COEXISTENCE: THE HUMAN/GRIZZLY BEAR INTERFACE IN A RURAL COMMUNITY OF BRITISH COLUMBIA

By

GILLIAN L. SANDERS

A proposal for thesis to be submitted in partial fulfillment of the requirements for the degree of

MASTER OF ARTS
in
ENVIRONMENTAL EDUCATION AND COMMUNICATION

Dr. Michael Proctor
Birchdale Ecological

Dr. Richard Kool, EEC Program Head
School of Environment and Sustainability

Dr. Matthew Heinz, A/Director
School of Environment and Sustainability

ROYAL ROADS UNIVERSITY

April 2013

© Gillian L. Sanders, 2013
Abstract

Environmental Education is becoming increasingly important as human populations expand into wildlife habitat, often resulting in human/wildlife conflicts. Meadow Creek British Columbia has experienced a long history of conflicts with grizzly bears resulting in significant bear mortalities. This qualitative research investigates human attitudes and behaviours relating to human/grizzly bear coexistence in this area. Twenty eight participants with diverse values contributed to in-depth interviews and a focus group that revealed perceived barriers and potential solutions to human/grizzly bear coexistence. Results show increased attitudes of tolerance since mid-2000s and that on-going support is needed to enable bears and humans to coexist. This research suggests coexisting with grizzly bears in Meadow Creek may serve to improve the linkage function of this area, making coexistence important to local grizzly populations. This work may be a useful study for communities in areas of high human/bear conflicts or in linkage areas between threatened populations of wildlife.
To the memory of Koh Tek Chai, to wildlife and wild places,

and to people who love wilderness

Acknowledgements

This research journey began one evening in the jungles of Borneo when a friend of mine, Koh Tek Chai, challenged my beliefs of the value of higher education. Chai died the following day while crossing the Boh River and this combination of events prompted me to enroll in university shortly after. The challenge of writing this thesis took longer than anticipated, and I am extremely grateful for the support I received along the way. I thank my professors and cohort of amazing people at RRU, my family, my research participants and friends, and most of all my thesis advisor and mentor, Dr. Michael Proctor.
# Table of Contents

Abstract .................................................................................................................................................. 2
Acknowledgements ................................................................................................................................. 3
Table of Contents .................................................................................................................................. 4
Chapter One: Introduction ....................................................................................................................... 7
  Statement of Research Problem .......................................................................................................... 9
  Human/Wildlife Coexistence .............................................................................................................. 9
  Human/Wildlife Conflict .................................................................................................................... 10
  Grizzly Bear Mortality ......................................................................................................................... 11
  Study Area ........................................................................................................................................... 12
  Action Research ................................................................................................................................. 13
  Research Objectives ........................................................................................................................... 14
  Research Questions: ............................................................................................................................ 15
Chapter Two: Literature Review ............................................................................................................. 16
  The Role of Grizzly Bears in Popular Culture .................................................................................... 16
  Human Perspectives of Human/Wildlife Conflicts ........................................................................... 18
    Human values of wildlife .................................................................................................................... 18
    Value orientations (group values toward nature) .............................................................................. 19
    Social norms ...................................................................................................................................... 21
  Grizzly Bear Conservation ................................................................................................................... 22
    Grizzly bear mortality and biology .................................................................................................... 22
    Human/bear conflicts ......................................................................................................................... 23
    Habituation of bears to human activities .......................................................................................... 23
    Attractant sinks ................................................................................................................................. 24
    Linkage areas .................................................................................................................................... 25
    Need to work with local residents................................................................................................... 25
  Summary ............................................................................................................................................... 26
Chapter Three: Research Methods .......................................................................................................... 27
  Research Methodology and Rationale .................................................................................................. 27
  Data Collection ..................................................................................................................................... 28
    Interviews .......................................................................................................................................... 29
    Focus group ....................................................................................................................................... 30
  Data Analysis ...................................................................................................................................... 31
  Research Credibility ............................................................................................................................. 32
Chapter Four: Results

Research Question One: Do Residents Living near the Meadow Creek Spawning Channel Believe that Coexisting with Grizzly Bears is Possible?

- Increasing tolerance and improved coexistence. ........................................... 35
- Grizzly bears perceived as part of the landscape. .......................................... 36
- Different views of coexistence........................................................................ 37

Research Question Two: What are Perceived Barriers to Coexisting with Grizzly Bears?

- Historical and current lack of tolerance......................................................... 38
- Attractant management and human responsibility........................................... 39
- Fear of bears................................................................................................. 41
- Bears losing fear of us................................................................................... 41
- Cost of less-lethal alternatives...................................................................... 42
- Increasing human settlements and use of the backcountry............................ 42
- Meadow Creek Spawning Channel................................................................. 43

Research Question Three: What are Possible Solutions for Improving Coexistence with Grizzly Bears?

- Education....................................................................................................... 43
- Attractant management.................................................................................. 44
- Attitudes of respect and tolerance for bears.................................................. 45
- Electric fencing and trained dogs.................................................................. 46
- Bear spray...................................................................................................... 47
- Less-lethal management................................................................................. 47
- Keeping bears fearful of us........................................................................... 47
- Wildlife law enforcement.............................................................................. 48
- Habitat management...................................................................................... 48

Research Question Four: How Important is Human/Grizzly Bear Coexistence to Grizzly Populations in this Linkage Area?

- Grizzly Bear Populations and Linkage............................................................ 50

Research Question Four a: What is the Past and Present Rate of Human Caused Mortality due to Conflicts?

- Research Question Four b: Are Grizzly Bear Mortalities due to Conflicts Reported to the Conservation Officer Service? Why or Why Not?

Summary........................................................................................................ 57

Chapter Five: Discussion

- Why and how has Coexistence Improved?..................................................... 59
Marblehead garbage dump

Changing social norms and increased tolerance.

Improved attractant management through education and tools.
  Bear resistant bins.
  Electric fencing.
  Bear spray.

Role of the Conservation Officer Service.

Understanding Attitudes of Little-Tolerance

Fear of bears, hunting, and attitudes of backcountry users.

Influence of attitudes of zero-tolerance.

Change in reporting grizzly bear mortalities.

Potential Issues Associated with Coexistence

People management at MCSC.

Interface between MCSC and residents of Meadow Creek.

Less-Lethal Management

Research Limitations

Future Research Directions

Summary

Chapter Six: Recommendations

Recommendations to Support Coexistence in Meadow Creek

Lessons for other Linkage Areas or Communities with High Human/Bear Conflicts

Effective Education to Influence Attitudes and Behaviours of Rural Residents

Promote the Use of Electric Fencing

Hunter Education

Conclusion

References

Figure 1. Map showing the regional grizzly bear sub-populations in relation to Meadow Creek

Figure 2. Map of area around the Meadow Creek Spawning Channel in Meadow Creek

Appendix A: Interview Questions

Appendix B: Research Consent Form

Appendix C: Research Consent Form

Appendix D: Focus Group Questions
Chapter One: Introduction

Environmental education is about human relationships with earth’s natural resources and ecological systems necessary for survival of life. As human populations and developments increase worldwide, how we coexist with wildlife in rural communities has become increasingly important for the health of local wildlife populations (Woodroffe, Thirgood, & Rabinowitz, 2005). In 2004, the International Union of Conservation of Nature Fifth World’s Parks Congress acknowledged that:

Human–wildlife conflict is increasing in both frequency and severity worldwide and will likely continue to escalate. Protected areas are increasingly becoming islands of habitat surrounded by seas of cultivation and development as wildlife and humans increasingly compete for space, resources, and places to call home. Although ecosystem-based approaches (including the development of corridors between protected areas) offer improved long-term protection for many species from a biological perspective, they also involve extensive regional opportunities for interaction and conflict between local people and wildlife. (Madden, 2004, p. 249)

Rural residents’ relationship with wildlife often results in conflict that can lead to the mortality of individual animals and potential extirpation of populations (Mattson & Merrill, 2002). Biological science provides solutions to human/wildlife conflict from the animal perspective, yet to effectively address conflicts we also need to consider the human dimensions of politics, economics, social norms, and worldviews (Madden, 2004; Manfredo, 2008). Social science provides conservation biologists and wildlife managers with additional tools and understanding to manage conflict and to create coexistence between wildlife and people (Baruch-Mordo, Breck, Wilson, & Broderick, 2009; Madden, 2004; Manfredo, 2008).
I have chosen to study barriers and possible solutions to coexistence with grizzly bears (*Ursus arctos*) because of their status as an “umbrella” species (Caro, 2003), sensitivity to human development (McLellan & Shackleton, 1989), changing human attitudes from persecution towards tolerance (Taber & Payne, 2003), and the high profile nature of human/bear conflict (Herrero, 2003).

In the first 75 years of the 20th century, grizzly bear distribution in North America decreased by 98% south of the Canada/US border due to habitat loss and conflicts with humans (Mattson & Merrill, 2002). In British Columbia (BC), extirpated grizzly populations have a direct correlation to either historical and/or current high human density (Lower Mainland), high resource extraction and processing areas associated with high historical human density (Sunshine Coast), or to ranching/agricultural areas (Fraser Valley/Okanagan/Caribou/Peace River areas). Remote areas of the province such as northern BC have no current conservation concern for grizzly bear populations, and grizzly bears are thought to be expanding their range into some of the formerly extirpated areas in southern BC (M. Proctor, personal communication, March 30, 2013). Since the 1970’s, there has been a paradigm shift in our attitudes towards grizzly bears to one of increasing tolerance such that there have been no range contractions of grizzly bears within North America for the past 40 years (M. Proctor, personal communication, March 30, 2013).

In southern BC, there are trans-border grizzly subpopulations from the provinces of BC and Alberta and the US states of Montana, Idaho and Washington at the southern edge of the contracted North American distribution. These populations have been fragmented into habitat peninsulas corresponding to the north–south oriented Rocky, Purcell, and Selkirk Mountain ranges that span the international border (Proctor, McLellan, Strobeck, & Barclay, 2005). In the
US, these subpopulations are considered “Threatened” by the US Endangered Species Act. In BC the trans-border subpopulations in the southern portions of the Selkirk and Purcell Mountains are considered threatened at a Provincial level (Austin, Heard, & Hamilton, 2004). In these regions, the lives of grizzly bears are mostly confined to backcountry mountain habitat as valley bottoms are generally occupied by human settlements (McLellan, 1998; Proctor et al., 2005; Proctor et al., 2012). Future long-term resilience of these grizzly bear subpopulations in the southern Selkirk and Purcell Mountains depends on re-connecting fragmented subpopulation units to, and maintaining the subpopulation sources of, the larger healthier Central Purcell and Selkirk subpopulation (Figure 1, Proctor et al., 2012).

To link habitat areas of fragmented grizzly bears subpopulations we need to manage connectivity in the areas between these subpopulations (Proctor et al., 2012). Conflicts with humans are a main cause of fragmentation between subpopulations and source populations (Proctor et al., 2012), and by working with local residents in these linkage areas we can better promote connectivity, coexistence, and grizzly bear survival (Madden, 2004).

**Statement of Research Problem**

The community of Meadow Creek, in the valley bottom between the Selkirk and Purcell ranges (Figure 2), has experienced significant conflict with grizzly bears over the past four decades (L. Butler, personal communication, November 2007). The aim of this research is to understand residents’ perceived barriers to coexisting with grizzly bears, and to identify possible solutions to improve human and grizzly bear coexistence in the Meadow Creek area.

**Human/Wildlife Coexistence**

Coexistence: n. Existence together or at the same time.
Private lands are often critical low elevation and riparian habitats for a variety of species. These rural areas may include critical winter ranges, spring breeding sites and fall foraging grounds (Mace & Waller, 1998). Wildlife is dependent on human tolerance for their survival in habitat that includes agricultural lands or that are adjacent to rural residents and communities, which is especially true for large carnivores (Northrup, Stenhouse & Boyce, 2012), but also true for grazing animals and migratory waterfowl that may feed on crops (Parker & Parker, 2002). Human activity can lead to habituation of wildlife, which happens when wildlife becomes comfortable with human behavior, or the waning of a response to a repeated stimulus that is not associated with either a positive or negative reward (Knight & Temple, 1995). With bears habituation is often (but not always) associated with food conditioning, which happens when bears find anthropogenic food sources such as garbage, fruit, birdseed, pet food, and/or other attractants and learn to associate humans or residences with potential sources of food (Herrero, 2003). Bears will return to sites where they have received anthropogenic food, leading to increased conflict and associated mortality (Gunter et al., 2004; Herrero, 2003).

**Human/Wildlife Conflict**

From the days of European settlement, humans are the greatest cause of grizzly bear mortality (Mattson & Merrill, 2002). There is a long history of conflicts between humans and grizzly bears, especially on agricultural land used for livestock production where people have systematically eradicated grizzly bears and other large predators (Herrero, 2003; Mattson, 1990; McLellan, 1998; Mattson & Merrill, 2002; Wilson et al., 2005; Wilson, Madel, Mattson, Graham, & Merrill, 2006). There is some evidence that pre-European contact cultures also extirpated grizzly bears from some agricultural areas (Mattson & Merrill, 2002), but without the use of firearms it wasn’t possible to eradicate them from the landscape (Herrero, 1970). The
'lethality' (Mattson & Merrill, 2002) of human-bear contacts can be determined by many combinations of factors. The presence or absence of available natural food, the presence of agricultural crops, livestock, orchards, hunting kills, and other potential food sources all increase the likelihood of conflicts between bears and humans (Herrero, 2003; Mace & Waller, 1998; Mattson & Merrill, 2002).

When addressing these conflicts, both humans and grizzly bear populations can benefit from management approaches that enable land users and authorities to work together to recognize and prevent these situations before they happen (Wilson et al., 2006). Time and effort spent on biological understanding of a particular wildlife species is often compromised by a lack of understanding of the motives, beliefs, and values of the local people (Madden, 2004).

Our relationship with grizzly bears has a direct influence on the health and persistence of their populations (Mattson & Merrill, 2002; McLellan, 1998), and our actions are often determined by our values of wildlife (Manfredo, 2008). This research recognizes that human values and attitudes create the possibility (or impossibility) for coexistence.

**Grizzly Bear Mortality**

Grizzly bear researchers determined that in interior regions, an acceptable rate of reported human-caused mortality of 2-6% of the estimated population is sustainable, if female mortalities are limited to 33% of this total figure. This rate includes reported mortalities; the additional unreported mortality rate that is added to this rate has been estimated through research (McLellan et al., 1999). McLellan et al. (1999) found that in BC there is one unreported grizzly bear killed for every 2 reported human-caused mortalities.

Proctor et al. (2007) found that the Central and South Purcell Grizzly Bear Population Units (GBPU) contained fewer bears than government estimates suggested. In fact, these are at
approximately 54% and 46% respectively of the government estimated habitat capability of these areas (note that the government estimates of habitat capability are not data-based so these are rough estimates at best). When a GBPU is below 50% of the estimated habitat capability, it is designated “Threatened” (Austin, Heard & Hamilton, 2004). Proctor et al. (2007) speculate that one primary cause of the low numbers of bears in the Purcell Mountains may be related to unsustainable human-caused mortality, either from over-allocated hunting quotas or excessive conflicts with humans, or both.

The number of grizzly bears killed by humans depends on the frequency and lethality of contact (Mattson & Merrill, 2002). The juxtaposition of rich bear habitat and rural residents and/or communities has a high likelihood of affecting the frequency of contact between bears and humans (Mattson & Merrill, 2002). Kellert, Black, Rush, and Bath (1996) found that rural residents who live in grizzly bear habitat and depend on resource-based industries hold utilitarian attitudes of nature and wildlife and may be unwilling to modify their behavior to benefit grizzly bears. Reducing the lethality of encounters between humans and grizzly bears may depend on changes in human values and worldviews towards wildlife (Kellert et al., 1996; Mattson & Merrill, 2002; McLellan, 1998).

**Study Area**

The focus community of this research, Meadow Creek BC, is located between the Central Selkirk and Central Purcell mountain ranges at the north end of Kootenay Lake and at the confluence of the Duncan/Lardeau River Valleys. In 1967, the Duncan River was dammed to form the Duncan Reservoir, as part of the greater Columbia River hydro-electric system. The Meadow Creek Spawning Channel was constructed in the same year to partially compensate for the dam’s interruption of spawning Kokanee from Kootenay Lake to the Duncan river system.
The juxtaposition of the Meadow Creek Spawning Channel (MCSC) with the community of Meadow Creek creates a complex human-bear interface, with the potential for conflict.

The valley bottom between the Selkirk and Purcell mountains is fairly narrow (between three and four kilometers wide). The Kokanee salmon spend their adult life in Kootenay Lake and follow Meadow Creek to MCSC in the spawning season each fall. The creek runs up from the west side of the Meadow Creek flats, directly through residents’ yards and within 200 metres from Jewett School (Grades K-5). Each September, Meadow creek and MCSC host upwards of five-hundred-thousand spawning Kokanee, which as carcasses, float downstream through October. The Meadow Creek flats are west and north of residences in Meadow Creek and provide excellent low-elevation spring and fall habitat for grizzly bears. The juxtaposition of MCSC and the community of Meadow Creek has led to decades of human/grizzly conflicts as bears come to feed on Kokanee and are drawn to residences by household attractants and livestock on small farms.

Action Research

Action Research is a participatory process that seeks not only to research, but also to inspire action (Cohen, Manion & Morrision, 2007; Kemmis & Wilkinson, 1998). This research employs Action Research methods to better understand the perceived barriers and identify potential improvements to human-grizzly coexistence in the area of the Meadow Creek Spawning Channel. Community-based action research methods allow the researcher to work with stakeholders’ diverse knowledge and experience to develop solutions that fit the community’s needs (Stringer, 1999). To understand and/or be successful in improving human/grizzly bear coexistence, we need to work with the people who live or work in the area of question. Stringer (1999) recognizes that individuals tend to react negatively to processes in
which they are not directly consulted and may be told what to do by an authoritarian source.
Parker and Parker (2002) think that wildlife protection measures that do not include rural residents could have the unintended result of increasing illegal mortality. For these reasons, I asked the people who live with grizzly bears in their backyards in Meadow Creek what they thought about coexistence. While there is no ‘recipe’ for success when involving stakeholders in conservation processes, it is useful to present scientifically generated information, treat all citizens equally, and promote communication and education (Chase, Seimer, & Decker, 2002).

Stringer (1999) differentiates community-based action research from traditional research:

> Traditional research projects are complete when a report has been written and presented to the contracting agency or published in an academic journal. Community-based action research can have these purely academic outcomes and may provide the basis for rich and profound theorizing and basic knowledge production, but its primary purpose is as a practical tool for solving problems experienced by people in their professional, community, or private lives. (p. 11)

**Research Objectives**

My research objective is to understand residents’ perceived barriers to coexisting with grizzly bears and identify possible solutions to improve human and grizzly bear coexistence in the Meadow Creek area. An additional objective is to understand the rate and cause of grizzly bear mortality due to conflict with humans in this area, and determine if these mortalities are reported, and if not, why. These objectives may be useful in improving the chance of long-term resilience of Central Purcell and Central Selkirk grizzly bears as source populations for fragmented and vulnerable populations to the south (Proctor et al., 2012).
**Research Questions:**

1. Do residents living near the Meadow Creek Spawning Channel believe that coexisting with grizzly bears is possible?

2. What are perceived barriers to coexisting with grizzly bears?

3. What are possible solutions for improving coexistence with grizzly bears?

4. How important is human/grizzly bear coexistence to grizzly bear populations in this linkage area?

   4a. What is the past and present rate of human caused mortality due to conflicts?

   4b. Are grizzly bear mortalities due to conflicts reported to the Conservation Officer Service? Why or why not?

I also provide recommendations to inform human and grizzly bear coexistence efforts in linkage areas of threatened grizzly bear populations or areas of high human/bear conflicts elsewhere.
Chapter Two: Literature Review

Our values and perceptions of bears influence our attitudes and behaviour (Manfredo, Teel, & Zinn, 2009) that directly affect possibilities of human/grizzly bear coexistence. Combining the themes of cultural values and social norms with grizzly bear conservation biology is important to understanding the issues surrounding coexistence. In this brief literature review, I discuss: the role of grizzly bears in popular culture, perspectives of wildlife relating to human values, group values of nature and social norms, and aspects of grizzly bear conservation including grizzly bear mortality and biology, human/grizzly bear conflicts, habituation of bears to human activities, attractant sinks, linkage areas, and the need to work with local residents to promote human and grizzly bear coexistence.

The Role of Grizzly Bears in Popular Culture

We’ve been meeting them in the wilderness, and in our dreams, since the dawn of human history. Bears have been celebrated in art and myth since we began drawing on the walls of caves. No beast casts a longer shadow over our collective subconscious. Perhaps more than any other animal, the bear remains at the very heart of our concept of wilderness.

(Payton, 2007, p. 2)

Ursine images pervade North American language, literature, religion, economics, psychology, athletics, and childhood stories and toys (Kellert et al., 1996). In current North American culture there is a dichotomy of commonly competing perceptions of bears; the predatory killer or a toy teddy bear (Marty, 2008; Payton, 2007). We have anthropomorphized bears with characters such as Smokey the Bear, Yogi Bear, Rupert Bear, Pooh Bear, Paddington Bear, and the three bears of Goldilocks.
Attitudes towards bears may be influenced by the culture in which people grow up; in rural areas (where people are more likely to have bear encounters) people have generally been less tolerant and be more likely to perceive bears as threats to livelihoods (such as raising livestock) or serious threats to human safety (Kellert, 1994). In urban environments people have been less likely to encounter bears (until recent decades with expanding human development and increasing black bear (*Ursus americanus*) populations in North America), and may be more likely to perceive bears as cute and cuddly, based on teddy bears and cartoons.

The scientific name for grizzly bears *Ursus arctos horribilis* suggests a perception of this species in particular as fearsome and dangerous (Kellert et al., 1996). Shelton (1994) writes that the fear of being attacked by a bear brings panic to most people far greater than the fear of other types of danger. Kellert (1994) recognizes that fear of bears’ capacity to injure or kill us likely influences attitudes of intolerance towards bears. Though much less frequent than human deaths by livestock or dogs, bear attacks make top news stories and we pay attention when these rare events happen (Herrero, 2003).

Grizzly bears are also prominent symbols of wilderness and challenge our supremacy on the landscape (Herrero, 1970; Payton, 2007). Kellert et al. (1996) suggest we attribute qualities to bears that are a reflection of a wilder and more independent human nature that has diminished in modern culture. Anthropomorphizing wildlife may make us care more about it, and while science does not approve of anthropomorphizing, Manfredo (2008) reminds us of evidence that humans have attributed human qualities to animals since the Paleolithic period of 40,000 years ago. Bears are prevalent in our myths, stories and legends as we have feared, revered, and even worshipped them as we have shared the landscape with them since that time (Hallowell, 1926; Payton, 2007; Kellert et al., 1996). Herrero (1970) references evidence of bear cults from
Neanderthal to Paleolithic times, and of ceremonialism associated with bears across North America, Europe, and Asia. In many cultures bears symbolized harmony between nature and humans and were revered for their power (Kellert et al., 1996).

Modern lifestyles create physical and ideological separation from nature, which affects our relationship with wildlife (Manfredo, 2008). Poulsen (2009) believes that in our search for understanding what it is to be human, we have consistently denigrated other species and have created separation between us and the living things around us. Exploring our relationship to bears and looking for human connections to the wild may be the source of our fascination with bears; by studying bears we may learn more about ourselves (MacDonald, 2009; Payton, 2007), and possibly about our relationship with the balance of nature.

**Human Perspectives of Human/Wildlife Conflicts**

A review of social science literature related to human-wildlife conflict reveals the theoretical concepts of values, value orientations, and social norms commonly used when studying relationships with wildlife (Kellert, 1994; Manfredo, 2008; Manfredo, Teel, & Zinn, 2009). The concept of ideologies, or worldviews, include beliefs about social stereotypes, roles, origin myths, and ideas that form groups (Pratto, as cited by Manfredo, Teel, & Zinn, 2009) provides us with background understanding of human behaviour.

**Human values of wildlife.**

Human attitude and behaviour is guided by our values, which Manfredo, Teel and Zinn (2009) suggest operate at multiple scales from the individual to populations and across generations and characterize as:

- Values form slowly over many experiences. They are shaped through learning during one’s youth and change very little throughout one’s adult life.
• Values are super-ordinate guidelines for what to think and do. They direct human behavior through their influence on attitudes and norms, giving consistency to thought and action across time and situations.

• Values are critical elements in the transmissions of culture from one generation to the next.

• Values are culturally directed ways of meeting the existence needs of individuals and the cohesion needs of society. (p. 37)

Kellert (1980) was one of the first to use a social science approach to understand our diversity of wildlife values. He proposed that basic wildlife values broadly influence how people perceive a particular species such as bears. Perceptions of bears are influenced by how similar to us they are seen to be, their aesthetic value, size, perceived intelligence, our cultural and historic relationship, their perceived dangerousness, and the likelihood of property damage (Kellert, 1994). He also found that factual understanding, ecological knowledge, and awareness of conservation issues affected knowledge of a wildlife species. Population and conservation status, conflict due to property damage, consumptive and non-consumptive use, and land-use relationships affected interactions between people and wildlife. Kellert (1994) believes that North Americans generally regard bears from a highly appreciative aesthetic, naturalistic, humanistic, ecological, and see bears as intelligent, culturally significant, highly appealing, and relatively speaking, similar to people.

**Value orientations (group values toward nature).**

Value orientations describe the personality of a cultural group (Kluckholn, as cited by Manfredo, Teel, & Zinn, 2009). Manfredo et al. (2009) propose that a significant amount of thought related to wildlife in North America is directed by the conflicting values of human
dominance over nature or humans being one part of nature. Manfredo et al. (2009) explain that “a domination wildlife value orientation holds an ideological view of mastery over wildlife”, whereas a mutualism wildlife value orientation views wildlife “as part of an extended family”, and deserving of care, stewardship, and compassion (p. 198). People with a mutualism view believe that wildlife is capable of living in relationships of trust with humans, that wildlife may have rights similar to those of humans, and are unlikely to support actions resulting in death or harm to wildlife (Manfredo et al., 2009). In contrast, those with domination view are more likely to prioritize human well-being over wildlife, accept death as a control measure of wildlife, and evaluate wildlife in utilitarian terms (Manfredo et al., 2009). Kellert (1996) describes utilitarian wildlife values relating to the practical and material exploitation of nature for human use.

Emotional responses to wildlife can vary according to one’s value orientations, and Manfredo (2008) suggests that our wildlife values are revealed by how we feel about wildlife. Manfredo et al. (2009) suggest that values related to conformity, tradition, security, and self-enhancement support utilitarian views toward wildlife, while values related to openness to change and self-transcendence support more protectionist, aesthetic, and mutualistic views toward wildlife. Basically, a mutualistic view may be more likely to perceive wildlife as being part of the landscape that has intrinsic value and a right to exist, whereas a domination view may perceive wildlife as competition for resources that needs to be suppressed. A domination view believes that individual rights, needs, and comfort take precedence over the needs of animals. Because a mutualistic view will consider animal’s perspectives as having value, they may also devote more effort to considering solutions that benefit both wildlife and humans. While individual people’s values may not fall entirely within one of these two opposing value orientations, these perspectives are useful to understand someone’s values of grizzly bears.
Kellert (1994) found an important demographic distinction when looking at private property issues in agricultural and/or resource based rural communities, which are the communities overlapping with grizzly bear range (Proctor et al., 2012). Kellert’s various studies identified highly utilitarian and domination wildlife values in these communities and found they typically expressed little support for moralistic and humanistic wildlife values (Kellert, 1981, 1984; as cited in Kellert 1994). When looking at human relationships with bear conflicts, Kellert concluded that rural and resource-dependent groups, particularly livestock producers, endorsed attitudes and behaviours that would consistently value human interests and practical needs over the needs of bears (1994).

**Social norms.**

Social norms form guidelines for acceptable behaviour within a group and help to explain how the actions of the individual are influenced by the group (Manfredo, 2008). To the extent that a person identifies with a group and its values, they will be more likely to adopt the group’s norms (Manfredo, 2008). Norms help people interpret situations and Horne (as cited in Manfredo, 2008) suggests that norms may be internalized as the standard of practice of a person and held as a personal value or attitude. Norms are rule-like beliefs tied to our values and yet Fine, (as cited in Manfredo, 2008) suggests that norms are not followed blindly; they are acted on depending on the situation. Fine (as cited in Manfredo, 2008) contends that norms may be enacted depending on one’s perception and understanding of circumstances, events, and the actions of others. This frame of perception and understanding is based on previous experiences and the contexts in which they occurred. Norms are conditional, ambiguous, and are often negotiated between group members, and are prevalent as guidelines of our day to day activities (Manfredo, 2008). Emotions such as contempt, anger, sadness, or shame may prompt one
member of the group to sanction another’s behaviour (Manfredo, 2008). Sanctioning of norms may happen when someone directly speaks to another regarding their behaviour or when someone perceives another person judging their behaviour; where the threat of sanction controls the behaviour (Manfredo, 2008). With the threat of sanction from a group member(s), social norms influence behaviour even when one is not physically with the group (Manfredo, 2008).

Human values, value orientations, and social norms all affect individuals’ attitudes and behaviours towards grizzly bears, their conservation, and human/grizzly bear coexistence.

**Grizzly Bear Conservation**

Factors affecting grizzly bear population conservation in North America include habitat loss, fragmentation of populations, and human-caused mortality due to conflicts (Proctor et al., 2012). This section reviews grizzly bear mortality and biology, human/grizzly bear conflicts, habituation of bears, attractant sinks, linkage areas that span fragmented populations, and the need to work with local residents to promote grizzly conservation.

**Grizzly bear mortality and biology.**

Grizzly bear populations recover slowly from high rates of human-caused mortality (Herrero, 2003; McLellan et al., 1999; Miller, 1990). Populations are especially sensitive to female mortality because of their low reproductive rate set by female’s late age of first reproduction (age 5-8), small litter sizes (1-3 cubs), and long inter-birth intervals (2-4 years) (Mace & Waller, 1998; McLellan, 1989; McLellan & Hovey, 2001; Schwartz et al., 2003). Grizzly bears’ biological resilience at the inter-population scale is challenged due to limited female dispersal from their natal home range (McLellan & Hovey 2001; Proctor, McLellan, Strobeck, & Barclay, 2004). Grizzly bears are opportunistic feeders that eat plants, roots, berries, insect larvae, and the higher protein foods of ungulate meat or fish, if/when available (Herrero,
Bears that have access to fish protein as a significant part of their diet grow larger and are more productive than bears without access to fish (Mowat & Heard, 2006). Bears are also attracted to anthropogenic food sources such as fruit orchards, gardens, garbage, livestock, livestock feed, pet food, birdseed, grease, and other smells that may bring bears into conflict with people at farms and residences (Gunter et al., 2004; Herrero, 2003). When natural foods are scarce, such as dry summers when berries are not plentiful, hungry bears are more likely to be attracted to human-based food sources, including crops and livestock (Knight, Blanchard, & Eberhardt, 1988; Mattson, 1990).

**Human/bear conflicts.**

Human/wildlife conflict is the result of the needs and behaviours of wildlife impacting negatively on goals of humans, or the goals of humans impacting negatively on the needs of wildlife (Madden, 2004). These conflicts may result when wildlife damage crops, injure or kill domestic animals, or threaten or kill people (Madden, 2004). At the 2012 Bear-People Conflicts Workshop in Missoula Montana, the term *bear-human conflict* included interactions, encounters and incidents where people perceive or experience a threat to life or property from bears. Kellert (1994) differentiated direct and indirect human conflicts with bears; direct conflicts involve a threat to person and/or property and indirect conflicts relate to perceived competition for land and resources. Some conflicts relate to people’s perception that bears are inherently dangerous, whether or not the bear actually poses a physical threat (Herrero, Smith, DeBruyn, Gunther, & Matt, 2005).

**Habituation of bears to human activities.**

Habituation of bears may be associated with anthropogenic food sources, such as garbage dumps that both humans and bears frequent (Herrero, 2003), but can also be the result of people
intentionally viewing bears for pleasure or the purpose of taking photos (Herrero et al., 2005). Habituation of bears foraging on natural foods such as spawning salmon can enable bear viewing opportunities to watch undisturbed wild animals in their habitat, with minimal safety risks to viewers (Aumiller & Matt, 1994). Bears learn to become comfortable with people viewing them as the benefits of staying to eat outweigh the costs of leaving the food source, but if the bear is wrong in its assessment of cost/risk benefits, it may pay with its life (Herrero et al., 2005). Female bears have benefited from habituation as human presence tends to deter male bears and habituation allows females with cubs to benefit from rich food sources (Herrero et al., 2005).

Bear viewing activities may have impacts on bears by displacing wary bears away from a rich food source, or bears that become habituated may become more likely to approach residences (Herrero et al., 2005). This makes attractant management even more important to prevent bears from being drawn to anthropogenic food sources at residences, and creates the potential need for less-lethal management tools to create boundaries near human settlements (Herrero et al., 2005; Nielsen et al., 2004).

**Attractant sinks.**

Areas of excellent grizzly bear habitat may not actually be productive for grizzly bear reproduction and survival if these habitats draw bears into conflicts with humans (Nielsen et al., 2004; Nielsen, Stenhouse, & Boyce, 2006). Grizzly bear mortalities are often associated with attractant sinks, or ecological traps, where bears are attracted to food sources that overlap with high rates of human encounters and/or conflicts (Nielsen et al., 2006; Northrup et al., 2012).

Attractant sinks may become population sinks if they are the cause of high female grizzly bear mortality (Knight et al., 1988; Nielsen et al., 2006). Private lands in rural areas can become attractant sinks because low-elevation habitat is attractive spring and fall foraging areas and
provides anthropogenic foods such as garbage and/or agricultural foods such as fruit trees and livestock (Mace & Waller, 1998; Northrup et al., 2012).

**Linkage areas.**

Habitat loss is compounded when contiguous habitat becomes fragmented into smaller pieces and animals become isolated from each other by unsuitable habitat, including highways or/and commercial and residential development (Proctor, Servheen, Kasworm & Radandt, 2008), that may act as attractant sinks (Nielsen et al., 2006). This frequently leads to contraction of populations into ‘islands’ that incur an increased risk of extinction (Proctor et al., 2005). As populations are fractured, the edge effect with humans is increased and this leads to increased interactions and conflicts with local people (Madden, 2004; Proctor et al., 2012). Linkage areas connect larger ‘core’ areas of habitat and frequently span human developed areas to provide for the movement of animals (Proctor et al., 2008). Linkage areas are not simply travel corridors, but are habitats that support feeding and behavioural activities in intervening spaces between these core habitats (Proctor et al., 2008). Proctor et al. (2012) found that dispersal of grizzly bears from core populations is difficult through human-dominated linkage areas, where their reputation as dangerous carnivores often leads them to experience higher rates of human-caused mortality than can be sustained. For linkage areas to be effective in reducing population fragmentation they require some level of tolerance towards bears and the support of local human residents to manage properties to avoid conflicts and/or associated grizzly bear mortality is necessary (Proctor et al., 2012).

**Need to work with local residents.**

Researchers and managers recognize the need to work with local residents when attempting to reduce human/wildlife conflicts (Madden, 2004). On the Eastern Front of the
Rockies Mountains in Montana, models showed a high likelihood of conflicts with livestock producers in some areas where there were in fact no recorded mortalities (Wilson et al., 2006). Researchers hypothesize that mortalities were occurring but were unreported because of intolerant attitudes towards grizzly bears, potential distrust of state managers, or perceptions related to personal privacy on private property (Wilson et al., 2006). On public lands, Mattson, Herrero, Wright, and Pease (1996) found that when restricting human road access, successful conservation of core habitat depends on the level of support and acceptance for grizzly conservation from local residents. Proctor et al., (2012) showed that historic mortality associated with human settlement has been, and likely continues to be, a primary cause of fragmentation for grizzly bears. Primm and Wilson (2004) suggest that people who live with recovering and expanding populations have insight and practical knowledge that is valuable when considering conservation projects that encompass private lands, especially in linkage areas.

**Summary**

This literature review combines the fields of wildlife biology with social science to provide the reader with a background in which to place the following results, discussion, and recommendations of human/grizzly bear coexistence. Social norms, values, and values orientations influence an individual’s or community’s attitudes and behaviours towards wildlife conservation. This review of human perspectives combined with grizzly bear conservation reveals the need to include community members in measures to improve human/grizzly bear coexistence.
Chapter Three: Research Methods

The following chapter reviews elements of qualitative research methods used in this study. First, I discuss the use of action research and the rationale of why I chose this methodology. Then I explain the process of finding research participants, procedures used for data collection and analysis, researcher’s and participants’ potential bias, and the dependability of this analysis.

Research Methodology and Rationale

Action research is a disciplined inquiry based on cooperation, fairness, equality between researcher and participants, and active participation that seeks not only to research, but also to inspire action (Cohen, Manion, & Morrison, 2007). Action research attempts to create change and improvement at the local level using systematic efforts (Cohen et al., 2007). In that context the goal of my research was to understand perspectives and investigate solutions to improve coexistence with grizzly bears in the area of the Meadow Creek, BC, Canada.

Initially I wanted to improve coexistence between grizzly bears and humans, and I had identified my local community as a potential area where I might accomplish this. As Bear Smart Program coordinator, I saw the need to better understand the perspectives of people who live close to grizzly bear feeding grounds in Meadow Creek. Community-based action research enacts localized, pragmatic approaches to research by employing the basic cycle of ‘think, act, and reflect’ that enables improvement of current practises (Stringer, 1999). I worked to involve those who live with grizzly bears in the research process (Kemmis and McTaggart, 1992) to provide both researcher and participants with new understandings of the significant community issue (Stringer, 1999) of human-bear conflicts. Key features of action research are:

- attempts to solve real, practitioner-identified problems
• collaborative participant involvement
• understanding causes and solutions to those causes
• participant generated solutions
• development and implementation of specific solutions
• evaluation the attempted solutions. (Cohen et al., 2007, p. 307)

Action research develops through ongoing cycles of planning, acting, observing, reflecting, and then further planning which leads to another cycle of implementation, observation and reflection (Cohen et al., 2007; McNiff, Lomax, & Whitehead, 1996). My research and recommendations naturally fell into this cycle by: planning for research, implementing research (acting and observing), writing the thesis (reflecting), and re-planning for the future by creating recommendations for next steps. Evaluation of the improvement in human/bear coexistence in this area is an area of potential future study.

Interviews provided opportunities for residents to discuss barriers and suggest potential solutions in a private and confidential setting. The discussion of the focus group helped bring together neighbours to talk about living with grizzly bears, confirm findings from the interviews, and to explore options for coexistence used in other areas.

**Data Collection**

Research began with asking long-term residents of the North Kootenay Lake area to participate in interviews about conflict and coexistence between grizzly bears and people. Participants were initially selected because they had experiences with grizzly bears in the area. As interviews progressed it became apparent that those who have the most at stake in the issue (Stringer, 1999) of coexistence were residents who lived on property that bordered the Kokanee spawning areas of Meadow Creek as it leads to MCSC. I then focused on outreaching to these
residents for interviews, with the result that all but one household on the west side of Meadow Creek Road participated in either interviews or the focus group, or both.

Interviews were conducted over the space of twenty-one months, allowing residents time to participate as they felt comfortable. I acknowledge some sensitivity to asking questions about unreported mortality because of its illegality, and needed to allow time for residents to want to participate in interviews, as building and maintaining healthy relationships is an important part of action research (Cohen et al., 2007). This qualitative research project had a total of twenty-eight participants, and consisted of nineteen semi-structured interviews and a focus group that were digitally recorded for to maintain integrity of participants’ responses and ideas (Cohen et al., 2007). Following the suggestion of Stringer (1999), I recognized that it is important to hear voices expressed in participant’s own words and not to report impersonal, objective accounts of their experiences. I also made written notes to record non-verbal expressions and overall impressions after each interview (Cohen et al., 2007).

**Interviews.**

All participants signed a research consent form (Appendix B) and were asked the same questions (Appendix A) in a consistent order. Most interviews were between thirty minutes and one hour in length. Questions were designed to be open-ended to enable participants to describe their experiences in their own words, reflecting their personal experiences and perspectives (Cohen et al., 2007; Stringer, 1999). A pilot interview was carried out and subsequently included in the evaluation process. Interviews took place at participant’s homes except for one at the local restaurant and one at my home. There were five interviews of residents from the Meadow Creek area and sixteen participants contributing to eleven interviews of residents who live directly along Meadow Creek and/or at the Spawning Channel.
Four interviews consisted of more than one adult because spouses were interested in participating. I acknowledge the possibility of ‘group thinking’ in interviewing couples together (Cohen et al., 2007) and therefore was careful to ask each spouse if they had different answers to the various questions posed. Upon analysis of these group interviews, I noticed the differences and similarities of opinion from each participant and am confident that they responded according to their individual beliefs.

Eight interviews turned into conversations about bears and people and continued for more than two hours. Cohen et al., (2007) remind the researcher that an interview is not merely a data collection exercise, but is a social and interpersonal encounter. As such, I did not want to prematurely end these longer interviews as they revealed additional ‘rich’ data and perhaps allowed participants to express their thoughts in a safe and (hopefully) unbiased setting.

While the majority of interviews took place before the focus group, three additional interviews occurred after the focus group in March 2011. At this point I felt confident that the investigation had been completed and that the data had become ‘saturated’ or redundant, with no more new or relevant data emerging (Cohen et al., 2007). To confirm data regarding historical and current grizzly mortality, I also interviewed Len Butler, BC Conservation Officer (CO) for the area from 1993-2007, and from May 2010- May 2011. Whereas all other interviews were anonymous, Butler agreed that I could use his name as a personal communication to reference his report of events.

**Focus group.**

The focus group gathered community members and the research team of Gillian Sanders and thesis advisor Michael Proctor. This phase was necessary to understand what level of coexistence was possible between the neighbours that own land in the Meadow Creek Flats or
along Meadow Creek Rd. The focus group consisted of nine participants, six of whom had not previously participated in interviews.

This activity continued for two hours and was held in my living room with refreshments to provide a comfortable setting (Krueger & Casey, 2009). A research consent form was signed by all participants (Appendix C), and I facilitated and guided the group through six questions (Appendix D). The focus group provided an opportunity to ask residents if they had anything to add, revise, or delete regarding barriers or improvements to coexistence to validate the evidence and the conclusions from interviews (McNiff et al., 1996). After the five group discussion questions were completed, Proctor presented research of grizzly populations in the Selkirk and Purcell mountain ranges and how the Meadow Creek area fits into the regional meta-population. He also spoke of less-lethal management actions taken in Montana and BC that may be relevant to improving coexistence in our area. Some group discussion followed this presentation.

**Data Analysis**

The following procedures were used to examine, order, and reassemble participant’s accounts (120,000 words transcribed) into coherent descriptions of their perspectives and their interpretations to answer my four research questions (Padak & Padak, 2010; Stringer, 1999). These procedures were also used to maintain trustworthiness of data and analysis (Shenton, 2004).

To become familiar with my data I listened to my recordings at least four times, for transcription, verification of accuracy, discovery of anything new that was not previously captured, and finally for data saturation. I read the transcriptions at least three times. During this process I noted the frequency of common responses in my transcriptions, and began to code words and ideas to identify significant data (Cohen et al., 2007). I then sorted the data under
broader themes and wrote summaries of the main characteristics of responses (Padak & Padak, 2010).

I organized the interview data to correspond with each of my research questions, noting that there was some overlap, (some data informed more than one question) culminating in recognizable themes of significant elements that are affecting the situation in Meadow Creek (Stringer, 1999). I then rated each participant’s level of agreement with these identified themes by Yes (Y), maybe (M), or No (N). Major themes were confirmed by taking into account how many people and how strongly participants held certain beliefs. There were some views held by an individual participant that I identified as relevant to my research and were also included.

For analyzing the focus group, I made a digital recording and created exact transcriptions of the discussion. As with the interview transcriptions, I listened to and read these numerous times to ensure full understanding of the data. I then highlighted those pieces of the discussion that validated conclusions from interviews or revealed a deeper understanding of issues relating to my research questions. Collaboration of interview and focus group results confirmed the main themes and responses used to evaluate this research.

**Research Credibility**

I recognized that because all the research participants knew I coordinated the local Bear Smart education program, some responses may have been what participants thought I wanted to hear, as opposed to responses they may have had if they were talking to a neighbour who shoots bears. However, I was careful to phrase and present the interview and focus group questions in a manner that was designed to be open to their honest responses. I was careful to not seek answers that supported any preconceived notions and the open-ended nature of interview questions and comfortable interview settings allowed for an interpersonal exchange where participants may
have been more likely to disclose aspects of their thoughts, feelings, and values than they would in a less comfortable situation. Cohen et al., (2007) write that the human element in the interview is necessary to its ‘validity’; “if the interviewer becomes rational, calculating, and detached, the less likely the interview is to be perceived as a friendly interaction, and the more calculated the response is likely to be” (Kirkwood 1977, as cited in Cohen et al., p 153).

**Research Dependability**

Reliability in quantitative research refers to the replication of data; however the unique and subjective nature of qualitative research suggests that the data is not replicable (Cohen et al., 2007). Cohen et al. (2007) conclude that dependability in qualitative research is a better concept to judge accuracy of research, which is seen as the relationship between recorded data and the phenomenon under study, relating to the degree of accuracy and comprehensiveness of the findings. The result is that findings must be logical and make sense to the unaided observer.

The transferability of qualitative findings to other situations is problematic because of the infinite complexity of human behaviour, but I attempted to detail my results so others can determine the transferability for themselves (Tobin & Begley, 2003).
Chapter Four: Results

You can take the wildness out of wilderness, and the grizzly is part of that. Yeah, it’s easier to go hiking in the mountains without the threat of a grizzly bear, but I think that changes things. Maybe it’s the old romantic idea of the West or the North, but the grizzly bear is part of the wilderness experience. (L. Butler, personal communication, August 4, 2010)

Research Question One: Do Residents Living near the Meadow Creek Spawning Channel Believe that Coexisting with Grizzly Bears is Possible?

I found 27 of 28 (96%) of research participants believe that coexistence between grizzly bears and humans is possible. The one participant who didn’t answer affirmatively, answered with a “maybe”. Looking beyond their yes-no responses, I found two themes: increasing tolerance and improved coexistence since 2005, and participants held different views of what coexistence means for them.

Table 1. Results of themes where <25% of participants mentioned significant contribution to coexistence

<table>
<thead>
<tr>
<th>Research question/theme</th>
<th>% agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Is coexistence possible?</td>
<td>96%</td>
</tr>
<tr>
<td>Coexistence is improving</td>
<td>100%</td>
</tr>
<tr>
<td>2. Barriers to coexistence</td>
<td></td>
</tr>
<tr>
<td>Intolerant historical attitudes</td>
<td>100%</td>
</tr>
<tr>
<td>Poor Attractant management</td>
<td>100%</td>
</tr>
<tr>
<td>Fear of bears</td>
<td>36%</td>
</tr>
</tbody>
</table>
3. Improving coexistence

**Education** (result of community program, patient communication, and demonstrating effective solutions to prevent conflicts through attractant management) 70%

**Attractant management** (result of education and use of effective tools such as electric fencing and bear resistant containers to prevent conflicts, resulting in more tolerant attitudes) 100%

**Tolerant attitudes** (result of improved attractant management, social norms influenced by demonstrated coexistence, allows for increased education) 50%

4b. **Historical mortalities not reported** (result of independent attitudes, lack of outreach from authorities, and remote location) 100%

---

**Increasing tolerance and improved coexistence.**

All participants believed that human/grizzly bear coexistence is improving and that historical, pre-2005, attitudes (see Discussion) were generally zero tolerance for grizzly bears. Not every resident minded bears, but those who were intolerant shot any bear on sight, if feasible. The actions of intolerant residents left little room for coexistence for others who didn’t mind or even appreciated bears. Participants also believed that since 2005, people were more willing to change their behaviour by managing their attractants, and people no longer are “actively shooting [bears] just for the hell of it” (P [Research Participant] 26).

P2 mentioned that they, and possibly others, realized that bear conflicts are generally caused by anthropogenic food sources available near residences. P15 said that their attitudes towards fruit trees have changed from shooting bears to protect the fruit to “just picking the apples so the bears aren’t in danger”. Len Butler, CO for the area from 1993-2011, reported an increase in tolerance in resident’s attitudes towards grizzly bears around 2005, exemplified by resident’s new willingness to try electric fencing and bear deterrents. Butler believes that we can coexist with grizzly bears, but people need to realize grizzly bears are common in the area they
live in and to be careful with attractants, and to stay aware and prepared while in the bush. He also recognized that Tesla Spring Farm’s commitment to living and farming directly at the Meadow Creek Spawning Channel (MCSC) without shooting any grizzly bears since 2000 is a clear demonstration that coexistence is possible (L. Butler, personal communication, August 4, 2010).

P2 reported that they, and possibly others, see value in having bears as part of the landscape, and that people are not as fearful of bears as they were in the past. P2 and P4 believed that intolerant attitudes stemmed from fear and that these attitudes have been changing with increased education. P27 thought that part of the cultural shift had to do with media and school education about wildlife as beings that belong here, and that the older generations did not receive this type of education.

*Grizzly bears perceived as part of the landscape.*

Though I was not attempting to categorize participant’s responses according to their values towards wildlife, I recognized that the majority of participants held the belief that grizzly bears are part of our landscape and are deserving of conservation measures (ie. have a mutualist value orientation). The following beliefs are indicative of tolerant views towards grizzly bears and coexistence, exemplified by P15’s statement that “we are in the bear’s yard; they are not in our yard”. P24 and P10 had the perception that bears were here before us, and should be here long after us. P5 thought that teaching children that we share this land with other forms of life that are equally important as us will help instill attitudes of tolerance and respect, and P4 mentioned teaching local children to understand that “we have a unique opportunity in our area to make conscience decisions to [conserve wildlife] so that we have these species into the future”. P24 thought that hiking in grizzly country is a thrill and wants their children to grow up
to learn respect for all wildlife and to share the land with them. P24 went on to make the point that grizzly bears help to keep us humble, and P22 believed that living with grizzly bears helps them “connect to the bigger picture of life; that it is not just about humans”. P21 said it is a pleasure to live in a place where there are all kinds of wildlife, including bears. P21 went on to laugh that “bears can be pretty inconvenient at times, but so can your children”.

**Different views of coexistence.**

There were a variety of views of what coexistence meant to participants, almost as many as participants. Some mentioned that coexistence is possible in a community the size of Meadow Creek as there is a low human population (95 residences in the Meadow Creek/Howser area). Some see coexistence as simply allowing bears to access Kokanee at MCSC but will shoot bears that come near residences, destroy property, or pose a menace to livestock. R9 stated “if they [bears] are not bothering you, don’t bother them back (...) as long as they aren’t killing your livestock or wrecking everything, we coexist with them just fine”. Other participants were concerned that bears do not become too comfortable around people and do not ‘hang around’, especially in daylight hours. Others were fine with seeing bears near residences, but want them to leave if they step outside. For P7, coexistence depended on being given deterrents such as rubber bullets and bear bangers to scare off bears from their yard, especially if the kids are outside, and mentioned that previously they would have used lethal means to remove the threat.

Some residents thought that coexistence means recognizing grizzly bears’ need for space and food sources, and P11 mentioned that when clearing land they leave the native berry bushes for bears to forage on. P14 wanted to plant the back portion of their land to attract bears and to help them feed well in the spring and fall. For P4, coexisting meant a give and take and it may
not always be in our favour; it should also be in favour of the bears. P2 and P5 mentioned limiting human access to some areas.

When asked if coexistence was possible, not one participant mentioned barriers to coexistence from the bears’ perspective. P5 believed that they are creatures just trying to make a living, just like us. P17 said that “it [coexistence] is possible because nobody makes a living that is diminished by grizzly bears”. P12 believed that any problems come from the attitudes of the humans, and P10 mentioned, laughing, that they think “it is very nice of the bears to tolerate us”. P25 stated that “if bears wanted to be aggressive there are plenty of reasons [there could be greater conflicts] but the bears choose not to (…) I think it [coexistence] depends on the people”.

**Research Question Two: What are Perceived Barriers to Coexisting with Grizzly Bears?**

I was able to discern the following themes for perceived barriers to coexisting with grizzly bears in Meadow Creek: **Historical and current lack of tolerance** for bear presence in the community, lack of knowledge and/or **responsibility to manage food attractants**, **fear of bears** and **bears’ potential lack of fear for us**, **cost of less-lethal alternatives**, **future expansion of human settlements**, and **issues with the MCSC**.

**Historical and current lack of tolerance.**

Participants unanimously agreed that historical attitudes towards coexistence were near zero-tolerance, and that shooting bears was the social norm if one experienced conflict. There was one resident in particular who was repeatedly referred to by his family and in the community as having an influence of zero tolerance. This person (pseudonym ‘John Smith’) was known to go out of his way to kill bears and seemed to be determined not to only shoot bears on his property but to eradicate bears from the valley. He was known by his neighbours to track grizzly bears across their private property with the intention of killing the bear(s). Second hand reports
by immediate relatives and neighbours suggested ‘John Smith’ may have killed up to 120 grizzly
bears and perhaps 500 black bears in the 40 years that he raised his pigs and chickens within 20
meters of Meadow Creek as it leads to MCSC. While it is difficult to verify these estimates, this
number was agreed to be possible by the local CO Len Butler, who learned of these events in the
later years of his tenure (personal communication, August 4, 2010).

P7 grew up with conflicts between bears and livestock in this area and has chosen not to
raise animals because of how hard it is to protect livestock from bears. The attitude of
intolerance still echoes in his statement that “If you want livestock left [alive], you have to be
quite vigilant about it. Any animal that comes in to threaten your livestock, well, you just have to
whack it.” Raising livestock on the creek was obviously difficult, but many participants believed
that attitudes of intolerance led to elevated numbers of kills which extended beyond bears
predating on livestock. ‘John Smith’ died in 2005, and it seems that though some individuals in
the community are intolerant of bears and may still shoot them on sight, there have been more
grizzly bears sighted near the spawning channel in recent years. P5 [who works at MCSC]
reports “I remember when I’d see five sightings in a year. Now I can have five sightings in a
day”. Focus group participants also thought that more grizzly bears were being sighted in recent
years [past five years]. Some participants believed more bears are being seen as a result of the
passing of John Smith. P7 stated that if John Smith were still around and he saw any of the bears
seen in the area recently, it would “just be shoot, shovel, and shut up”.

**Attractant management and human responsibility.**

All participants understood that attractant management continues to be a consistent
barrier to coexistence in Meadow Creek, and this was confirmed by focus group participants.
Garbage was a bigger problem in the community when the Marblehead landfill was an open pit
from mid-1960s until 2001, when it was changed to a transfer station and garbage was no longer accessible to bears (this site became a recognized landfill by the Regional District in 1983 but was used previously as a refuse site). When the landfill was open to bears, participants reported that they would take visiting friends and relatives to the dump to see bears, and that at times there were up to eleven or twelve grizzly bears feeding on garbage. Dump bears were known to stay at the garbage pit spring, summer, and fall, with this plentiful food source disrupting their natural feeding regimes. A participant who lives between the spawning channel and the refuse site reported that the Conservation Officer Service (COS) would tell him to get rid of any problem bears because they were unhealthy third and fourth generation dump bears. At times there were so many bears shot that people stopped burying the carcasses and “left them for the coyotes” (P18).

Fruit trees were also mentioned as a problem, exemplified by the statement of P15 “The biggest problem for us is the apples in the yard. We used to not want to pick them before they were ripe, so it was kind of like our apples were more important than the bears.” Other participants mentioned that not only do bears eat the fruit but they cause property damage by breaking the branches of the trees, which is not tolerated. P18 mentioned that if one picks the apples early, bears won’t wreck the trees, but pointed out that some varieties of apples won’t keep properly if harvested early. P8 spoke of some years when bears were eating plums that were still green and “hard as rocks”, again making the point that harvesting fruit early does not prevent bear conflicts.

P14 acknowledged that coexistence “takes a lot of work”. Many participants mentioned that people’s unwillingness to put out extra effort towards attractant management, whether through “laziness or unwillingness to change” (P25), remains a barrier to coexistence. People’s
lack of education and consideration in regard to bear activity was mentioned, including lack of human responsibility when people go to view bears intentionally. P1 recognized the need for people to not approach or harass bears when viewing or taking photographs. It was also acknowledged that while people have a strong sense of private property, bears do not have a sense of boundary and will walk through people’s yards on their way to the next meal.

**Fear of bears.**

Fear of bears was mentioned by 36% of research participants and was recognized as both a historical and current barrier to coexistence. It was acknowledged that some people’s fear of bears would have led them to shoot a bear on sight because of the perception that “you need to shoot it before it gets you” (P9). P4 speculated that the basic premise for why people shoot bears is that they are afraid. P4 also thought that people from the same extended families are the ones who have the greatest fear of bears and the least tolerance for bears near their properties [this may be because fear and intolerance of bears is taught to younger relatives as they grow up]. Some residents recognized a limitation of living with bears is potentially not accessing some areas because of bear activity; P22 admitted to being scared of bears and does not walk in the places they like to walk when it is bear season.

**Bears losing fear of us.**

There was a perception that if bears lost their fear of people and became comfortable around us [habituated], that these bears are inherently dangerous. P18 stated that we need to “keep the upper hand with bears... and bears that have lost their fear of us are not safe and obviously unhealthy”. P3 mentioned the “teddy bear mentality”, where people think of bears as cute and cuddly and forget that they are wild and dangerous animals.
Many participants were concerned that if bears become habituated to us that they could start ‘hanging around’. P22 mentioned that in 2005 when two grizzly cubs lost their fear of people and were habituated in the community, they felt like “a hostage” in their home when the bears were in the yard. P22 also mentioned steps used when these bears were around; keeping the students in at recess and lunch at Jewett School, and driving their own children to the end of the drive to meet the bus to prevent encounters with the bears. Generally, it seems that participants like to see bears, but also do not want them to be comfortable around people, residences, or public places, especially near the schoolyard. P15 stated that “It’s nice to see them, but it’s nice to see them go”.

**Cost of less-lethal alternatives.**

The cost of less-lethal alternatives such as rubber bullets was mentioned as a factor preventing coexistence by P7. They reported, “five dollars a shot for a rubber bullet or you can buy a pack of double ought buck and never have to deal with that bear again”.

**Increasing human settlements and use of the backcountry.**

Increasing human populations, settlements, and backcountry use was recognized as a barrier to coexistence. Human settlements and associated highways were mentioned as a barrier by P4: “if more people move here I think it is really important to identify the crucial bear habitat that we have and do some landscape planning to where our human settlements will be”. P18 recognized that as more people have increased backcountry access via roads and AVT trails, we experience more bear sightings and encounters. P26 mentioned that should there be a fisheries collapse related to artificially enhanced populations created by the Kootenay Lake fertilization program, Meadow Creek would end up with lots of hungry bears resulting in a very difficult barrier to coexistence.
Meadow Creek Spawning Channel.

Participants also perceived that habituation of bears at MCSC could become a barrier to coexistence. Some participants thought that human pressure on bears at MCSC could displace bears into the community. P5 perceived that too many people and vehicle traffic drives the bears away from the fish, which P5 thought that bears need access to. P5 also reported that some visitors to MCSC are acting in ways that may lead to close encounters and conflicts: walking around the channel at dusk with small children, allowing dogs off leash, and not carrying bear spray to prevent encounters from becoming conflicts.

Research Question Three: What are Possible Solutions for Improving Coexistence with Grizzly Bears?

Participants identified the following themes to improve coexisting with grizzly bears in Meadow Creek: education to increase understanding of bears, education and tools to support attractant management, attitudes of respect and tolerance for bears, the use of electric fencing and trained dogs to protect livestock and fruit trees, use of bear spray, and tools for less-lethal management. Also mentioned was keeping bears fearful of us, wildlife law enforcement, and habitat management by potentially limiting human access to some areas and maintaining corridors for grizzly movements.

Education.

Seventy percent of participants identified education as the primary tool to improve coexistence. Though I did not ask research participants specifically about the education work that I do, 18 participants independently recognized the educational efforts of the North Kootenay Lake Bear Smart Program as helpful towards promoting coexistence with grizzly bears in the area.
P10 acknowledged that community education efforts give residents information about what they can do to prevent conflicts and helps people to enjoy grizzly bears, instead of being afraid. P29, P27, and P10 thought that presentations from experts educating about grizzly populations, behaviour, and ecology helped people to care about grizzly bears and understand the importance of coexisting. Education of schoolchildren was also mentioned as very important by eight participants and P22 credited the bear safety message from the North Kootenay Lake Bear Smart Program to help her children act appropriately and to stay safe when they had a close encounter with a bear in their yard.

P26 thought that how the educational message is presented (working with people instead of “talking at them”) had been successful and is necessary to improve coexistence. This participant acknowledged that some of Meadow Creek’s residents may not only have had intolerance towards bears, they may also have intolerance towards being told to change their behaviours, especially on their private property. A positive approach towards working with and supporting residents to offer options to prevent conflicts was also mentioned by P15. P13, P4 and P24 thought that education to prevent conflicts, combined with active support to provide options when conflicts do happen, is necessary to developing consistency in attractant management. CO Len Butler echoed the need to provide options and education, and to demonstrate examples of coexistence tools such as electric fencing. P26 reported that this approach was changing people’s attitudes because “people just can’t get away with blatant ignorance anymore; it is not accepted. That’s a pretty big step.”

**Attractant management.**

Ninety-six percent of participants mentioned garbage management as being of primary importance to coexistence. The focus group members unanimously agreed that the easiest path to
coexistence was ensuring that attractants (especially garbage) were managed at every residence to prevent any human-food conditioning of bears. P24 also proposed communication between residents if there was a grizzly ‘hanging around’ and that this communication should involve a reminder to neighbours to manage their attractants. P18 echoed that a community approach was needed because “if they find food at your house, they will be at my house the next day (...) they get accustomed to it and they will come after it”. P26 and P24 mentioned that the Bear Smart Program’s effort to provide residents with loans of bear-proof bins creates positive association for effective attractant management. P4 reported that these types of models and demonstrations of attractant management, as well as less-lethal methods as alternatives to the use of firearms, had a positive effect on coexistence. P29 included managing and cleaning up areas of butchered domestic or wild animals and associated gut piles as also being very important.

**Attitudes of respect and tolerance for bears.**

Fifty percent of participants mentioned respect for bears as being important when living, working, and recreating in bear country. P12 believed that a mutual respect between humans and bears will improve coexistence, so that bears also respect our space. P15 thought keeping a respectful distance from bears is important and P13 identified the need to be aware and not to put oneself in a situation where the bear feels that it needs to protect itself or its cubs. P27 recognized that the spawning channel is a huge draw to bears and as a result won’t recreate in that area alone when the Kokanee are spawning.

When describing a situation with two very habituated grizzly cubs in 2005, P22 mentioned that though they were uncomfortable going outside on their property when the bears were around, they believed that attitudes of respect and tolerance were necessary. P22 mentioned that they were willing to accept the limitations of having these bears around, “it is a season (...)
they [bears] come for the fish and also want dessert (...) we can live with them”. P11 mentioned that when a grizzly did get into their greenhouse, they had the attitude that they should’ve checked their electric fence and that the incidence “was his fault” and recognized that if they had a different attitude, they would have just shot the bear.

While P4 believed that it will be difficult to change attitudes of someone who does not respect hunting regulations or conservation values, P15 mentioned that community tolerance has changed towards coexisting and there is no longer community tolerance for shooting bears just because they are walking across your property. CO Len Butler also mentioned the need for education on bear behaviour to define an ‘aggressive bear’ to recognize that most bears in community settings are not aggressive; they are hungry. P28 believed that pictures from local photographers are helping to increase appreciation of local bears, and to de-mythologize the perception that bears are aggressive in nature.

**Electric fencing and trained dogs.**

Six research participants mentioned that protecting fruit trees from bears would help to improve coexistence and allow fruit to properly ripen on the trees. Four participants reported that electric fencing is the primary way to do this. They and the eight focus group members acknowledged electric fencing as the primary tool to allow rural residents to raise their fruit, meat, and other foods without predator conflicts. CO Len Butler mentioned that Tesla Spring Farm (adjacent to MCSC) has done excellent work with electric fencing and acknowledges that this farm demonstrates an admirable example of coexisting.

P10 and P14 mentioned the use of trained dogs, especially livestock guardian dogs, as another tool towards promoting coexistence with bears.
Bear spray.

Only one participant mentioned bear spray as a safety tool. P24 mentioned that their family will use it as a preventative when walking to the community hall with their children.

Less-lethal management.

P14 promoted the use of bear bangers and rubber slugs should bears come near residences instead of using lethal means to deal with bears. P4 suggested an aggressive program to scare bears away from residences to encourage them to stay away and P24 suggested a community based project to manage bear conflicts.

P29 thought that tracking bears (and especially family groups) through sightings and radio collars might help people make personal connections to individual bears and therefore be more willing to take steps to make sure that attractants are managed to keep bears out of trouble.

Keeping bears fearful of us.

Two participants thought that shooting bears and keeping bears fearful of us would help to improve coexistence. P3 said that coexistence could be improved by “shooting an odd bear so that bears have some way of fearing us”. P7 also believed in the use of firearms; when asked how to improve coexistence they simply answered “Shotgun; 100% effective and no repeat offenders”. Though these two participants reported that shooting bears is necessary to coexist, (showing a domination value orientation towards wildlife), all participants thought that if a grizzly population was threatened that we should make efforts to conserve grizzly bears. P7 would like to continue to have grizzly bears on the landscape so that their children can hunt them if they want to.
Wildlife law enforcement.

Wildlife law enforcement was mentioned by three participants as a way to improve coexistence by making sure residents managed attractants and/or reported grizzly mortalities. P2 mentioned that wildlife laws need to be enforced and/or be made stronger for people who do not clean up attractants because it puts neighbours at risk, and suggested that the CO could write more warning tickets and then levy a fine to clean up attractants. P2 also said that if someone shoots a grizzly due to conflicts, that the investigation process should be rigorous and people need to be charged if found to be outside the law. P22 thought that the investigations into grizzly mortalities due to conflicts should include inspecting the neighbourhood because attractants may be available at more than one location. Cooperation between agencies (education programs, COS, and the BC Government Fish and Wildlife Branch) was mentioned by CO Len Butler; with the admission that he thought the COs need to follow up when they say they will. Butler spent lots of time in the community of Meadow Creek to gain the trust and respect of local residents so that they would call the COS when experiencing a grizzly conflict and/or report grizzly(s) shot by residents.

Habitat management.

Habitat management was mentioned by five participants as an important consideration to improve coexistence, whether it means limiting human access to important habitat or landscape planning to protect movement corridors. P2 said that coexistence “takes a lot of human responsibility” and recognized that coexistence may sometimes limit human activity in important bear habitat, but felt it is worth the limitations to have grizzly bears on the landscape and specifically in the Meadow Creek area. P5 recognized the need to limit human access to MCSC
to minimize people having surprise encounters with grizzly bears at close range, especially while on foot and in the limited light of dawn or dusk

P11 made the point that when fencing to keep bears or other wildlife out of areas that we need to think about their needs for movement and maintain important travel corridors. P11 recognized that if we are to fence off an area that bears use for travel, the consequence may be that the bears may simply break down the fence to move through.

P4 reported that to improve coexistence we also need to think on the landscape level and that “we definitely need to protect their really crucial habitat, whether it’s berries or fish, or whatever, and their migration routes and corridors… and just share the landscape with them in an equal fashion.”

**Research Question Four: How Important is Human/Grizzly Bear Coexistence to Grizzly Populations in this Linkage Area?**

It is difficult to quantify the importance of coexistence in Meadow Creek, but it does appear possible that the juxtaposition of MCSC adjacent to the historically intolerant community of Meadow Creek acted as an attractive sink (Nielsen et al., 2005) from ~1970-2005. An attractive sink is when a very good food resource attracts bears and another aspect about that area results in a high mortality of those bears. A potential contributing factor to this sink effect was the Marblehead open-pit garbage dump (~1965-2001). Increased human and grizzly bear coexistence in Meadow Creek has potentially decreased grizzly bear mortality rates in the local area and therefore possibly improved the linkage function improving realized connectivity between the Central Selkirk and Central Purcell populations.
Grizzly Bear Populations and Linkage.

Linkage through Meadow Creek may increase the viability of the depressed Central Purcell grizzly bear population unit (GBPU) of 87 bears by providing connectivity to the larger, more viable Central Selkirk Goat Range subpopulation of 223 bears (Proctor et al., 2012). Larger GBPU’s with high probability of long-term persistence can act as source populations for threatened subpopulations, with appropriate management to reduce mortalities (Proctor et al., 2012). Linkage between these GBPU’s has been potentially compromised by the effects of hydroelectric development combined with human caused mortalities in Meadow Creek. The main impacts associated with hydroelectric development in this area are primarily loss of habitat, and potentially of connectivity, as a result of the Duncan Reservoir. There are additional impacts associated with building MCSC in the community of Meadow Creek.

The Columbia River watershed has been impacted by hydro-electric development that eliminated anadromous salmon runs that formerly (pre-1965) reached throughout Southeast BC (Proctor et al., 2012). In 1967, the Duncan Dam was built in Meadow Creek, flooding the low elevation wetland habitat of the Duncan River and preventing fish migration between Kootenay Lake and the Duncan system. In Montana, Mace found the Koocanusa Reservoir a barrier to female grizzly movements (Mace, unpublished data in Proctor et al., 2012). The Duncan Reservoir, Kootenay Lake and the Koocanusa Reservoir, have similar widths (~ 1 km). It is possible that these water bodies act as fractures to female bear movements, potentially resulting in East-West movement being funneled into the isthmus of Meadow Creek. The excellent low elevation spring and fall habitat in this area may be a draw for grizzly bears, and is further enriched by spawning Kokanee at MCSC.
The Meadow Creek Spawning Channel (MCSC) was built in Meadow Creek in 1967 to compensate for the impact of Duncan Dam on Kootenay Lake fisheries. MCSC provides grizzly bears with a concentrated food source that may be a destination for bears from a wide area. Proctor found female grizzly bears travel ~25 air kilometers and male grizzly bears ~50 air kilometers to rich food sources in the South Selkirk GBPU (M. Proctor, unpublished data). It is possible that bears from a wide area have been/are drawn to this unique concentration of Kokanee, but due to the compounding factors of the Marblehead dump and historical intolerance, this area has become an attractive sink (Nielsen et al., 2005).

The former Marblehead garbage dump may have contributed as an additional destination food source to MCSC, while it was operating as an open-pit landfill from ~1965-2001. As noted in the discussion chapter, open landfills create garbage conditioned bears that likely result in intolerant attitudes and increased mortalities due to conflicts. Proctor and Neumeier (1996) report that over 105 grizzly bears over a ten-year period were killed or trans-located out of the open Revelstoke landfill.

The linkage function of this area may have been compromised by the historic (1970-2005) mortalities due to conflicts in Meadow Creek, (possibly 2 - 3 or more bears/year). It is possible that human/grizzly bear conflicts in Meadow Creek contributed to the diminished viability of the Central Purcell GBPU. Along Hwy 31A between Kaslo and New Denver (between the subpopulations of South Selkirk Goat and South Selkirk Kokanee), Procter et al., (2012) found that human-caused mortality resulted in a fracture in linkage between these areas. It is possible that sustained mortalities due to conflicts and intolerant attitudes in Meadow Creek created a similar type of fragmentation between the Central Purcell GBPU and Central Selkirk Goat Range subpopulation.
This research suggests that coexisting with grizzly bears in Meadow Creek may serve to improve the linkage function of this area, making coexistence important to local grizzly populations. This connectivity depends on preventing and reducing conflicts near residences and farms and a somewhat tolerant attitude of residents towards their ursine neighbours.

**Research Question Four a: What is the Past and Present Rate of Human Caused Mortality due to Conflicts?**

I defined the past as 1967-2005 and the present as 2006-2013. The reason for this differentiation is I began bear education in the Meadow Creek area in 2006 and have a direct, and therefore much better, idea of bear mortalities since that time. Also, it appears that events in 2005 (see discussion) served to change both resident’s and CO Len Butler’s attitudes towards bear conflicts. Though CO Len Butler returned to the area for one season from May 2010 to May 2011, his main work was from 1993-2007 and he was able to reflect on mortalities and attitudes prior to and over this timeline. Butler reported “With the old timers, if there was a grizzly problem, they dealt with the grizzly problem. They shot it. That’s it. It didn’t get a second chance, a third chance. They just shot it”.

When asking participants about numbers of grizzly mortalities, participants were generally vague in their estimates. A few participants mentioned that though they knew it happened with some regularity, they were not in the circle of people who knew and they personally didn’t ask. Even when I clarified that the interview was confidential, this question was to just get an idea of the past rate of mortalities, and that no person could be charged through my research, participants seemed wary of getting themselves or their neighbours into trouble with authorities. Three interviews yielded the most pertinent information to this question and these answers were thought to be reasonable estimates by CO Len Butler.
The main person identified with shooting grizzly bears in Meadow Creek died in 2005, and this may be part of the reason why people felt comfortable talking about his penchant for killing grizzly bears (and other predator species). I have called this person ‘John Smith’ for the sake of anonymity. From participant’s accounts, which were deemed possible by CO Len Butler, it seems that ‘John Smith’ shot 120 grizzly bears in the thirty-eight years that he lived in Meadow Creek, for an average of three grizzly bears per year. Butler spent time with ‘John Smith’ to try to mitigate his bear conflicts and over time, Butler says that ‘Smith’ started to share his stories about how many bears he had killed. There was one year (~1985) where John Smith was known by his family members to have shot seven grizzly bears. Though these numbers may seem unrealistically high to wildlife managers, many females have more than one cub and a family group may consist of three or four bears. ‘John Smith’ kept chickens and pigs within 20 metres of Meadow Creek where Kokanee swim by each August-September and carcasses accumulate in September-October each year, and most of Smith’s kills were claimed as protecting his livestock. ‘John Smith’ also would hang cattle and pig carcasses in his barn and leave the gut piles in the yard beside the creek where they were accessible to bears, and would shoot any bear that came in to feed or investigate the smells. ‘John Smith’ also was known to intentionally bait bears with fish and other attractants to his property so that he could shoot them.

Two research participants claimed that they found ‘Smith’ trespassing on their land while tracking grizzly bears with his gun in hand and out of bear hunting season, and perceived that ‘Smith’ seemed to have the intention to shoot any bear who showed up in the valley. ‘Smith’ slowed down in age after the year 2000 and as his eyesight went his bear-killing correspondingly slowed as well.
In addition to ‘John Smith’, there were other grizzly bears shot at the farm adjacent to the Meadow Creek Spawning Channel from ~1990-2000. This farm kept free-range pigs that sheltered in open lean-tos, easily accessible to bears. They also had a carcass disposal site that was very attractive to bears frequenting the Spawning Channel. I identified another location on Meadow Creek Road that kept pigs and chickens and were known to have problems associated with grizzly bears, livestock, and garbage. Additionally, other residents had conflicts with grizzly bears due to household attractants such as garbage and fruit and would shoot bears periodically. Between the garbage dump, MCSC, livestock, and household attractants, an average of three or more grizzly bears per year may have been shot in the community of Meadow Creek, including family groups of two or more bears.

It was also stated to me by a Meadow Creek resident (in a conversation outside of this research) that about thirty years ago, it was culturally approved upon to simply shoot bears on sight, and that ‘you were a fool if you didn’t’. P19 added to this that bears were looked at differently when he was younger, and black bears:

were treated like vermin (…) every logger in the country, you slammed on your brakes if there was a bear on the road and you shot it (…) and that was the way to deal with it; you stepped out your door with your gun and that was the end of it (…) you just don’t do that anymore. (P19)

CO Len Butler stated that in the fifteen years (1993-2007) that were the main part of his tenure in the Meadow Creek area, he shot at least one grizzly and knew about at least one other grizzly killed by residents each year, and thought that there were likely additional mortalities that he did not know about as has been reported for grizzly bears in the region in general (McLellan et al., 1999). Butler also remembered relocating fifteen grizzly bears from Meadow Creek to the
north end of the Duncan Valley over his time as CO in the area. The rate of mortality slowed down after the year 2000 and Butler put additional time into Meadow Creek. In 2005 there were two habituated young grizzly bear cubs shot by a relative of ‘John Smith’ and Butler said “I finally had enough of dealing with these people (…) because people were not helping themselves (…) and I charged him under the wildlife act”. Butler told me that he thought that these two young bears were not posing a risk to human safety and that it was time that the community changed the way it reacted to grizzly bear conflicts and started to put effort into coexisting.

In the recent past, I know of two adult male grizzly bears shot for eating pigs in 2007, one young grizzly poached in 2009, an adult male grizzly shot from a hanging deer carcass in 2010, and an adult male grizzly shot for killing livestock in 2012.

**Research Question Four b: Are Grizzly Bear Mortalities due to Conflicts Reported to the Conservation Officer Service? Why or Why Not?**

All research participants agreed that historically (pre-2007), people tended to not report grizzly mortalities due to conflicts to the COS. Participants thought there was little incentive or benefit to making a report after shooting a bear, and only potential hassles involved with reporting. Participants identified fears about being charged with shooting out of season or without a tag when they believed that they were simply defending themselves.

When I interviewed CO Len Butler, he stated that though he saw an increase in grizzly conflicts and mortalities reported to him in the time he worked in the Meadow Creek area (1993-2011), he believed that there will always be unreported mortalities. There was a transition in reporting pre-1993 and his time in the area because former COs did not spend time in Meadow Creek. Butler said of earlier years of his tenure in the area, “it was socially acceptable to shoot bears...it was understood that we live out in the country and this is what we do”.
By 2006, the majority of grizzly mortalities and conflicts were thought to be reported to the COS. Butler said he worked on getting people to report grizzly problems to him and thought that with his communication networks developed in the area that if a grizzly were shot and not reported, that he would end up hearing about it. This was part of his method of getting people to report; he understood that there were many conflicts because of the high density of grizzly bears in the area and wouldn’t charge people if it was self-defence or a menace to livestock and they let him know about it. However, he spread the word that if he found out that someone had shot a grizzly without reporting to him, he would charge them under the Wildlife Act.

P14 stated that “if no one sees you pull the trigger and you don’t tell anybody, it is impossible to be charged”, and this belief is prevalent among many backcountry users. It is also my understanding that lack of evidence in the case of illegal wildlife mortalities prevents these cases from being concluded with someone being held responsible and charged under the Wildlife Act. When asked if grizzly mortalities are reported to the COS, P18 said “what they don’t know doesn’t hurt them”.

Focus group participants also agreed that generally, the community would not call the COS if they had an issue with a bear and thought that residents have an independent attitude of ‘why call in someone from the outside to deal with our problems’. The only benefit that participants identified with reporting mortalities to the COS was fear of being caught if one didn’t make the report. P7 said that he would report if he needed to shoot a grizzly out of fear of losing his firearms license. In the past (pre-2005), it seems that shooting grizzly bears in Meadow Creek was fairly accepted socially, but more recently some participants identified new concerns with letting people know about shootings, as more recent residents to the area have
different attitudes towards wildlife and may get upset. Overall, participants thought that if a person kept quiet about it, then no one would know it happened.

Summary

In summary, results showed that participants thought coexistence with grizzly bears is possible and that coexistence is improving in Meadow Creek. Historically, intolerant attitudes and lack of attractant management posed significant barriers to coexistence. Contributing to intolerant attitudes were the lack of authoritative support for the value of wildlife (killing bears as a quick solution to conflict or perceived conflicts was almost sanctioned by the BC government through the COS of the day). The almost predatory attitudes of a few influential individuals (‘John Smith’) towards grizzly bears near the community and in general, appeared to influence the attitudes of their extended family and even other community members. The lack of understanding of basic bear biology and energy needs contributed to bear’s attraction to garbage and other human foods being confused with aggression. Also challenging the ability to coexist was the unfortunate placement of a kokanee (salmon species) artificial spawning channel in close proximity to residences, small-scale farmers with livestock and fruit trees, and a primary school. This essentially was a recipe for conflict between grizzly bears and human residents.

Potential solutions to improve coexistence include education, attractant management, and increasing tolerance. Education included one-on-one discussions and providing and demonstrating workable solutions to attractant management, such as electric fencing. Once people saw that if they secured attractants, conflicts were prevented and bears left human areas, and tolerant attitudes increased. Tolerance also improved as a result of increased law enforcement concerning attractant management and illegal killing of grizzly bears by the COS. The government also closed an open garbage dump that was available to bears for decades, thus
reducing the attractant quality of the community and reducing residential conflicts. Possibly the most effective factor in increasing tolerance was the exchange of influential community members. When the influential predatory individual died, others moved away, and community values began to change. Simultaneously, another farmer (Tesla Spring Farms) applied good husbandry activities that provided a living example of how farms and bears can coexist directly at the spawning channel.

Until ~2007 there were a minimum of two grizzly bear mortalities annually due to conflicts in the area, and these were generally not reported to the COS. It is possible that this rate of mortality compromised the linkage function of this area between the Central Selkirk and Central Purcell GBPUs. Human/grizzly bear coexistence in Meadow Creek could be a factor in assisting the recovery of the compromised Central Purcell grizzly bear population. The following chapter provides discussion about these findings.
Chapter Five: Discussion

Permanent grizzly ranges and permanent wilderness areas are of course, two names for one problem. Enthusiasm about either requires a long view of conservation, and a historical perspective. Only those able to see the pageant of evolution can be expected to value its theater, the wilderness, or its outstanding achievement, the grizzly. (Leopold, 1949, p. 199)

In this chapter I discuss the following themes which stem directly from my research on coexisting with grizzly bears in Meadow Creek, but also form a greater scope of reference that might be relevant to other communities in BC: why and how coexistence is improving, understanding attitudes of intolerance (including change in reported mortalities), potential issues associated with improved coexistence, less-lethal management of bears, limitations of this research, and future research directions.

Why and how has Coexistence Improved?

I found that coexistence with grizzly bears is improving in Meadow Creek. The main factors participants mention that have helped to improve coexistence are: the closing of the Marblehead garbage dump, changing social norms toward increasing tolerance, improved attractant management through tools and education to support coexistence, and improved community integration and enforcement of the COS.

Marblehead garbage dump.

A provincial effort to bear-proof garbage dumps (and replace highway and provincial park garbage containers with bear-resistant bins) has helped to reduce bear conflicts and improve attitudes towards bears throughout the province (M. Badry, personal communication, March 12, 2013). The Marblehead garbage dump (located about 2 kms north of Meadow Creek on the
Lardeau River) began as an unofficial refuse site in the mid-1960’s and became a recognized waste landfill by the Regional District in 1983. When the open-pit landfill was changed to a transfer station in 2001 and garbage was shipped by large containers to Salmo BC, garbage at this site was no longer available to bears.

Prior to 2001, the dump was a feeding ground for both black and grizzly bears, with sightings of up to twelve grizzly bears at the same time. Participants reported taking visitors to the landfill to view the grizzly bears, and bears were habituated to humans and vehicles at the dump site. The open landfill was fenced with chain-link fencing in the 1980’s, but when bears breached the fence and got trapped inside, the fence was removed.

Garbage conditioned bears used to frequent the site spring, summer, and fall when this food source was constantly available. It appears that bears conditioned to garbage at the dump would be attracted to residential garbage if stored outside people’s homes. When people leave garbage on their porch or deck, bears will approach houses to gain access to this food. CO Len Butler remembers that there were greater conflicts and associated mortalities with garbage conditioned bears in the first years after the dump closure, but since then residential garbage management has become easier without bears already conditioned to this food source. Focus group participants agreed that bear conflicts have decreased significantly since the open-pit landfill was closed.

Results from interviews and the focus group discussion indicate that dump bears were seen as problems that must be destroyed, and generally were not respected as wildlife but perceived as a nuisance and potential danger. Making garbage dumps in the province inaccessible to bears has had a large impact towards improving attitudes towards bears that have home ranges near human settlements (M. Badry, personal communication, March 12, 2013).
Changing social norms and increased tolerance.

I found that social norms in Meadow Creek have changed from little or zero-tolerance of bears to attitudes that are somewhat tolerant or even appreciative of grizzly bears. Several participants mentioned a generational shift in attitudes in the community and perceived a greater cultural shift throughout BC in public awareness towards bears and other wildlife. Several participants and CO Len Butler identified events in 2005 as a significant turning point in coexistence in Meadow Creek. There were a few factors leading to this, not least of which is that ‘John Smith’ lost his right to own firearms in 2004 after some of his shots went through his neighbour’s porch when he was trying to shoot a black bear. Also, CO Len Butler was losing patience with the community that would not make an effort to coexist with the bears that would inevitably be attracted to Kokanee in the creek and at MCSC.

The turning point in 2005 may have centered on 2 sub-adult grizzly bears which became habituated to humans and were finding food (mostly apples) in and around several yards and Jewett School. Butler spent a lot of time in the community on education, telling people to pick their apples and manage other attractants, and he changed his approach to the community around these bears. These young bears were not acting aggressively towards people and he warned community members and ‘John Smith’s relatives to not shoot them.

Eventually a relative of ‘John Smith’ shot the two bears, killing one and wounding the other, which Butler had to put down. Butler charged the shooter under the Wildlife Act because the shooter was not defending his life or livestock. Butler said it was the first time he had charged someone for shooting bears in Meadow Creek. It seems that the events surrounding these cubs brought more attention to the shooting of grizzly bears in Meadow Creek. This shift of practical application of COS policy made it clear that this type of bear-shooting was no longer
acceptable. These two bears stood out in participant’s memories as a turning point where it became less socially acceptable to shoot grizzly bears, and some newer residents to the area became more vocal about the need to coexist with wildlife.

Through my work with the North Kootenay Lake Bear Smart Program, I was asked by the principal of Jewett School to harvest apples adjacent to school grounds [that the two grizzly bears had been feeding in the year previously] with the older students in 2006, which was my first introduction to helping with bear issues in Meadow Creek. I brought along some Bear Aware educational materials and have visited the school to educate about bears and bear attractants each year since then. I began electric fencing to protect livestock from a grizzly female with three cubs in 2007 as a request from CO Len Butler. Butler suggests that the timing was perfect for the educational program to begin in Meadow Creek as more residents were open and wanting information to avoid conflicts with bears.

An additional factor in improving coexistence is the fact that the owner/residents of Tesla Spring Farm, located right at MCSC, have demonstrated coexistence by living and farming there since 2000 without needing to shoot any grizzly bears. It is acknowledged within the community that if anyone has grizzly bears nearby, it is this farm. The owner/residents have been able to coexist mostly because of their attractant management practises, including electric fencing for their chickens and fruit trees. Another factor is their attitude towards bears; they have a high tolerance and appreciation for having bears in their area that seems to have influenced other residents as they have seen what level of coexistence has been possible at MCSC.

**Improved attractant management through education and tools.**

Attitudes of tolerance towards grizzly bears have improved as people become educated on bear behaviour and they understand that bears approach people’s yards and residences for
food and not to attack them or their children. A big misperception associated with attractant management has been the practice of leaving garbage, compost, or pet food on porches or decks. When bears learn to find food close to people’s homes, they can be perceived as ‘looking in the windows and about to break into the house’. Educating people to not store bear attractants on their porches or near their homes has alleviated this problem generally and helps to promote attitudes of coexistence as people do not encounter bears right outside their door. As people experience fewer encounters and associated conflicts with bears near their homes, tolerance for having bears eating Kokanee at the nearby MCSC has increased.

Garbage and attractant management are essential factors to prevent conflicts with bears, but participants also recognized that education was needed. When asked if the trend in Meadow Creek was going towards garbage management after the dump was changed to a transfer station, P7 acknowledged that education efforts were needed from the North Kootenay Lake Bear Smart Program. Without this education, P7 and P8 perceived that many residents would still be leaving residential garbage available to bears.

Providing options such as bear resistant garbage bins and electric fencing to protect livestock is a necessary part of coexistence beyond telling people what they ‘should do’, as acknowledged by several participants, as it makes solutions easily available and demonstrates that they are effective. The major benefit to managing attractants is that one can immediately notice the effects. Bears simply do not ‘hang around’ places where there is not a food source available, as their survival and ability to reproduce depends on their ability to find calories.

**Bear resistant bins.**

The loan of bear resistant bins to store residential garbage has been well received in the community of Meadow Creek and area, as the cost of these bins (~$220/each) is a deterrent for
people. Some residents live in trailers or small homes without room in their residence to store garbage until they can take it to the transfer station for disposal. Loaning the bins to local residents has been effective in reducing garbage available to bears and has raised appreciation and positive association for responsibly managing bear attractants.

**Electric fencing.**

Electric fencing is the only tool known to effectively deter bears each and every time a bear tries to breach an area to reach livestock. It has been used effectively for decades to protect honeybee hives from bears, and is now being used to protect other livestock such as sheep, goats, pigs, chickens and other poultry, calves, donkeys, fruit trees and any other type of attractant, including garbage landfills. To be effective, electric fencing needs to be installed properly to deter bears and also to be maintained regularly. The use of electric fencing has increased in Meadow Creek and area through a cost subsidy program to assist residents in the cost of the fence. As residents experience the effectiveness of this tool, they are willing to give the time and attention required to maintain their fence.

When bears kill livestock it is also scary for residents as they come out in the morning to find mutilated carcasses lying in their yard. People may feel violated as well as scared, and may be wondering if the bear would come to kill them or their family next. There is also an emotional response to predation on small farms as the farm animals are well known, and caring for a few animals is more intimate than caring for a large herd. As residents see that properly installed electric fencing works to prevent these conflicts, they are motivated by not having the hassle of predation as well as protecting against financial or emotional loss associated with losing livestock.
CO Len Butler says that the biggest contributing factor to grizzly bear conflicts was not aggressive grizzly bears; it was protecting livestock. Focus group participants agreed that many conflicts in the area were associated with livestock predation, especially with grizzly bears eating domestic pigs. In the past, the only way for people to protect their livestock was the use of firearms, to either haze a bear away or to shoot the bear. It seems that generally people believe that if a bear has tasted livestock that they will come back and the only way to manage the situation is to kill that bear. It also seems that in the case of ‘John Smith’ and others that he/they would shoot any bear that they saw near their livestock and they perceived as posing a menace. It is also possible that in many cases bears were shot that were not killing livestock but were attracted to the area because of the smells associated with slaughtering and butchering of meat.

Awareness around slaughtering animals for food and managing associated gut piles was mentioned by participants as important to prevent conflicts. A grizzly was shot at a residence on Meadow Creek Road in October 2010 when it was attracted to a hanging deer and gut pile in someone’s yard. This incident brought more awareness to this aspect of attractant management and became a higher profile consideration for coexistence among residents.

*Bear spray.*

Though only one research participant recognized the efficacy of bear spray as a tool to use if they found themselves in an encounter with a bear, it is worth mentioning as a tool for coexistence. We now live in a culture where the use of firearms in less prevalent and bear spray is being recognized across North America as an effective deterrent to black, grizzly, and polar bears (Smith, Herrero, DeBruyn, & Wilder, 2008). Bear spray could help residents when they feel uncomfortable recreating in the Meadow Creek area as an easy-to-use deterrent which provides a safe option should they encounter a bear at close range. Another point around the use
of bear spray is that while it gives people a safe option to defend themselves against a bear attack, it cannot be used to kill a bear that simply happens to be in the area; therefore it provides the person and the bear time to leave the situation safely (in most incidences without having to be deployed).

**Role of the Conservation Officer Service.**

While it is difficult to determine exactly what caused people’s attitudes to change, it appears that the COS charging ‘John Smith’s’ relative for the illegal shooting of two bears in 2005 influenced some change in resident’s attitudes. I speculate that this incident may have influenced this change by two mechanisms; residents potentially gained some respect for bears as a resource worth enforcing laws over, and this example showed other residents that they too would be charged for the illegal shooting of bears.

CO Len Butler also recognized a change in his attitudes towards managing grizzly bears around this time. He supported the coexistence measures taken by the new resident/owners of Tesla Spring Farm, and noticed that the community was changing as new residents were not supportive of these types of shootings. Butler mentioned that he attended a workshop (organized by Dr. Michael Proctor), with the regional COS and bear conflict specialist Tim Manley from Montana. Manley presented his work with various non-lethal bear management tools, including showing videos of electric fencing that worked to deter grizzly bears. Butler was impressed by the electric fencing and tried some of these new methods in the spring of 2007 when 2 male grizzly bears were killing pigs in Meadow Creek.

**Understanding Attitudes of Little-Tolerance**

One of my goals of was to gain a better understanding of attitudes towards bears, to facilitate understanding of the motives of residents from various backgrounds. I found attitudes
towards grizzly bears in Meadow Creek were formerly of little or zero-tolerance. Research participants unanimously agreed that in the past there were probably not as many bears (and other predators) around in past decades due to intolerance at a landscape level beyond the community of Meadow Creek itself.

Two stories seem worth mentioning as a reflection of past attitudes and bear management in the backcountry. P3 had a job (~forty years ago) where his only purpose was to shoot bears at a mining camp in the Duncan Valley about twenty kilometers north of Meadow Creek. P3 says that there was a massive berry failure for two years and the work camp had a meat storage building that was constantly being ripped into by both black and grizzly bears. When P3 was hired, his job was to shoot every bear he saw. He remembers clearly that “there were times when I shot eight bears in one day”. They couldn’t bury all the bodies and other bears would come in to feed on the carcasses, “so I would just shoot them too”. He says the smell of the place must have kept drawing in hungry bears from a great distance because he remembers shooting dozens of bears at that camp over the two years. P3 also remembers that as men would drive the new roads up the Duncan after the dam was built, they would shoot any bear they saw (this corroborates a story from P19).

I think that P3’s mining camp story is significant for two reasons: it shows some past attitudes towards bear conflicts, and P25 says that ‘John Smith’ also had a similar job in his younger days before he moved to the Meadow Creek area. It may be significant that both P3 and ‘John Smith’ were from the same generation, had very similar jobs hired exclusively to remove bears from an area, and that they both continued this behaviour into their senior years. It is possible that these two men were not unique and that other backcountry camps may have hired men to do similar work in other areas of the province. It seems widely accepted that in the 1920-
1970’s, miners and others had zero-tolerance for bears and other predators such as wolves, and that populations of these animals are making a comeback with the generational change since then.

**Fear of bears, hunting, and attitudes of backcountry users.**

These interviews suggest that historic attitudes of people hunting and trapping in BC were generally pretty hard on bears and other predators, with little or zero tolerance. Participants perceived that past attitudes reflected a fear of bears and that shooting a bear on sight used to be common, because you had to ‘shoot it before it got you’. This type of conflict is relevant to coexistence in this area as there is an active fall ungulate hunt in the salmon-rich areas of the Lardeau River and at MCSC. CO Len Butler recalls three grizzly shootings associated with ungulate hunting on the Meadow Creek flats near MCSC because of close encounters and perceived self-defense.

**Influence of attitudes of zero-tolerance.**

It is possible that the attitude of zero-tolerance and associated behaviour of one man raising livestock in a linkage area of prime grizzly habitat could have an effect on bear populations. ‘John Smith’ seems to have had a considerable influence with his intolerant attitudes towards grizzly bears that extended beyond his immediate family members to his extended family and also to his neighbours. Attitudes towards bears have greatly improved since ‘Smith’ lost his right to own firearms in 2004 and have influenced social norms of increased tolerance. Supporting this tolerance through education and management will help to solidify these new social norms of this community. In this way, even if a new resident with similarly intolerant attitudes were to move to the area, one person could not easily generate the same influence of intolerance as ‘John Smith’ had previously.
Similarly, but in the opposite direction, the owners of the Tesla Farm immediately adjacent to the MCSC appear to have had a positive influence on the community’s tolerance and ability to coexist with grizzly bears. Certainly the small size of the Lardeau Valley community allows the attitudes and behavior of a few people to have a seemingly disproportionate influence. But often, rural communities that face coexistence issues are relatively small, so the people trying to understand and potentially influence the dynamics of social attitudes should be aware of this effect. It is also noted that there can be a wide variation in views within a community, and that in some situations this discrepancy may actually lead to conflict between humans about wildlife (Madden, 2004).

**Change in reporting grizzly bear mortalities.**

This research indicates that residents who shot grizzly bears pre-1995 did not report these mortalities to the COS. CO Len Butler remembers it took a few years of encouraging residents to call him when they had a bear conflict or if they had shot a grizzly, though black bear mortalities still seem to be unreported. It seems that the person in his position before him did not go to Meadow Creek very often and residents did not involve the COS in their problems with bears. Butler believes that over time he gained the trust of residents in the area and began to hear more stories of unreported mortalities. He put the word out to the community that if he heard about a grizzly getting shot and that the person did not report the kill to him, that he would charge them under the Wildlife Act. Butler put effort into managing grizzly conflicts in the area, and he would tell people “I’ll put in the time, I’ll spend all night here and I’ll eat your bacon and eggs in the morning; then you should be willing to drop me a line... and you have my home phone number”. Butler thinks that the time he spent in Meadow Creek, especially staying up all night to
wait for bears to show up, earned him respect in the community and over time people went from shooting bears and not calling the COS, to reporting conflicts to the COS.

When I asked about grizzly mortalities, I sensed that some participants did not want to talk about them, which left me with the distinct impression that social norms in Meadow Creek were to generally frown upon asking this sort of question, and that people kept quiet about bear shootings, very probably because it was illegal in many instances. Through my discussions with community members outside of formal interviews, it was acknowledged that when the Canadian Firearms Act required registration of non-restricted long-guns (introduced in 1995 and repealed in 2012), it resulted in some residents being less likely to admit to possessing unregistered firearms or firearms that they did not intend to register, and that this could have been a deterrent to admitting that they had used these guns to shoot a bear. The majority of grizzly conflicts that Butler responded to were associated with livestock, and basic policy in BC is that predators that kill livestock are destroyed.

I asked focus group participants what bear behaviours they considered not acceptable and they responded the following: when bears become destructive to sheds, cars, or houses, if the bear was badly injured, or if the bear was aggressive towards people. They also believed that bears don’t necessarily have to run from people on sight, but that bears should move away from people if/when people want them to.

**Potential Issues Associated with Coexistence**

Since the mid-2000s when social norms changed such that many fewer grizzly bears were shot on sight, some research participants thought that there are more grizzly bears frequenting the area around MCSC. It is possible that more bears are coming in to access Kokanee salmon simply because fewer of them are being shot. It is also possible that more bears are being sighted
because they have lost some of their wariness of people as attitudes towards bears have become more tolerant. There are two issues with this; people management at MCSC and management within the interface between MCSC and residents of Meadow Creek.

**People management at MCSC.**

Bear viewing is a growing phenomenon in BC (G. MacHutchon, personal communication, March 30, 2013). In recent years, local residents from the Meadow Creek area and people from farther away have been coming to MCSC in hopes of viewing grizzly bears while they feed on Kokanee.

Effective management of people who come to MCSC to view bears is important for minimizing the potential for conflicts at MCSC and increasing coexistence with grizzly bears in Meadow Creek. There have been multiple sightings of females with cubs at MCSC in recent years and they can be aggressive if they feel they or their cubs are threatened. Lines of sight at MCSC are very tight due to thick brush on either side of the channel, which increases the likelihood of surprise encounters.

If a bear has frequent interactions with people and there is no negative consequence to the bear, then it often will habituate to people (Knight & Temple, 1995). Habituated bears tolerate people at closer distances, which make interactions between bears and people more likely and also make it more likely that people will approach bears, but it also reduces the likelihood these bears will act aggressively toward people unless pushed too far (Herrero et al., 2005). Such an incident occurred in Yellowstone National Park in 1986 when a photographer intentionally approached a habituated female grizzly bear with cubs. She initially tolerated his approach until he got too close for the bear’s comfort and she killed the photographer (Herrero et al., 2005). In addition, people who are not knowledgeable about bear behaviour could also encounter curious...
bears that approach people and these people may react inappropriately by running away or shooting the bear (Herrero et al., 2005). The more close interactions between people and bears, the more likely someone, either bear or human, will get hurt or killed. If this happened, it could seriously harm the acceptance for and tolerance of grizzly bears that has formed in Meadow Creek in recent years.

**Interface between MCSC and residents of Meadow Creek.**

While research participants unanimously accepted bears eating Kokanee at MCSC, some participants were uncomfortable with grizzly bears in people’s yards and want bears to respect people’s space around homes and especially near Jewett School. It seems that bears are becoming and likely will become more habituated to humans at MCSC through increased bear viewing at this location. Bears that are habituated at MCSC (or even non-habituated bears) may or may not approach people or residences, depending on a variety of environmental, bear, and human-related reasons (Herrero et al., 2005). However, the primary cost/benefit analysis of each bear is primarily driven by the need to find food; therefore attractant management of anthropogenic and natural foods near residences is paramount to ensure that the benefits of the rich food source of Kokanee at MCSC outweigh any benefit of being near residences.

It is possible that habituated bears can differentiate between locations and understand that being near humans at MCSC is different than being near residents of Meadow Creek (Grant MacHutchon, personal communication, February 28, 2013), even though the locations are only five hundred meters apart. However, making this distinction is made difficult because some of the more tolerant residents want to see grizzly bears on their properties and do not mind bears foraging on natural foods near their homes, so bears may be potentially receiving mixed messages from residents. On-going education will be necessary to help all residents understand
that they live in a community setting and some of their neighbors are very uncomfortable with bears who do not avoid people.

Consistency on the part of community members, most importantly in attractant management, but also in levels of tolerance of bears near people’s homes, will make it easier for bears to learn where human boundaries are.

**Less-Lethal Management**

Less-lethal management of bears works to teach both bears and people where the socially accepted boundaries are near people’s homes. Preventing conflicts through attractant management is the primary tool for coexistence, as less-lethal management actions often are not effective if food rewards remain available (Homstol, 2011). Less-lethal management of bears has been used by wildlife managers for the past 10 to 25 years in Alberta, Alaska, Manitoba, Montana, Idaho, and Washington where hard releases, hazing, and aversive conditioning are employed to teach black, grizzly, and polar bears to stay out of human-use areas. In BC, Proctor has been working with the COS over the past 8 years, and has managed 14 grizzly bears using these methods, 11 of which are still alive (M. Proctor, personal communication, February 26, 2013).

Less-lethal management provides options to move a bear away from an area without having to trap or shoot it. After managing attractants (anthropogenic and natural foods), and giving bears no reason to approach residences, clear boundaries around houses and neighbourhoods can be established to teach bears to stay away from people (Honeyman, 2008), while still allowing them safe access to Kokanee at MCSC.

Less-lethal management activities also provide excellent educational experiences for residents. Many times the resident experiencing conflict is invited to be present after a bear is
tranquilized (when is it safe and appropriate) and they may never have seen a live bear up close. When people experience the dedication shown by bear managers to try to keep bears alive, it can help to inspire them to change attitudes and behaviours to prevent conflicts (M. Proctor, personal communication, March 30, 2013). Less-lethal management is about teaching bears and people to coexist.

**Research Limitations**

I encountered the following limitations to this research: the potential for people who are interested in coexisting with bears may have been more likely to participate in interviews and the focus group, people potentially reporting according to what they though I wanted to hear, and the possibility of inaccurate memories of past events.

I recognize the potential that participants may represent the more tolerant views on coexisting with grizzly bears in Meadow Creek. It is possible that participant’s values towards nature (value orientations) influenced resident’s willingness to be a part of this research. In general, residents with a mutualist value orientation may have been more likely to agree to participate in this research because they are interested in coexistence and participating in finding solutions to bear-human conflict. Some residents with a domination value orientation and less interest in coexisting with bears may have not been as likely to respond to invitations to contribute. However, my results cover an accurate range of values towards grizzly bears in Meadow Creek, and all but one residence living on the west side of Meadow Creek road (identified as those most likely to encounter bears in their backyards) participated in interviews or the focus group, or both.

Another limitation is recognizing that social norms change depending on what group one might find oneself in. Research participants may, to some extent, have given me answers that
they thought I wanted to hear. Nevertheless, I believe with my steps to remove bias from this research, that my results reflect the attitudes of participants.

Finally, I acknowledge that memories of past events or reports of other people’s attitudes are potentially inaccurate. However, this issue was addressed by corroborating responses between various participants, and I discarded most perceptions of other people’s attitudes unless they were determined to be accurate by corroborating evidence from data or literature.

Despite these potential research limitations, through my dedication to accurate transcriptions of interviews, precise reporting of participants’ responses, and minimizing researcher bias, I am confident that this research accurately reflects the views of participants.

**Future Research Directions**

There is a need to further research and understand how habituation related to bear viewing may influence bear/human conflicts and coexistence in the residential area of Meadow Creek. As bear viewing is a fast-growing industry in BC, this research could be relevant to communities in BC and elsewhere.

This research was able to complete one cycle of action research; planning, implementing research, writing the thesis, and re-planning for the future by creating recommendations for next steps. As the recommended Less-Lethal Management Project is already underway, this project would provide excellent study for a further cycle of action research. Another option of study is an on-going evaluation of human/bear coexistence in this area.

Finally, as recognized above in research limitations, it is possible that residents who may have less interest in coexisting with bears may have been less likely to participate in this research. While steps were taken to minimize the potential bias affecting this research, it may be an interesting study to pursue further interviews (formal or informal) with these residents.
Summary

In summary, this chapter discussed why and how coexistence is improving (including the influence of the Marblehead garbage dump, improved attractant management, increased tolerance, and the role of the COS), understanding attitudes of intolerance (with the potential influence of intolerance and change in reported mortalities), and potential issues associated with improved coexistence (including people management at MCSC and the interface between MCSC and the community). I also discussed less-lethal management of bears, the limitations of this research, and potential future research directions. This work has led me to make the following recommendations for promoting human/grizzly bear coexistence in Meadow Creek and elsewhere.
Chapter Six: Recommendations

Learn from the people
Plan with the people
Begin with what they have
Build on what they know
Of the best leaders
When the task is accomplished
The people all remark
We have done it ourselves. ~Lao-Tzu Tao Te Ching

When beginning this research I wanted to discover how the people most likely to have grizzly bears in their yards felt about coexisting with bears. Through this process I found that residents living in the area of Meadow Creek Road believed that coexisting with grizzly bears is possible. This chapter suggests recommendations that will help to support coexistence in Meadow Creek, to support coexistence in linkage areas in threatened grizzly bear populations or areas of high human/bear conflicts, to provide effective education for rural residents, to promote the use of electric fencing, and to provide education on bear safety to hunters.

Recommendations to Support Coexistence in Meadow Creek

I recognize the need for less-lethal management of bears in Meadow Creek to provide non-lethal options to keep bears out of resident’s yards. The situation at the Meadow Creek Spawning Channel (MCSC) has recently been made more complicated by the public’s desire to view grizzly bears. I recommend addressing the need to manage the viewing public at MCSC to ensure consistent human behaviour and to provide education on bear behaviour, which should reduce the likelihood of bear conflicts and promote human/bear coexistence at this site. I also
recommend that local residents be included in any management planning for MCSC to minimize conflicts between management at MCSC and the local community. Madden (2004) recognizes that human/wildlife conflict may escalate if local people feel that the needs or values of wildlife are given priority over their own needs and/or authorities fail to address the needs of the local people. Often, human/wildlife conflicts can be conflicts between humans about wildlife (Madden, 2004).

Viewing activities may also habituate grizzly bears to human presence while the bears are feeding on Kokanee. It is possible that habituated bears may be more likely to approach people and their residences as bears lose their wariness of people (Herrero et al., 2005). Another possibility is that diurnal bear activity in the area around MCSC will increase as bears become accustomed to people, increasing the possibility of human/bear encounters (Herrero et al., 2005).

To address concerns about habituated bears approaching residences and further coexistence in this area, in 2011 I began the Meadow Creek Less-Lethal Bear Management Project, working in collaboration with the COS and grizzly bear biologist Michael Proctor. This project combines education, research and bear management to link these formerly separate approaches to bear conservation. When wildlife educators, researchers, and managers work together it forms a more complete approach to address issues facing conservation on all levels. Communication and collaboration between these aspects of conservation allows for community involvement beyond educating residents about bear attractants. By incorporating residents in research and management (when it is safe and appropriate to do so) community members are engaged hands-on in bear conservation practises, which can help to promote stewardship values of ‘their’ local bears.
This project is possible because of newer, more tolerant social norms in the community and because of the improved residential attractant management delivered through the efforts of the North Kootenay Lake Bear Smart Program. Through consistent hazing of bears near residential areas, less-lethal management can teach bears not to approach residences or move through people’s yards, though allow them safe access to feed at MCSC. Teaching bears that they are unwelcome at residences is only possible if food attractants are managed and inaccessible, giving them no reason to want to stay. I recommend the continuation of the Meadow Creek Less-Lethal Bear Management Project to help support human and bear coexistence in the area near MCSC.

I also recommend the continuation of the educational support and tools that have helped to promote coexistence in Meadow Creek, specifically the loan of bear-resistant bins to store garbage or livestock feed so that it is inaccessible to bears, and the subsidy program to assist residents with the cost of electric fencing. The cost associated with these tools to promote coexistence is a deterrent for their use in this economically depressed area, and these loans and subsidies not only help to make these tools accessible, but also create positive association towards living with bears.

Electric fencing is the only known tool to date to consistently and effectively deter bears from livestock or fruit trees. As noted in my discussion, when bears kill livestock people can feel scared and perhaps violated. They may understandably also feel that they do not want to live with this type of behaviour in their wild neighbours. The use of properly installed and correctly maintained electric fences is necessary to preventing these types of conflicts, and promotes tolerance towards bears in the area. To date there have been twenty-five electric fences installed in the Meadow Creek area. All of these fences have been effective to protect livestock and fruit.
trees, and have proven to be an essential tool in promoting coexistence with grizzly bears. I have also noted that the use of electric fencing seems to be becoming a social norm when keeping livestock in Meadow Creek as people experience how much easier it is to know that their livestock are safe.

Another recommendation for Meadow Creek is promoting the use of bear spray as an effective personal safety tool when recreating in areas of high bear density. If possible, it may also be beneficial to provide a subsidy in cost for local residents to encourage the use of a tool that is not yet widely accepted.

There is also the need for continued consistent COS response to charge people who take the law into their own hands when not appropriate, for example, when individuals are involved in indiscriminate killing when there is no real threat to human life or to livestock.

**Lessons for other Linkage Areas or Communities with High Human/Bear Conflicts**

In linkage areas, coexistence is necessary to provide safe access for wildlife to connect between core habitat areas. While I recognize that there is “no one-size-fits-all, standardized prescription for mitigation that can be applied successfully across the wide spectrum of specific conflict situations” (Madden, 2004, p. 251), results of this research may be helpful in promoting coexistence in other linkage areas and communities where there is a high level of human/bear conflicts. I believe that attitudes of residents in linkage areas need to have at least some level of tolerance, if not appreciation, for both wildlife and also for the greater importance of these areas for wildlife connectivity across the landscape. Attitudes for this appreciation led to increased effort to manage attractants to prevent conflicts with bears as they are using important habitat near human residences.
Effective Education to Influence Attitudes and Behaviours of Rural Residents

Community participation is a necessary measure in promoting coexistence. It is essential to coexistence that rural resident’s attitudes are somewhat tolerant of wildlife utilizing low-elevation habitat that often overlaps with private property, and that these properties are managed so as to prevent conflicts. However, rural residents may not be receptive to attempts at community education. They may not read pamphlets received, attend educational presentations or display booths at events, or ask for advice. Many rural residents seem to have an independent attitude that may resist well-intentioned assistance and especially unsolicited advice about attractant management on private property. How educational ideas are communicated is a significant factor in the ability of these ideas to change attitudes and behaviours. My education work, combined with this research process, has taught me that the most effective way to influence tolerance for wildlife in rural areas is to provide options for people without pushing them to change. If people feel pushed they may resist anything else you might have to offer, especially when trying to influence resident’s personal behaviour.

Word travels quickly in rural communities and the educator’s attempts will gather influence, whether a success or potentially even more so if a failure. If the educator is able to demonstrate successful methods and tools of coexistence, this influence may be effective beyond any verbal education the educator can provide. I recommend a patient attitude when attempting to influence change in a rural setting, and to accept resident’s views as valid even if they contradict with one’s own. It is vital to respect the right of residents to manage their private lands as they see fit. I have also found it important to communicate with the intention of assisting the resident instead of ‘saving’ the bear(s). Rural people may not be willing to change their behaviour to benefit wildlife, but they may be motivated to prevent conflicts if one can provide
an easy, reasonable, and cost effective solution. News of these solutions travel through an
established agricultural community and can serve as a communication network for change
beyond what the educator is capable of creating. When people come to you for assistance, then it
is easy to give help (this also seems to be true for less-lethal management on private lands).

Demonstrating the use of effective tools such as electric fencing to prevent conflicts and
making these tools available is necessary to promote tolerance. The use of bear-proof garbage
bins prevents garbage conditioning and reduces conflicts near houses, but most residents cannot
pay $220 for a garbage can. Loaning these bins to people not only reduces conflicts and
minimizes garbage conditioning, but also creates good will and a sense of support. Similarly,
subsidies for 50% of the cost of electric fencing to protect livestock and fruit trees assist in the
use of this very effective tool, and encourage residents to try something that may be new to them.
I noticed that people have been less willing to criticize educational messages (which could be
new or contradictory to their worldview) when they have directly benefitted from such a
program.

**Promote the Use of Electric Fencing**

I recommend that the use of properly installed and maintained electric fencing could
become part of BC’s Wildlife Act to prevent predation on livestock. In areas where
compensation is provided for livestock losses due to predation, I recommend that instead of
using this money to compensate for losses that some of these funds be used to subsidize the cost
of electric fencing to prevent these conflicts. Over time there would be less need for
compensation as livestock was protected from predation and perhaps compensation could be
delivered only in cases where for some reason the electric fencing was not effective.
A wider-scale electric fence subsidy program in areas of threatened grizzly bear populations in BC would help to promote the use of this effective tool to prevent grizzly/livestock conflicts. Conservation Officers are now recommending electric fencing in some areas when people report grizzly/livestock conflicts, which will help to encourage people to use this tool. However, if people are asking for help and they are told to invest more money after experiencing a financial loss associated with grizzly predation, they could become frustrated. A 50% subsidy to help with the cost of electric fencing may encourage these people to try this tool to prevent any further worry of predation from grizzlies on their livestock. Another benefit to this subsidy could be that it may encourage people to report grizzly conflicts to the COS instead of ‘taking care of the problem’ themselves.

**Hunter Education**

Finally, education on bear safety and on the use of bear spray are becoming more common in hunter training courses in Montana and Idaho. To educate hunters and prevent bear conflicts while hunting, I recommend the inclusion of bear safety, bear spray training, and also management of attractants in hunting camps in the Conservation and Outdoor Recreation Education (CORE) courses given to new hunters in BC.
Conclusion

This research determines that past attitudes of little or zero tolerance of grizzly bears in Meadow Creek BC are changing towards greater tolerance, making human and grizzly bear coexistence possible. Participants identified barriers and potential solutions to improve coexisting with grizzly bears. This research may help both ursine and human residents of this area coexist into the future, which could have a positive effect on linkage between Central Selkirk and Central Purcell grizzly bear subpopulations. Results and recommendations from this research may be applicable to linkage areas connecting threatened wildlife populations or areas of high human/bear conflicts in BC or elsewhere.
References


*Journal of Wildlife Management, 63*(3), 911-920.


Padak, N. & Padak, G. *Research to practice: Guidelines for planning Action Research projects.* Retrieved March 12, 2010 from: [http://archon.educ.kent.edu/Oasis/Pubs/0200-08.htm](http://archon.educ.kent.edu/Oasis/Pubs/0200-08.htm)


Figure 1. Map showing the regional grizzly bear sub-populations in relation to Meadow Creek, British Columbia as determined by and adapted from Proctor et al. (2012).
Figure 2. Map of area around the Meadow Creek Spawning Channel in Meadow Creek, British Columbia, Canada.
Appendix A: Interview Questions

Background experience
1. Where do you live?
2. How long have you lived there?
3. How long has your family lived in the area?
4. If your parents live or lived in the area, what would they do if they saw a grizzly?
5. How would you describe their attitude towards grizzlies?
6. What about their neighbours?

Personal experience of grizzly bears
7. Do you have a grizzly bear story you’d like to share with me?
8. What about the bear made you think it was a grizzly?
9. What do you think when you see a grizzly?
10. How do you feel when you see a grizzly?
11. Does it make a difference if the bear is near your home or out in the backcountry?
12. Do you enjoy watching grizzlies?
13. Do you feel more comfortable with black bears or grizzly bears?

Area attitudes
14. Do you think that the general attitude towards grizzlies has changed in this area?
15. If so, in what way has it changed?
16. If it has changed, why do you think it has?
17. Have you ever had to shoot a grizzly?
18. If so, how many grizzlies have you had to shoot?
19. Was a bear attractant the source of the conflict in this/these situations?
20. Do you think there are many grizzly bears shot in this area because of conflict with humans?
21. How many grizzlies would you say have been shot in the area due to conflict with humans in the past 5 years?
22. 10 years?
23. 20 years?
24. Do you think these mortalities are reported?
25. Why or why not?
26. Do you think it’s more important to conserve grizzlies if the population is threatened?
27. Why or why not?
28. What do you think about grizzly bears eating Redfish at the local spawning channel?
29. What about on the Lardeau River?
30. What do you think about the idea of coexisting with grizzly bears?
31. Is coexistence possible?
32. What barriers do you see to coexistence?
33. How do you think coexistence with grizzly bears could be improved in this area?
Appendix B: Research Consent Form

March 18, 2009

I am currently Master of Arts student at Royal Roads University and am researching interactions between humans and grizzly bears in the area of Meadow Creek BC. These interviews are completely confidential and unless you specifically indicate your consent, your name will not be repeated and will not appear in any report or publication of the research. Your name and audio recording of this interview will be stored in a locked and secure location until completion of the project, at which time it will be destroyed unless prior consent has been received. Data collected through this interview (other than your name and voice recording) will be kept in a secure location for a period of five years for the option of further study. I do not know of any risks associated with this interview. If you have any questions or concerns regarding the nature of this research, please contact Dr. Richard Kool, Royal Roads University at ____________.

By signing below, you agree to take part in this interview and allow me to use a voice recorder to record the interview. Your participation in this research project is completely voluntary and you may choose to stop participation at any time and all data collected from you up until that point will be deleted. Your decision not to volunteer will not influence the nature of the ongoing relationship you may have with me or Royal Roads University, either now or in the future.

Thank you for taking part in this research project. If any questions or uncertainties arise please contact Gillian Sanders at ______________________________.

Sincerely,

Gillian Sanders

I, ______________________________, consent to participate in the study outlined above, conducted by ______________________________. I have understood the nature of this project and wish to participate. I am not waiving any of my legal rights by signing this form. My signature below indicates my consent.

_________________________________________________________  ________________________________
Signature of participant  Signature of researcher

__________________________  __________________________
Date  Date
Appendix C: Research Consent Form

March 23, 2010

I am currently Master of Arts student at Royal Roads University and am researching interactions between humans and grizzly bears in the area of Meadow Creek BC. This focus group is completely confidential and unless you specifically indicate your consent, your name will not appear in any report or publication of the research. The voice recording of this focus group, and associated notes, will be kept in a secure location and will not be shared without consent. I do not know of any risks associated with this research. If you have any questions or concerns regarding the nature of this research, please contact Dr. Rick Kool, Royal Roads University at ______________________.

By signing below, you agree to take part in this focus group and allow me to use a voice recorder to record the proceedings. Your participation in this research project is completely voluntary and you may choose to stop participation at any time. Your decision not to volunteer will not influence the nature of the ongoing relationship you may have with me or Royal Roads University, either now or in the future.

Thank you for taking part in this research project. If any questions or uncertainties arise please contact Gillian Sanders at ______________________.

Sincerely,

Gillian Sanders

I, ________________________, consent to participate in the study outlined above, conducted by _________________________. I have understood the nature of this project and wish to participate. I am not waiving any of my legal rights by signing this form. My signature below indicates my consent.

_____________________________  ______________________________
Signature of informant          Signature of researcher

_____________________________  ______________________________
Date                           Date
Appendix D: Focus Group Questions

1. What does coexisting with grizzly bears mean to you?

2. Are there any benefits to coexistence? If so, what are they?

3. What are barriers to coexistence?

4. Do people report conflicts and/or mortalities to the COS?

5. What bear behaviours are not acceptable?

6. How can coexistence be improved in the area of Meadow Creek and the Spawning Channel?