doctorate (PhD) degree, my personal goal is to do research that is meaningful and useful for Peavine Métis Settlement.

Respectfully submitted,
Amy Christianson

Appendix 11: Formal letter of community support



September 9, 2008

Amy Christianson
Human Dimensions of Hazards Research Group
Department of Earth & Atmospheric Sciences
1-26 Earth Sciences Building
University of Alberta
Edmonton, Alberta T6E 2E3
Office: T3-91
Phone: (403) 895-5816
anc@ualberta.ca

To Ms. Amy Christianson:

I am writing this letter as a means of formal support for the *Métis Communities and Wildfire* research study. This project was formally accepted by the Council at Peavine Métis Settlement in a council meeting on May 13, 2008.

By formally agreeing to support this research project, we agree to:

- Provide Amy with a work space in the local Administration office (beginning Feb 2009 for one year).
- Provide Amy with access to the internet (beginning Feb 2009 for one year).
- Waive any booking fees for meeting space to conduct research meetings, advisory council meetings, and research presentations to the community.
- Assist Amy in the selection of a research advisory group and community research assistants. Funding for these assistants will be provided by Amy's team.
- Fully cooperate in the research study, and offer our time as participants, if needed.

We look forward to this opportunity with great enthusiasm. If further information is needed, please feel free to contact me at the numbers listed below or at the Finance Department at 780-523-3991.

Sincerely,

A handwritten signature in blue ink, appearing to read "V. Noskey".

Violet Noskey, Administrator

Peavine Metis Settlement Office, Box 238 High Prairie, Alberta T0G 1E0
PH: (780) 523 – 2557 or Toll Free 1 – 877 – 523 – 1410 Fax: (780) 523 – 2626

Appendix 12: Ethics Approval September 30, 2008 to September 30, 2009

***Arts, Science & Law Research Ethics Board (ASL REB)
Certificate of REB Approval for Fully-Detailed Research Project***

Applicant: Amy Christianson
Supervisor (if applicable): Tara McGee
Department / Faculty: Earth & Atmospheric Sciences, Faculty of Science
Project Title: Metis communities and wildfire

Grant / Contract Agency (and number): N/A
Application number (ASL REB member): 1871 (CLG08-09-08)

Approval Expiry Date: 2009-Sep-30

CERTIFICATION of ASL REB Approval

I have reviewed your application for ethics review of your human subjects research project and conclude that your project meets the University of Alberta standards for research involving human participants (GFC Policy Section 66). On behalf of the *Arts, Science & Law Research Ethics Board (ASL REB)*, I am providing expedited approval for your project.

Expedited research ethics approval allows you to continue your research with human participants, but is conditional on the full ASL REB approving my decision at its next meeting (*Oct 20, 2008*). If the full ASL REB reaches a different decision, requests additional information, or imposes additional research ethics requirements on your study, I will contact you immediately.

If the full ASL REB reverses my decision, and if your research is grant or contract funded, the Research Services Office (RSO) will also be informed immediately. The RSO will then withhold further funding for that portion of your research involving human participants until it has been informed by the ASL REB that research ethics approval for your project has been granted.

This research ethics approval is valid for one year. To request a renewal after **2009-Sep-30** please contact me and explain the circumstances, making reference to the research ethics review number assigned to this project. Also, if there are significant changes to the project that need to be reviewed, or if any adverse effects to human participants are encountered in your research, please contact me immediately.

ASL REB member (name & signature): Christina L. Gagné

Date: 2008-09-30



Appendix 13: Letter of Introduction

**Métis Communities and Wildfire
PhD Research Project
Amy Christianson, PhD Candidate
University of Alberta**

WHO:

I am a PhD student in Human Geography (study of peoples' relationship to land) from the University of Alberta. I was born in Whitecourt, and I now live in Rocky Mountain House.

WHAT:

This research, approved by the University of Alberta and the Elected Council of Peavine, is a collaborative project with Peavine Métis Settlement. I am studying the community's approach to reducing wildfire risk. The goal of this study is to examine local community characteristics in Peavine Métis Settlement that are influencing the creation and adoption of a wildfire risk reduction program.

WHEN and WHERE:

The data collection portion of this project will begin in February 2009, and conclude in October 2009.

WHY:

I was interested to work in an Aboriginal community that had been proactive in reducing wildfire risk. Through various recommendations, I ended up visiting Peavine. After one year of contact with the community, the Council gave formal support for the research project. I am interested to document what people in Peavine think about wildfire and the programs that have been implemented, so it can serve as an example to other communities trying to reduce their wildfire risk.

PARTICIPANTS NEEDED:

Volunteers will be needed to speak with me about wildfire and Peavine in an interview. There will be two types of interview: individual and group. If you chose to participate in an individual interview, a convenient location will be chosen for a private interview. If you chose to participate in a group interview, you will be taking part in an interview with yourself and five to six other people from Peavine. Potential participants will be approached and invited to participate in the Spring of 2009. Interviews will take place between May and July 2009. Individual interview participants will be able to keep copies of and be able to make comments on the interview transcripts and preliminary data analyses.

WHAT DOES PEAVINE GAIN?

During my time in the community, I will train two community researchers. This will increase local capacity for conducting other research projects in the community. This research project may also help to improve relations and understanding between Métis settlements and Sustainable Resource Development in relation to wildfire management. This research project will also build ties between Peavine and the University of Alberta. Peavine will also be recognized on a provincial, national, and international scale.

WHAT DOES AMY GAIN:

I will learn about Peavine. I will learn more about myself as a researcher, and I hope to meet many new friends along the way. I will complete the requirements for my PhD degree in Human Geography. I will also contribute to the academic arena and the community through written and oral communication of the research process and the research results.

FOR MORE INFORMATION OR TO VOLUNTEER IN THIS STUDY CONTACT:

Amy Christianson at (403) 895-5816 (phone) or anc@ualberta.ca (email)
Community Advisory Committee:

Appendix 14: Information sheet & consent form for key informant interviews



Key Informant Interview Information sheet

Thank you for taking the time to participate. I am a student at the University of Alberta being supervised by Dr. Tara McGee of the Human Dimensions of Hazards Research Group in the Department of Earth and Atmospheric Sciences. I am working on a project examining the local community characteristics in Peavine Métis Settlement that are influencing the creation and adoption of a wildfire risk reduction program.

During this interview, I would like to learn more about your community. Topics covered may include your family history with Peavine, your involvement in the community, and feelings about living in Peavine. I would also like to learn more about wildfire perception and preparedness in your community, so I will be asking about your thoughts about wildfires, your experiences with wildfires (if any), and your thoughts about the wildfire risk reduction activities going on in Peavine.

Interviews will take approximately one hour. Participation in this study is voluntary and all information that I obtain will be kept confidential. The interview will be tape-recorded with your consent, and the tapes and subsequent transcripts will be stored in a secure location. Information from these interviews will be used to develop an overall picture of wildfire management in Peavine. All participants will receive their transcripts and a summary of initial findings if requested. All participants will also be invited to share their opinion on the initial research results at a future community meeting. Results from this study will also be presented in both journal articles and conference presentations.

Sincerely,

Amy Christianson
Graduate Student
Department of Earth & Atmospheric
Sciences
1-26 Earth Sciences Building
University of Alberta
Edmonton, Alberta T6E 2E3
Office: T3-91
Phone: (403) 895-5816
anc@ualberta.ca

Tara McGee (supervisor)
Associate Professor
Department of Earth & Atmospheric
Sciences
1-26 Earth Sciences Building
University of Alberta
Edmonton, Alberta T6E 2E3
Office: T3-89
Phone: (780) 492-3042
tmcgee@ualberta.ca

Consent Form

Please initial each line if you agree with the statement, and sign your consent at the bottom.

- I am aware that the interview will cover questions about my community and wildfire
- The researcher has answered any questions I have in regards to this study.
- It has been explained fully to me that participation is voluntary
- I am free to withdraw from this study at any time
- I am under no obligation to answer any questions that I do not feel comfortable with
- I may refuse to disclose any information I do not want to
- I am aware that the interview will be tape recorded
- I understand that information gathered in the interview will be kept confidential
- I understand that the researcher may use information and/or short quotes from this interview, but that no information on my identity will be released.

Name of Participant: _____

Signature of Participant: _____

Date: _____

Name of Researcher: _____

Signature of Researcher: _____

Date: _____

Appendix 15: Interview Guide for Key Informant Interviews

<p>Name</p> <p>Employment</p> <p>Age</p>
<p>History</p> <p>History of family in Peavine</p> <p>Length of time in the community</p>
<p>Community</p> <p>General thoughts about the community</p> <p>Involvement in community</p> <p>Knowledge of neighbours and others in the community</p> <p>Dependence on community</p> <p>Strengths and weaknesses of community ties</p> <p>Examples of strength or weakness of community ties</p>
<p>Wildfire</p> <p>Personal experience</p> <p>Employment in fire-fighting (if any)</p> <p>Past wildfires at Peavine</p> <p>Local knowledge about wildfires</p> <p>Likelihood of wildfire affecting Peavine</p> <p>Threat of wildfire affecting Peavine</p> <p>Thoughts on community preparedness for wildfire</p> <p>Wildfire risk reduction programs</p> <p>Wildfire response</p>

Appendix 16: Information sheet & consent form for community member interviews



Interview Information sheet

Thank you for taking the time to participate. I am a student at the University of Alberta being supervised by Dr. Tara McGee of the Human Dimensions of Hazards Research Group in the Department of Earth and Atmospheric Sciences. I am working on a project examining the local community characteristics in Peavine Métis Settlement that are influencing the creation and adoption of a wildfire risk reduction program.

During this interview, I would like to learn more about your community. Topics covered may include your family history with Peavine, your involvement in the community, and feelings about living in Peavine. I would also like to learn more about wildfire perception and preparedness in your community, so I will be asking about your thoughts about wildfires, your experiences with wildfires (if any), and your thoughts about the wildfire risk reduction activities going on in Peavine.

Interviews will take approximately one hour. Participation in this study is voluntary and all information that I obtain will be kept confidential. The interview will be tape-recorded with your consent, and the tapes and subsequent transcripts will be stored in a secure location. Information from these interviews will be used to develop an overall picture of wildfire management in Peavine. All participants will receive their transcripts and a summary of initial findings if requested. All participants will also be invited to share their opinion on the initial research results at a future community meeting. Results from this study will also be presented in both journal articles and conference presentations.

Sincerely,

Amy Christianson
Graduate Student
Department of Earth & Atmospheric
Sciences
1-26 Earth Sciences Building
University of Alberta
Edmonton, Alberta T6E 2E3
Office: T3-91
Phone: (403) 895-5816
anc@ualberta.ca

Tara McGee (supervisor)
Associate Professor
Department of Earth & Atmospheric
Sciences
1-26 Earth Sciences Building
University of Alberta
Edmonton, Alberta T6E 2E3
Office: T3-89
Phone: (780) 492-3042
tmcgee@ualberta.ca

Consent Form

Please initial each line if you agree with the statement, and sign your consent at the bottom.

- I am aware that the interview will cover questions about my community and wildfire
- The researcher has answered any questions I have in regards to this study.
- It has been explained fully to me that participation is voluntary
- I am free to withdraw from this study at any time
- I am under no obligation to answer any questions that I do not feel comfortable with
- I may refuse to disclose any information I do not want to
- I am aware that the interview will be tape recorded
- I understand that information gathered in the interview will be kept confidential
- I understand that the researcher may use information and/or short quotes from this interview, but that no information on my identity will be released.

Name of Participant: _____

Signature of Participant: _____

Date: _____

Name of Researcher: _____

Signature of Researcher: _____

Date: _____

Appendix 17: Community Member Interview Guide

Name Employment Age
History History of family in Peavine Length of time in the community Why did you chose to reside/stay in Peavine
Community General thoughts about the community Favourite things about living in Peavine Involvement in community Knowledge of neighbours and others in the community Dependence on community Negatives of community
Wildfire Personal experience Employment in fire-fighting (if any) How did recruitment occur Past wildfires at Peavine Local knowledge about wildfires Likelihood of wildfire affecting Peavine Threat of wildfire affecting Peavine Thoughts on community preparedness for wildfire Individual preparedness for wildfire Wildfire risk reduction programs Wildfire response

Appendix 18: Member-Checking form letter

Hi (name),

I have finished typing up the transcript from the interview we had on (date) for the “Wildfire” research project I am conducting with Peavine Métis Settlement. I have read our transcript, and picked out highlights from the interview. The highlights are listed below. I would like you to read through these, and let me know if you agree with them.

Highlights:

1.

Once you’ve had a chance to read through the transcript and the list of highlights, you can let me know if I am on the right track. You can also elaborate on any of the highlights, if you wish. You can also remove any comments from the interview transcript that you would like to.

Please contact me with any feedback at:

Email: anc@ualberta.ca

Phone: 403-844-4394 OR 403-895-5816

Thanks again for taking the time to sit and chat with me!

Cheers,

Amy Christianson

Appendix 19: Ethics Approval September 30, 2009 to September 28, 2010

Notification of Ethics Delegated Approval

Study ID: [Pro00009365](#)

Study Title: Métis communities and wildfire – ASL REB file number 1871 (CLG08-09-08) - RENEWAL

Study Investigator: [Amy Christianson](#)

Supervisor: [Tara McGee](#)

Funding/Sponsor: Canadian Circumpolar Institute

Approval Expiry Date: September 28, 2010

Thank you for submitting the application above to the Arts, Science, Law REB. I have reviewed your application for human research ethics and find that your proposed research meets the University of Alberta standards for research involving human participants (GFC Policy Section 66). On behalf of the Arts, Science, Law REB, I am providing **delegated research ethics approval** for your proposed research.

Your application will be presented to the Board at its meeting on October 26, 2009. Any questions or comments raised about your project will be communicated to you as soon as possible after the meeting.

The research ethics approval is valid for one year and will expire on September 28, 2010.

A request for renewal must be submitted prior to the expiry of this approval if your study still requires ethics approval at that time. If you do not renew before the renewal expiry date, you will have to re-submit an ethics application.

If there are changes to the project that need to be reviewed, please file an amendment. If any adverse effects to human participants are encountered in your research, please contact the undersigned immediately.

Sincerely,

Dr. Christina Gagne, Delegated Reviewer - REB Member
Arts, Science, Law REB

Note: This correspondence includes an electronic signature (validation and approval via an online system).

Appendix 20: Focus Group Information Sheet



Focus Group Information sheet

GROUP 1 – Thursday, Dec 3rd, 5pm, Settlement Office

GROUP 2 – Tuesday, Dec 8th, 5pm, Settlement Office

Please inform me if you will or will not be attending – 403-895-5816

I would like to invite you to participate in a focus group with fellow fire-fighters at Peavine Métis Settlement. I am a student at the University of Alberta being supervised by Dr. Tara McGee of the Human Dimensions of Hazards Research Group in the Department of Earth and Atmospheric Sciences. I am working on a project examining the local community characteristics in Peavine Métis Settlement that are influencing the creation and adoption of a wildfire risk reduction program. Information from these focus groups and previous interviews will be used to develop an overall picture of wildfire management in Peavine

During this focus group, I would like to learn more about your experience with fire-fighting. Topics to be discussed will include how you were recruited into fire-fighting, your experiences fire-fighting, and your thoughts on current fire-fighting practices in Canada. We will also discuss wildfire preparedness in your community, so I will be asking about your thoughts about wildfires and the current wildfire risk reduction activities in Peavine.

Focus groups will take approximately one hour. Supper will be provided (please inform me if you have any dietary concerns). Participation in this focus group is voluntary. It is important to note that there will be three to four other community members present in the focus groups. All participants will be asked to keep all information volunteered in the focus group confidential; however there is a risk that participants will not follow this request. The focus group will be tape-recorded with your consent, and the tapes and subsequent transcripts will be stored in a secure location. All

participants will receive their transcripts and a summary of initial findings. All participants will also be invited to share their opinion on the initial research results at a future community meeting. Results from this study will also be presented in both journal articles and conference presentations.

Sincerely,

Amy Christianson
Graduate Student
Department of Earth & Atmospheric Sciences
1-26 Earth Sciences Building
University of Alberta
Edmonton, Alberta T6E 2E3
Office: T3-91
Phone: (403) 895-5816
anc@ualberta.ca

Tara McGee (supervisor)
Associate Professor
Department of Earth & Atmospheric Sciences
1-26 Earth Sciences Building
University of Alberta
Edmonton, Alberta T6E 2E3
Office: T3-89
Phone: (780) 492-3042
tmcgee@ualberta.ca

Focus Group Information Sheet

Name _____

Age _____

Length of time lived at Peavine _____

Years of fire-fighting experience _____

Appendix 21: Initial Coding Framework after Key Informant Interviews

Change
Fire Experience
Fire History
Fire Prevention
Fire Risk
Future
History
Home Ownership
Involvement
Management
Negatives
Pride
Projects
Roots
Support

Appendix 22: Detailed Coding Framework

<ul style="list-style-type: none"> • Benefits <ul style="list-style-type: none"> ○ Housing • Causes of Wildfire <ul style="list-style-type: none"> ○ Human <ul style="list-style-type: none"> ▪ Accidental ▪ Deliberate ○ Natural ○ Unknown • Changes in Community <ul style="list-style-type: none"> ○ Geographic ○ Social • Community Projects • Cree • Culture <ul style="list-style-type: none"> ○ Berry Picking • Dependence • Education <ul style="list-style-type: none"> ○ Importance ○ Level • Employment <ul style="list-style-type: none"> ○ Current ○ Historic ○ Past • Future • History <ul style="list-style-type: none"> ○ Memories ○ Métis ○ Peavine • Hunting <ul style="list-style-type: none"> ○ Subsistence ○ Recreational • Involvement • Land and Home Ownership • Management <ul style="list-style-type: none"> ○ Community Services ○ Finances ○ Training Program • Negatives of community • Pride • Recreation • Roots • School <ul style="list-style-type: none"> ○ Memories ○ Where 	<ul style="list-style-type: none"> • Social Networks <ul style="list-style-type: none"> ○ Community ○ Extended Family ○ Friends ○ Immediate Family • Time Away • Time in community • Values • Where Live • Aboriginal Use of Fire • Benefits of Wildfire <ul style="list-style-type: none"> ○ Berry Patches ○ Financial ○ Grass burning ○ Land clearing ○ Risk Reduction • Firefighting <ul style="list-style-type: none"> ○ Aboriginal Firefighting ○ Alberta firefighting practices <ul style="list-style-type: none"> ▪ Change ○ Benefits ○ Experience <ul style="list-style-type: none"> ▪ Current ▪ Historic ○ Knowledge ○ Length of time ○ Negatives ○ Peaviners ○ Recruitment ○ Training • House fires • Mitigation Activities <ul style="list-style-type: none"> ○ Community ○ FireSmart ○ Individual • Negatives of Wildfire • Pine Beetle • Wildfire Experience • Wildfire Potential • Wildfire Prevention • Wildfire Response • Wildfire Risk Perception • Wildfires in Peavine
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Appendix 23: Ethics Approval September 28, 2010

Notification Re-approval

Date:	August 19, 2010
Principal Investigator:	Amy Christianson
Renewal ID:	Pro00009365_REN1
Study ID:	Pro00009365
Study Title:	See Legacy File – ASL REB file number 1871 (CLG08-09-08)
Approval Expiry Date:	September 28, 2011

Thank you for submitting the request for re-approval for this study. Kimberly Noels has reviewed the file on this project for which all documentation is currently up-to-date, and concludes that the proposed research meets the University of Alberta standards for research involving human participants (GFC Policy Section 66). On behalf of the Arts, Science, Law REB, I am providing a re-approval for the study referenced above.

The expiration date for this approval is noted above. A renewal report or closure report must be submitted next year prior to the expiry of this approval. You will receive electronic reminders at 45, 30, 15 and 1 day(s) prior to the expiry date. If you do not renew on or before that date, you will have to submit a new ethics application.

If there are changes to the project that need to be reviewed, please file an amendment. If any adverse effects to human participants are encountered in your research, please contact the undersigned immediately.

Sincerely,

Dr. Nancy Lovell
Chair, Arts, Science, Law REB

Note: This correspondence includes an electronic signature (validation and approval via an online system).

Appendix 24: Verification of context of quotes form letter

Hi (name),

I am just finishing writing the articles for the “Wildfire” research project I am conducting with Peavine Métis Settlement. I have included some quotes you provided in either the interview or the focus group. I just want to make sure that I am using the information you provided in the proper context. Please look through the attached articles. Any quotes you gave me that are used in the articles are highlighted in yellow. I would like you to read through these, including the paragraph the quote is included in, and let me know if you agree with them.

Once you’ve had a chance to read through your quotes in the articles, you can let me know if I am on the right track. You can also elaborate on any of the quotes, if you wish. You can also let me know if you feel that your quotes have not been used in the proper context.

Please contact me with any feedback at:

Email: anc@ualberta.ca

Phone: 403-895-5816

Thanks again for taking the time to sit and chat with me!

Cheers,

Amy Christianson

Appendix 25: Thank-you to Participants

Thank you Participants



I would like to thank you for participating in the study I conducted from 2007 to 2010 in Peavine on wildfire risk reduction, risk reduction strategies, and wildfire response. Results from this study have been presented at international and national conferences. Lorne and I are also working on an article we will be submitting to the international magazine 'Wildfire'.

I have summarized the findings of the study below:

- Participants had varying wildfire risk perceptions (from low to high) which were influenced by wildfire experience and social networks
- Wildfire experiences in the community were varied and included traditional burning and/or firefighting employment or bystander wildfire experience
- The majority of participants gave five reasons why they believed wildfire risk was increasing on the settlement – fire suppression, mountain pine beetle, changing land-use, increasing population, and changing climate (decrease in precipitation)
- Risk mitigation strategies implemented by the settlement (such as thinning vegetation) were preferred over individual activities implemented by each homeowner
- Support for the community wildfire mitigation program Peavine FireSmart Projects was influenced by local leadership, economics, increase in wildfire risk perception, local capacity, and land & home ownership
- Participants were confident in the ability of their community to prepare for and respond to a wildfire

The results from this study will be given to Alberta Sustainable Resource Development and the Canadian Forest Service, and will hopefully influence policy regarding wildfire risk reduction and response. I will also be compiling all the stories I was told about the history of Peavine into a book which I will give to the settlement.

If you would like more detailed information on the findings OR if you would like a copy of any articles published from this research project, please call me at 403-895-5816 or email me at anc@ualberta.ca or add me as a facebook friend & send me a message.

Sincerely,
Amy Christianson