# Exploring Bear Attractant Management Strategies in Vancouver Island Campgrounds

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## DECLARATIONS

This thesis is a product of my own work and is not the result of anything done in collaboration.

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Michele Greene

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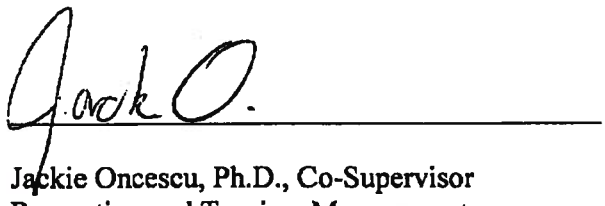

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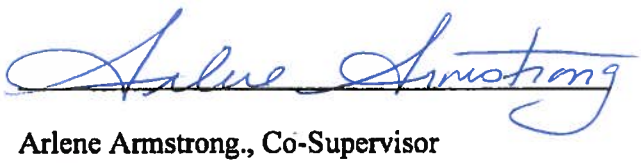

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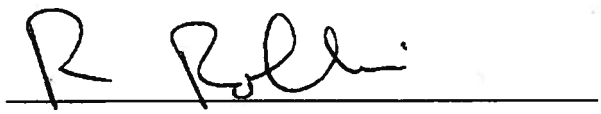

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# Abstract

Human-wildlife conflict is a global problem. As the human population increases, we further encroach on wildlife habitat. British Columbia has experienced high levels of human-wildlife conflict involving black bears. These can occur in nature tourism contexts such as campgrounds. Campgrounds are often constructed in or near bear habitat because of the beautiful natural appearing terrain. Not only do visitors enjoy natural settings, they also seek to experience wildlife in their own habitat. On Vancouver Island, campgrounds constructed in semi-urban or rural environments are not exempt from human-bear conflict. While bears adapt to the presence of humans, humans do not always adapt their behaviour when they are in wildlife habitat. Consequently, bears can become habituated to people and food-conditioned when they take advantage of unsecured human food and garbage sources. This puts bears at risk of destruction if they are seen as a danger to visitors. Campgrounds have a major role to play in mitigating human-bear conflict through proper management of bear attractants. This research explores black bear attractant management (BBAM) strategies in campgrounds on Vancouver Island, using a mixed methods research design. The findings indicated that all campgrounds employ BBAM strategies to some degree, but there were no consistent approaches found across the campgrounds. Most campgrounds in the study had highly attractive campsites.



Keywords: human-wildlife conflict, human-bear conflict, black bear attractant management, campgrounds

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# Chapter 1 Introduction

> "Humans are always, and have always been, enmeshed in social relations with animals to the extent that the latter, the animals, are undoubtedly constitutive of human societies in all sorts of ways" (Philo and Wilbert, 2000. p.3).

Human wildlife conflict ("HWC") is a global problem and occurs when wildlife impacts negatively on the goals of humans or when human goals impact negatively on wildlife (Madden, 2004). As human populations increase and spread, they encroach on the habitat of wildlife and interactions between wildlife and humans increases (Coad, et al, 2008; Kretser, Sullivan, Knuth, 2008; Nelson, 2008). The increase in interactions between wildlife and humans are one of the most critical conservation challenges facing protected areas today (Madden, 2004).

Conflict involving humans and wildlife is rapidly becoming one of the most widespread issues facing wildlife conservationists and managers today (Marchini, 2010). One reason for this is the competition for space and other natural resources is increasing as human settlement and development spreads across the landscape. In some instances, wild animals may destroy or consume crops and domesticated animals in their search for food; and in other instances, humans destroy wildlife habitat and wildlife for industrialization or suburban expansion. For example, simply creating roads that interrupt large forest blocks can lead to reduced wildlife populations even in protected areas (Blom, Van Zalinge, Mbea, Heitkönig, & Prins, 2004). Another reason is that people are behaving differently in wild spaces. Some may approach wild animals too closely; others may try to offer human food to them.

Humans have had a fascination with animals for as long as they have shared the earth; and human-wildlife interactions (HWI) have always been significant (Newsome, Dowling & Moore,

2005). While some people seek out wildlife for specific reasons such as a food source, HWI can also be the impetus for people to seek out nature experiences or they can be the reason that people avoid them. Those that seek to interact with wildlife sometimes do so inappropriately and in a way that causes harm to the animal or to people; this is known as human-wildlife conflict (HWC).

Where the wildlife profession was once immersed in the biological tradition with an emphasis on animals and their habitats, this approach has not proved adequate to deal with the social nature of HWC (Marchini, 2010). HWC is also a human behaviour problem and must be handled from a social science perspective (Dickman, et al., 2011). Research is now looking to understanding how to better influence human behaviour in order to reduce HWC of all forms (Schultz, 2011; Mascia, et al., 2003; Peterson, 2000). Decker et al (2005) stated that wildlife management is the set of required practices enabling coexistence of humans and wildlife on a sustainable basis. Sustainability refers to the ability to continue a given behaviour indefinitely and this is broken down into three main areas: economic, environmental, and social (Sustainability, 2014). In the case of this research, the behaviour is engaging in nature tourism, specifically in bear habitat. Sustaining this would ensure the preservation of bears, the local economy, and First Nations' cultures as well as the well-being of other people involved in or living near nature tourism offers.

The management of human behaviour is a crucial part of creating a positive interface between humans and animals. This interface is especially prevalent in nature tourism contexts and thus the need for modifying human behaviour becomes crucial in those areas. Nature tourism is tourism that occurs in natural areas and one form of this is ecotourism distinguished by its educative and conservation supporting elements (Rollins, Dearden, & Fennell, 2016)

HWC, specifically with black bears, can occur in natural areas, such as campgrounds. In particular, bears are commonly involved in HWC in campgrounds because campgrounds are often established in bear territory. Interactions between humans and bears are more common when both are using the same area. Black bears use the same corridors for travel and foraging for decades or longer. In many cases, they can navigate their way through a campground built in their habitat unseen by visitors (Key Informant, personal communication, May 6th, 2015). While bears adapt to the presence of humans, humans are demonstrating a lack of ability or willingness to adapt their behaviour around bears.. For example, visitors to campgrounds often carry with them food, cooking stoves, and other items that are attractive to bears, but they do not necessarily manage these attractants properly to avoid human-bear conflict (HBC) (Bob Hansen, Personal Communication, May 6th, 2015). HBC have resulted in many bears being destroyed following attacks or perceived risk to the safety of humans or other animals (Hopkins, et al. 2010).

Black bears comprise a significant portion of the large carnivores in British Columbia. In 2006, there were a reported 140,000 black bears in the province (Spencer, Beausoleil & Martorello, 2007), with an estimated 7,000 – 12,000 of them on Vancouver Island (VI-Wilds, N.D.). In the same survey, it was noted that 10,000 HBC complaints per year were received in British Columbia, with this trend on the rise (Spencer, et al., 2007). The Ministry of Environment spent over 25 million dollars between 1992 and 2008 managing human-bear conflicts in communities (Hamilton, 2008). A great deal of money is being spent on problem management and not on problem solving (Hamilton, 2008; Gore, 2004). While understanding the nature of bears is crucial in reducing conflict with humans, influencing human behaviour is also essential.

Social science information is needed to better understand campground and park use by visitors, but will also help create effective solutions to HWC (Manfredo, 2008). In particular, information is sought with respect to better understanding how visitors to campgrounds in bear habitat behave and how to resolve HBC (Dickman, 2010; Jackson, 2005). While research indicates the need for multiple strategies for reducing HBC (Madison, 2008; Pettigrew et al., 2012; Dunn, Elwell & Tunberg, 2008), consistent application of the necessary strategies can prove challenging.

Nature tourism operators often see protecting wildlife as critical to the industry's success (Van Tighem, 2013). Campgrounds play a role in affecting the behaviour of visitors in wildlife habitats. Being one of the closest contact points with tourists, these businesses stand to be the most influential regarding behaviour modification and they also stand to lose the most if HWC is not mitigated (Ballantyne & Packer, 2013). Campgrounds in or near bear habitat are in the unique position of being able to offer first hand knowledge about bears and educate visitors about (BBAM) strategies to keep both humans and bears safe, and help visitors enjoy their experience.

Large carnivore wildlife is an important part of the visitor experience and if bears are at risk, so is the nature tourism offer. People often consider large carnivores such as bears, cougars, and wolves to be indicators of "wilderness". If there is no such wildlife to see, there is the risk of losing paying customers (tourists) and support for conservation. However, consistently applying BBAM strategies is not without its challenges. Cost of bear proof infrastructure such as bear-proof garbage bins is high, especially considering the short camping season and subsequent probability of not recouping such large expenditures. Enforcement can also be an expensive undertaking and many campgrounds cannot afford the staff for effective enforcement. While educating visitors can be effective, the campground population changes on a regular basis and

constant re-education is necessary. Furthermore, there is not agreement on which strategies work and a lack of research examining the efficacy of each or multiple strategies (Gore, Knuth, Curtis & Shanahan, 2006a).

The central region of Vancouver Island is a very popular camping destination where close interactions with wildlife such as bears are possible, and the associated heightened potential of HBC. Through the years, many bears have become habituated to humans and subsequently food-conditioned, resulting in many dead bears as they threaten human safety. According to the WildSafeBC 2014 Annual Report (Platenius, 2014), black bears were the number one problem animal in the west coast region of the island based on the number of reports to the RAPP (Report all Poachers and Polluters) line. This was largely due to garbage—the number one bear attractant (Platenius, 2014). This is problematic, specifically in the context of campgrounds, as they are ideal locales for humans and animals to interface. Given that the literature is clear about the fact that there is a problem, as well as ways to mitigate the problem, it was important to discern if and how the campground owner/operators on Vancouver Island were mitigating HBC.

Other research supports a link between conservation and human behaviour, stating that there is a need to promote collaboration amongst disciplines such as social scientists and conservation biologists in the context of HBC (Schultz, 2011; Mascia, et al., 2003). There is a need to more fully incorporate human dimensions research into decision-making (Peterson, 2000; Dickman, 2010). The human dimension of wildlife management is a field of study that applies social sciences to human wildlife relationships and provides information that contributes to wildlife conservation efforts (Manfredo, 2008). Schultz (2011) states that there is a fundamental link between conservation and human behaviour and that social and behavioural scientists should be included in conservation efforts with natural scientists. Social sciences will be the key to

creating effective solutions to HWC (Manfredo, 2008; Don Carlos, Bright, Teel, and Vaske, 2009). Marchini (2010) supports the human dimension perspective to understand and resolve HWC, commenting that this perspective has been poorly researched and under-represented in wildlife management action plans and policies. Research is now looking into understanding how to better manage humans in order to reduce HWC of all forms.

HWC illustrates unsustainable tourism that undermines conservation, economic development, and social aspects of sustainability (the visitor experience). Sustaining bear populations is important for sustaining the environment. Healthy bear populations are imperative for wildlife tourism, which in turn can contribute to sustainable tourism by supporting tourism economies. Further, wildlife tourism can also contribute to bear conservation via visitor appreciation and support for conservation and it can also contribute to local communities and values with respect to wildlife.

The purpose of this research was to explore Vancouver Island campgrounds' bear attractant management strategies. The primary research question was, what BBAM strategies exist in Vancouver Island campgrounds? The sub-questions used are as follows:

- What education strategies do campground owners/operators use to mitigate HBC?
- What bear proof infrastructure strategies do campground owners/operators use to mitigate HBC?
- What enforcement strategies do campground owners/operators use to mitigate HBC?
- What is the current state of bear attractants in the campgrounds?
- What challenges do campground owners/operators face in terms of HBC?

## Key Terms

**Enforcement** – strategies used to help ensure compliance to the rules associated with HBC**.**

**Education -** information offered as a means to modifying human behaviour to reduce HBC (Gore, 2004).

**Campground owner/operator** – a person or persons who support the operation at a campground. This includes owner/operators, contracted operators, and on-site managers and/or staff.

**Human-wildlife conflict** - HWC occurs when the needs and behavior of wildlife impact negatively on the goals of humans or when the goals of humans negatively impact the needs of wildlife (Madden, 2004).

**Bear proof infrastructure** – basic physical structures such as garbage bins, recycling containers and food caches that are impervious to bears.

**Bear attractant management** – strategies used to reduce items known to be attractive to bears

**Habituated bear -** a bear that shows little to no overt reaction to people (Herrero et al. 2005) as a result of being repeatedly exposed to anthropogenic stimuli without substantial consequence (Hopkins, et al., 2010)

**Anthropogenic -** foods or attractants having a human origin (Hopkins, et al., 2010)

**Food-conditioned bear -** a bear that has learned to associate people (or the smell of people), human activities, human-use areas, or food storage receptacles with anthropogenic food (Herrero et al. 2005)

**Sustainable tourism -** tourism that respects local people and the visitor, cultural heritage and the environment. It seeks to provide excitement and education for the tourist, while benefiting the people of the host country (UNESCO, 2010).

**Sustainable leisure/tourism management -** ensuring the availability of leisure or tourism experiences on a sustainable basis (economically, environmentally, and socially).

## Organization of thesis.

This thesis is organized into five chapters that (1) introduce the study, (2) describe the theoretical framework through a comprehensive literature review, (3) present the methodology, (4) describe the results, and (5) discuss conclusions, including how the study contributes to academic literature.

# Chapter 2 Literature Review

This research was undertaken to explore BBAM strategies that are used as mitigations to address HBC within the context of Vancouver Island campgrounds. To provide context for the research, the following topics have been reviewed below: 1) sustainable tourism; 2) human-wildlife conflict; 3) human-bear conflict 4) human-bear conflict in nature tourism offers; and, 5) human-bear conflict management in ecotourism settings. Finally, the theoretical framework that was developed for this research is reviewed.

## Sustainable Tourism

Travelers are showing increased interest in environmentally and socially responsible forms of tourism, while operators are offering more sustainable services (Landthaler, 2014). In turn, governments, businesses, and tourism leaders are focusing more on sustainability based on preserving the resources upon which tourism depends (Edgell, 2016). Sustainable tourism includes economic, environmental and social goals (Murphy, 2005). Edgell (2016) notes that tourism can provide a local community with economic development, environmental sustainability, and social benefits. He further states that sustainable tourism growth management will provide benefits to the local community, enrich the tourist experience, and preserve the tourism offer for future generations. Because of the need for sustainable growth coupled with the growth of the tourism industry, sustainable leisure (or tourism) management is ever more important (Edgell, 2016).

## Human-Wildlife Conflict

Human-wildlife conflict (HWC) is one of the most widespread issues in conservation and is illustrative of unsustainable tourism. The World Conservation Union defines HWC as occurring when "wildlife requirements encroach on those of human populations, with costs to both residents and wild animals (IUCN, 2005). Similarly, Madden (2004) defines HWC as

occurring when the needs and behavior of wildlife impact negatively on the goals of humans or when the goals of humans negatively impact the needs of wildlife.

HWC imposes a wide range of costs upon a large number of people worldwide and includes loss of life, crops, or livestock to wildlife (Burua, Bhagwat & Jadhav, 2013). This has considerable effects on people's livelihoods and their food security (Burua, et al., 2013). For example, some of the least privileged people in the world may lose up to 10 – 15% of their agricultural output to elephants (Lamarque, et al, 2009). The response to this conflict has sometimes resulted in lethal control of the animal involved (McManus, Dickman, Gaynor, Smuts & MacDonald, 2015). When livestock depredation occurs, the farmer may retaliate by killing the offending carnivore McManus, et al., 2015). As the world population increases, humans continue to encroach on wildlife habitats, intensifying the issue. The United Nations declared that the population of the world in 2015 was 7.34 billion people and this was an increase of 1.15% over the year before. This growth trend is expected to continue with a predicted 20% in population between 2015 and 2035 (United Nations Population Division, N.D.). Human development can create the conditions for increased HWC, and communities and transportation systems are often configured without regard to large carnivores such as bear and deer (Decker, et al., 2005). Not only do these factors facilitate habituation to human activity for some species, they also contribute to the increase of human-wildlife interactions (Decker, et al., 2005).

Humans are seeking nature-based experiences in more remote areas, increasing the chances of wildlife encounters with humans (Higham & Shelton, 2010). Wildlife viewing has become more of a mainstream activity and this viewing can change the wild quality of animals due to habituation (Knight, 2009). Animals that come into viewing range may also come into nuisance range, spilling over into human areas, causing damage for local farmers and residents

(Knight, 2009).

Researchers have pointed out that HWC is more of a human than a wildlife problem (Dickman, et al., 2011). Peterson, Birckhead, Leong, Peterson, & Peterson (2010) criticized the term "human-wildlife conflict", pointing out that portraying animals as conscious human adversaries clouds the underlying human dimension. Knight, Cowling, and Campbell (2006) noted that human–wildlife conflicts have proven challenging to manage partly because in most cases the social dimensions are not considered. The issues are between conservation and other human activities; and not between humans and the species involved (Redpath, Bhatia, & Young, 2010).

Values related to nature are pitted against one another and economic, legal, social, and environmental issues are involved (Knight, 2000). In spite of this, much of the literature is based around animals and specific areas (Lacombe, 2005; Madden, 2004; Wade, 2010). One animal commonly noted in HWC worldwide is the bear. A survey of the world's bear experts revealed that human-bear conflict (HBC) is worsening in terms of severity and impact on bear conservation on every continent inhabited by bears (Can, et al., 2014).

## Human-bear Conflict (HBC)

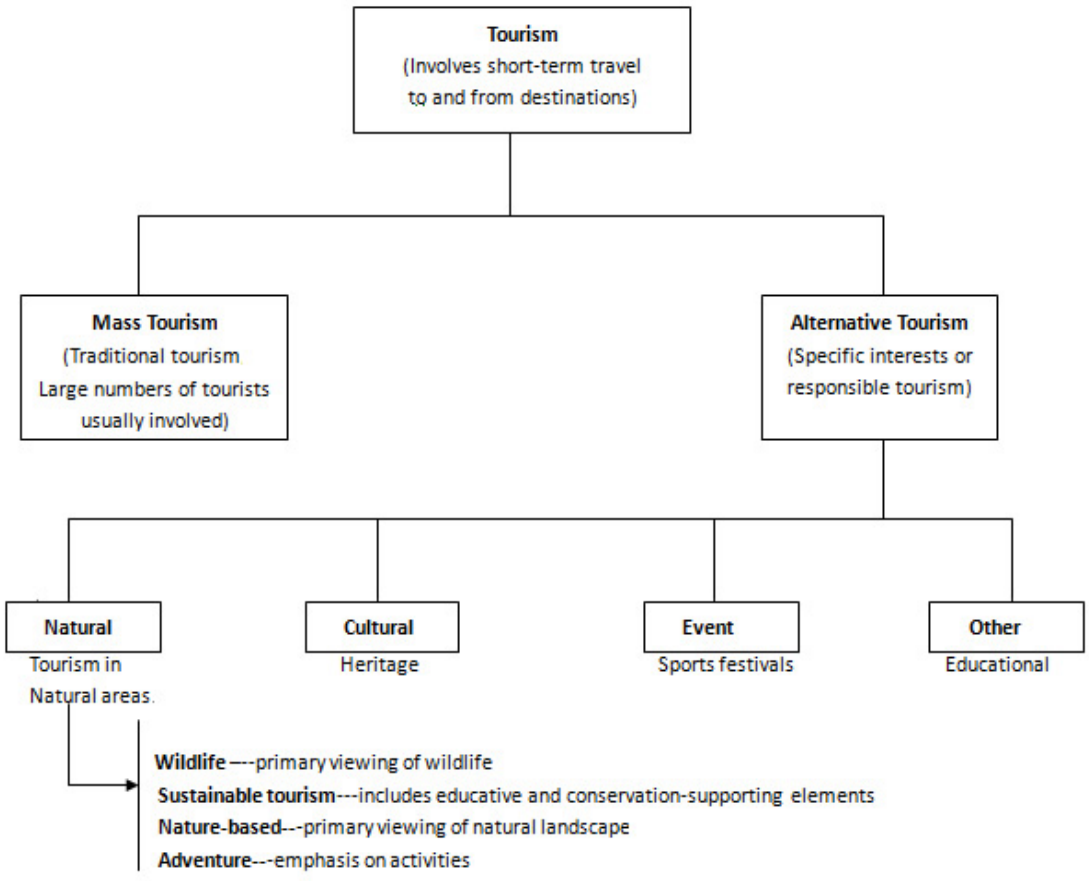
Bears and people have experienced conflict with each other for a very long time (Van Tighem, 2013). HBC include any negative interactions between people and bears. In North America, black bears are the most common species involved in conflict (Gore, Knuth, Curtis, Shanahan, 2006). Eighty-two percent of black bear managers surveyed in the United States, Canada, and Mexico indicated that HBC's are "common," "increasingly common," or "a serious problem" (Spencer, Beausoleil & Martorello, 2007). The same study reported that 69% of managers ranked garbage and food attractants as the most common reason for the conflict.

The most significant negative effect on black bear behaviour is food-conditioning to human sources of non-natural food. While access to non-natural food sources is the primary influence that can be altered to reduce bear problems (Herrero, 2003, Mace & Waller, 1998; Mattson & Merrill, 2002), food conditioning in bears cannot be reversed (Arlene Armstrong, Personal Communication). A food-conditioned bear is one that has learned to associate people and their smell, human activities, human-use areas, or food storage areas with anthropogenic food (Herrero et al., 2005). For example, in Yosemite National Park, bears seek out human food on a daily basis, often resulting in HWC (Hopkins, Koch, Ferguson & Kalinowski, 2014). This has resulted in 12,000 reported incidents in twenty years (Hopkins & Kalinowski, 2013). Non-native apples from the orchards at Yosemite are considered anthropogenic food and bears can become food conditioned because they seek these apples in an area close to human activity (Greenleaf, Matthews, Wright, Beecham, & Leithead,, 2009). Since a bear's strategy is to obtain the highest number of calories with the least amount of effort, it may adapt its foraging behaviour to finding and consuming anthropogenic food in areas where there are people rather than foraging for natural food (Nelson et al., 1993). When a bear receives a food reward, it becomes conditioned to expect something (Neary, 2001). Additionally, bears are opportunistic and their compulsive need for high-energy food may (often) overcome their aversion to being near people (Van Tighem, 2013). As such, securing attractants so they are not accessible to bears, like human food and food waste is crucial for reducing HBC (Waller, 2012). Habituated bears can easily become food conditioned (Neary, 2001).

Bears may become so used to people that they show little to no obvious reaction to them (Herrero et al., 2005). This behaviour referred to as habituation, results from repeated exposure to humans without significant negative consequence (Hopkins et al., 2010). Habituation itself is

not bad; conflicts arise when hungry, habituated bears begin to associate humans with food and become food-conditioned (Herrero, 1985). Food-conditioned bears may be a threat to human safety and consequently to themselves. When a bear is used to people and associates them with food, it may become aggressive in its quest for food and this may result in physical harm to a human (Herrero, 1985). Subsequently, the bear may be destroyed as a result of its aggression. Once a bear becomes habituated to humans, its chance of mortality dramatically increases (Knight et al., 1988). This is problematic, especially in ecotourism offers where loss of wildlife and/or risk to the health and safety of visitors can be a result.

## HBC in Nature Tourism Offers




Rollins, Dearden & Fennel, 2016, p. 395

Tourism takes many forms as noted in the above the schematic  Tourism continues to grow and nature based tourism is an expanding sector with more emphasis on ecotourism (Page & Dowling, 2002; Walpole & Thouless, 2005).  The world's terrestrial protected areas receive approximately 8 billion visits per year (Balmford, et al., 2015). Balmford, et al. (2009) noted that globally, visits to protected areas are increasing in four out of six continents and in 15 out of 20 countries for which data was available. The International Ecotourism Society (2004) defines ecotourism as "responsible travel to natural areas that conserves the environment and sustains the well-being of local people". This type of tourism is important for the livelihood of the local communities as they benefit from economic development, education, and conservation (Israr, et al., 2009). Because camping is an important element of ecotourism (Leung and Marion, 2004), for the purposes of this literature review, information noted about ecotourism is applied to campgrounds in ecotourism destinations.

Ecotourism can involve viewing wildlife, whether intentionally or unintentionally; and for some visitors, it is an exciting part of their experience (Wearing & Neil, 2009). Researchers have identified that there needs to be a balance between watching wildlife and conserving wildlife and habitats (Wearing & Neil, 2009; Tapper 2006; Van Tighem, 2013). If visitors are coming to an area to see wildlife, the wildlife needs to be sustained. Thus, both ecotourism operators and tourists must play a part in conserving wildlife. Without wildlife to view, there would be less visitor interest in ecotourism settings.

Campgrounds become pivotal areas for HBC because they are areas of concentrated human use, which attracts bears (Merrill, 1978). In particular, Poole (2011) noted that if anthropogenic foods are not available when bears enter campgrounds, they will continue on in search of natural foods and never become food-conditioned to human-sourced food. Beckmann,

et al. (2004) stated that because bears are food driven, once they become food-conditioned to anthropogenic food, they are unlikely to discontinue searching for human provided foods. What is evident is that campgrounds have a significant role to play in HBC. Consistent protocols and procedures can be effective strategies towards mitigating HBC. Conversely lack of effective measures can contribute to HBC.

One study on HBC and campgrounds examined the perceived risks of stakeholders with respect to HBC, specifically campground visitors and operators (Gore, Knuth, Curtis & Shanahan, 2006b). Understanding risk perception is important as it can influence people's support for bear management protocols and openness to messages (Gore, et al., 2006b). Van Highem (2013) suggests that tourism may help conserve bears in North America. Another study noted that except for bear resistant trash dumpsters and a few `Bear Warning' signs, campgrounds in bear habitat appear practically the same as other campgrounds (Creachbaum, Johnson, Schmidt, 1998). Further, nothing is done in these campgrounds to take advantage of an opportunity for educating visitors (Creachbaum, et al., 1998). Gore (2007) argues that investing in risk communication along with other options (fines for feeding bears, campground closures, installation of food lockers) may generate benefits to managers, users, and resources (i.e., black bears and campgrounds) by reducing the level and frequency of HBC.

Studies have confirmed that managing tourists' behavior can minimize the adverse environmental and social impact of tourism (Lee & Moscardo 2005; Powell & Ham 2008). Gore (2004) suggests that modifying human behaviour is a desirable element of black bear management policy. It seems that there are mixed views on the efficacy of interventions for shaping behaviour and that more research into this area would be helpful, especially in terms of campgrounds. For example, Pearce (2005) notes that an increase in legal mechanisms are

potentially effective but only if there is an increase in enforcement and prosecution. Pearce (2005) also suggests permits in places such as national parks to help control visitor behaviour, however the management of passes is in itself expensive. While education is seen as effective in influencing visitor behaviour, the question of what message, how it is delivered, and when remains an issue (Pearce, 2005). There is only limited evidence that interpretation promotes sustainable behaviour (Pearce, 2005).

## Current Bear Attractant Management Programs

Researchers have indicated that to resolve HBC, a single intervention will not work (Gore, et al., 2008). In fact, Madden (2004) stated "no one-size-fits-all standardized prescription for mitigation can be applied successfully across the wide spectrum of specific conflict situations" (p. 251). Multipronged approaches to reducing risks from HBC should be explored and systematically evaluated. This being the case, below is a summary of some BBAM programs in North America and the various strategies utilized to reduce HBC.

**Parks Canada's Bare Campsite Program.** One such targeted program was created by a team of Pacific Rim National Park Reserve Resource Conservation and Visitor Services staff led by the park Human-Wildlife Conflict Specialist, Bob Hansen. The Bare Campsite started as a pilot program that was developed immediately in the aftermath of a bear destruction in Greenpoint campground. The draft protocols were implemented for a trial period during part of the summer of 1998. The protocols of the Bare Campsite Program include storing all food and wildlife attractants in hard sided vehicles or the available bear proof food caches whenever campers leave the campsite or when campers are asleep (Parks Canada, N.D.). Brochures are distributed to campers that explain the Bare Campsite Program and detail what items are considered attractants. Further, these brochures advise how the program is enforced and the penalties for non-compliance. The program is also explained on checking in at the campground and staff reach out

to visitors during campground patrols. Engaging educational programs are offered in the park theatre in the campground every evening (Parks Canada, N.D.). Park staff patrol the campground daily and may remove attractants from unattended sites. If campers fail to comply with the Bare Campsite Program rules, their camping permit may be revoked and charges may be laid under the *Canada National Parks Act and Regulations* (Parks Canada, N.D.). One of the biggest keys to success of the Park program is that staff are committed to the program and the messages visitors receive during their visit are consistent (Beasley, Bekker & MacHutchon, N.D.).

To research the effectiveness of the pilot program, the attractiveness of campsites to bears was documented before, during and after the program trial. A campsite survey methodology was developed to assess the condition of campsites. A rating scale for scoring various common bear attractants was developed (e.g. water jug – low versus pan of bacon grease - high). Surveys were conducted twice daily several times a week. On each survey, campsites where campers were absent or sleeping, were assessed and scored. Their site was given an attractiveness rating from not attractive to a bear to very attractive to a bear. The campsite rating was based on the absence or presence of unattended attractants observed (e.g. everything appropriately secured versus bag of garbage beside picnic table). Campground staff suggested some key improvements based on the trial pilot project. The results of the research help finalize the program for the 1999 camping season. Since the implementation of the "Bare Campsite" Program, the number of bear destructions at the campsite was reduced from 1-2 bears per year to two animals killed in the sixteen years. The success of this program suggests that other campgrounds can mitigate human-bear conflict by addressing the problem of bear attractants in unattended campsites.

**Other HBC management programs.** Bear Smart is another program designed to involve all levels of government, NGO's, and other stakeholders to reduce HBC (BC Bear Smart

Consulting Inc, 2015). Bear Smart programs have been adopted and implemented in communities and parks across Canada. The Ministry of Water, Land and Air Protection initiated Bear Smart Community Programs in British Columbia in 2002. The Bear Smart Program is a community driven process and is a voluntary initiative aimed at encouraging communities to reduce the amount of conflict between people and bears by taking personal responsibility for change. (Revelstoke Bear Aware Society, N.D.). It involves education, attractant management, bear proof infrastructure, and enforcement.

Wildsmart, is another initiative that encourages community efforts to reduce HWC in Alberta, Canada (Wildsmart Community Program, 2012). In the Bow Valley Wildsmart Program, a multi-prong approach is used and involves education and outreach programs, bear management, and attractant removal. Education and outreach include materials, workshops, community events, speakers, social media, volunteer and partnership programs, children's programs, and "Nature for Newcomers". Natural and non-natural attractants have been reduced through education using bear proof receptacles, and enforcing regulations (Wildsmart Community Program, 2012).

The district of Ucluelet, a small community on Vancouver Island, has a HBC hazard assessment outlining HBC risks and a management plan that outlines strategies for managing those risks. HBC mitigation measures include using attractant management, infrastructure, education and outreach, and community planning (Beasley, et al., N.D.) It extends to the campground within the town of Ucluelet. The program focuses primarily on reducing food and garbage attractants at all areas in the district by implementing bylaws and enforcement as well as providing and/or encouraging bear-proof infrastructure. Similarly, the resort municipality of Whistler, B.C. also has an HBC management plan (Paquet, 2009). Like Ucluelet, part of Whistler's goal is to effectively reduce HBC and in the process meet the criteria to achieve BC

Bear Smart Community status. The town has a Whistler Bear Working Group that promotes mitigating HBC through education and outreach, attractant reduction, bear proof infrastructure, enforcement, and planning (Paquet, 2009).

Management actions directed at changing human behavior include education and law enforcement. Often employed strategies include "Bear Aware," "Bear Smart," and "Bear Wise" education campaigns that require considerable material and labor to educate people on how to reduce the availability of garbage to bears (Peine, 2001). In Whistler, British Columbia, for example, the 1998 black bear management plan budgeted for over $30,000 CAD to cover advertising, brochures, signs, and sticker costs (Black Bear Task Team, 1998). Despite these campaigns and dollars spent, however, the efficacy of such management tools in changing human behavior remains largely unknown (Gore, Knuth, Curtis, & Shanahan, 2006). Managers are left with little information for gauging the costs, benefits, and overall success of these actions (Gore, et al., 2006).

One exception to these statements is the data collected annually through the on-going Bare Campsite Surveys and other associated monitoring in Pacific Rim National Park Reserve. The effectiveness monitoring methodology developed in 1998 is still used each camping season. Program compliance data is summarized and analyzed annually. By 2002, the park managed to get the level of compliance with the program to 97 or 98 percent of campers and the goal is to keep non-compliance at less than five percent (Arlene Armstrong, Personal Communication). HBC and general bear activity reports are captured in a wildlife database. Infrastructure costs have been tracked. Campers are encouraged to submit written comment cards to provide feedback on the program. Compliance in terms of warnings are recorded. Enforcement actions such as evictions for Bare Campsite Program non-compliance are captured in the National Park's

Occurrence Tracking System.

Despite the variety of HBC management programs, the literature on management strategies in an ecotourism setting, such as campgrounds is limited. Researchers have also stated that that managing HBC is challenging and that there is little doubt that the problem will escalate, underscoring the importance of continuing to investigate HBC to understand the behaviour of bears and people (Spencer, et al., 2007). Therefore, there is particular need to understand if and how the campground owner/operators promote and manage their campgrounds with respect to mitigating HBC. While research clearly indicates the need for BBAM strategies, there is scant research to indicate what and how campgrounds implement BBAM protocols (Gore, 2007; Wildcoast Primer, 2010). I believe this research will contribute to the current body of knowledge as it addresses this gap.

## Theoretical Framework

To explore the bear attractant management strategies that exist within Vancouver Island campgrounds, a framework that addressed multiple strategies was needed. On Vancouver Island, campgrounds are often located in wildlife habitat, specifically bear habitat, and it is important that campground owner/operators consider such strategies for mitigating HBC. The theoretical framework for this study was developed through a review of the literature on wildlife risk management strategies for mitigating human-bear conflict (HBC). Specifically, the literature outlines five risk management strategies that reduce HBC: 1) eliminating bear attractants (McCullough, 1982); 2) enforcement of rules (Hristienko & McDonald, 2007); 3) education (Dunn, Elwell, & Tunberg, 2008; Hopkins et al., 2010); 4) appropriate bear proof infrastructure (Herrero et al., 2011; Matthews, et al., 2003); and, 5) campground design (Creachbaum, Johnson, & Schmidt, 1998). While proper campground design is effective in reducing HBC, the campgrounds in this study were well established and redesign is not part of their protocol for

reducing HBC. The toolbox for mitigation does not include a full campground redesign and is beyond the scope of most campgrounds. Therefore, this study focused on the bear attractants, enforcement, education and infrastructure. Below is a description of each component of the theoretical framework.

## Bear Attractants

Mismanagement of bear attractants has been found to be one of, or the leading ranked hazard in HBC (Herrero, 1985; Hopkins III, et al., 2010; Spencer, et al., 2007). One study found that all measures of HBC were inversely related to food availability (Howe, Obbard, Black, & Wall, 2010). Bear attractants are anything that draws a bear's attention whether by odor or sight (Hristienko & McDonald, 2007). Experts in the field of HBC have indicated the following items are the most attractive to bears: garbage, human food, pet food, cooking utensils, suntan lotion, candles, soap, shampoo, dishes, beverage empties, and dish cleaning equipment (Parks Canada, N.D.). Bear attractants are problematic because once a bear is food-conditioned; removing attractants may not change the bear's behaviour. Often it takes only one experience with poorly stored food or garbage for a bear to learn how to access human food or garbage (McCullough, 1982). Managing bear attractants is critical to mitigating HBC (Key Informant, personal communication, May 6th, 2015) and often the primary focus of BBAM strategies.

## Enforcement

Enforcement is a key strategy to mitigating HBC. It helps to ensure compliance to the rules associated with HBC. Manning and Anderson (2012) note that very little research addresses the effectiveness of enforcement in parks and outdoor recreation contexts. Manning (2011) differentiates between direct and indirect management in protected areas: direct management strategies regulate behaviour and indirect strategies influence behaviour. Direct strategies include regulations and indirect strategies include education (Needham, Haider, Rollins, 2016).

These two types of strategies are complementary and therefore should be used together (Needham et al., 2016). Other researchers have found that enforcement helps ensure that policies related to HBC are properly implemented (Gibson, Williams, & Ostrom, 2004; Keane, et al., 2008). In the context of HBC, enforcement includes verbal requests to properly store attractants, applying fines for failing to adhere to HBC guidelines, revocation of camping permits, removal of bear attractants from unattended sites, and park staff advising visitors of potential park depreciation and harm to wildlife from actions or inactions of campers (Pendleton, 1998). Pendleton (1998) notes that these enforcements strategies are often called "soft" enforcement, because compliance is encouraged through education, prevention, and community relations. While other enforcement strategies can be more aggressive, such as arrest and impoundment of property, they are utilized less often (Graber & White, N.D.).

Enforcement strategies have had a positive influence on HBC in parks and other land management agencies (Pendleton, 1996, Pendleton, 1997). For example, Hristienko and McDonald (2007) found that enforcement of garbage and anti-feeding ordinances resulted in reduced conflict with bears in several provincial and national parks in Canada and the United States. Researchers have indicated that people are more likely to follow rules if there is a potential cost to disregarding them (Keay & Webb, 1989). Clark (N.D.) noted that while enforcement is not the complete solution, it is an important part to ensure rules are followed, and that the enforcement aspect of park operators' jobs will only continue to grow in importance. Soft enforcement is noted to reduce HBC risk (Pendleton, 2000), as well as being an initiative well supported by the public (Thompson, Shirreffs, & McPhail, 2003).

In some cases, provincial and municipal policies have been developed to support enforcement strategies. For example, the British Columbia Wildlife Act (33.1) states that a

person commits an offence, (subject to a fine) if they leave an attractant where there are people and where the attractant can be accessed by dangerous wildlife or attract dangerous wildlife. Similarly, the Alberni-Clayoquot Regional District Solid Waste Management Plan (2007), indicates that waste collection bylaws stipulate that residential waste must be stored in bear proof receptacles prior to collection. The bylaw also states that on-going bear awareness and education campaigns are required.

Despite the benefits of enforcement strategies and provincial and municipal bylaws that support their implementation, there are some limitations. For instance, many conservation officers have become responsible for more than wildlife conservation including, in some cases, enforcing drug and homeland security laws (McKay, 2007; Patten, Crow & O'Connor Shelley, 2015). McKay argues that these additional duties draw attention away from natural resource law enforcement associated with HBC. Tobias (1998) suggests that a large proportion of natural resource crimes are unenforced because resources are not available to contend with the problem. For example, the burden of work has been transferred to the conservation officers in the field on Vancouver Island even though their numbers have been drastically reduced (Struthers, 2013).

While strong laws and regulations with requisite fines or other sanctions may be in place, application of these punishments is often weak (Lawson & MacFaul, 2010; Sander, 2014). Furthermore, researchers found that visitors view regulation by rules or laws negatively due to the emphasis on what may not be done, and the potential for their enforcement with disciplinary actions (Marion & Reid, 2007). Often the regulations (without education) irritate visitors rather than win their support in mitigating HBC (Marion & Reid, 2007).

## Education

Many wildlife management agencies and ecotourism operators are turning to proactive management strategies such as education to address HBC (Gore, Knuth, Curtis, & Shanahan,

2006; Spencer, Beausoleil & Martorello, 2007; Ballantyne & Packer, 2013). Education is used as a means of modifying human behaviour to reduce HBC (Gore, 2004) and encouraging preferred behaviour (Ham, 2013). Researchers have found that such strategies are important for BBAM, especially in terms of modifying human behavior (Creachbaum, Johnson, Schmidt, 1998; Dunn, Elwell, & Tunberg, 2008; Gore, 2007; Gore, et al., 2006; Spencer, et al., 2007). Lee and Moscardo (2005) stated that ecotourism offers, such as campgrounds, use education to reinforce visitors' favourable environmental attitudes. Several studies point to the need for knowledge in order to make decisions about subsequent behaviour, including pro-environmental behaviour (Mankin, Warner, & Anderson, 1999; Flamm, 2006; Carter, Riley, Shortridge, Shrestha & Liu, 2013; Orams, 1999; Frick, Kaiser, & Wilson, 2004; Peterson, et al., 2010; Campbell, Bradley, Waliczek, Zajicek ,1999; Beaumont, 2001;Patchen, 2006).

A number of studies have indicated that education has had a positive impact on mitigating HBC (Ajzen & Fishbein 1980; Gore, 2004). For example, education programs can increase people's tolerance toward wildlife and thus represent another important strategy for bear conservation (Ogada, Woodroffe, Oguge, Frank, 2003; Lindsey, du Toit, Mills, Allexander, 2005; Gore, et al., 2006, Akinlabi and Kashyap, 2011). In addition, education improves visitor knowledge associated with HBC and reduces environmental and social impacts of visitors (Cole, Hammond & McCool, 1997; Confer, Mowen, Graefe, & Absher, 2000; Fazio, 1979; Kernan & Drogan, 1995; Stewart et al., 2000;).

Education strategies vary, but one way to educate visitors is before they arrive and this pre-trip knowledge is important because it can alter or shape visitor expectations (Newsome, Dowling, Kingston, & Moore, 2005; Eagles & McCool, 2003; Moyle & Croy, 2009:Fitzgibbon & Jones, 2005). The role played by websites is becoming increasingly important in terms of

planning trips and participating in interpretive activities (Tsai et al., 2010; Hughes,2011). Although controlling visitor expectations through education is noted in the research as a key management strategy for controlling negative impacts (Higginbottom, Green, & Northrope, 2003; Newsome, et al, 2005), there is no research confirming what form of pre-trip education is effective.

While pre-trip education is important, a more common approach is to educate visitors while on site. For example, educational brochures and presentations can educate visitors on bear behaviour, how to reduce bear attractants, how to use bear proof receptacles, and how to properly store food and garbage in bear-proof containers (Dunn, Elwell, & Tunberg, 2008; Spencer, et al., 2007). Pienaar, Telesco and Barrett (2015) found that providing information in the form of brochures and other literature that outlined information on bears, food-conditioning, and the need to secure garbage, improved the adoption of HBC management strategies. Other research reported the use of interpretation programs as a form of education to influence and manage visitors' onsite behavior (Gore, 2004; & Wearing & Neil, 2009). Similarly, Marion and Reid (2007) stated that educational interventions can result in modified visitor behaviours associated with HBC (Marion & Reid, 2007).

Education has been identified as a key management strategy in conservation (Fitzgibbon and Jones, 2005), because it can reduce a park's budget for rule enforcement (Papageorgiou, 2001, Roggenbuck & Ham, 1987). Alder (1996) found that education programs had a wider impact on human behavior and were cheaper than enforcement strategies. Falk and Gillespie (2009) found that interpretation resulted in emotional arousal, which in turn was related to positive changes in visitor attitude and behaviours. Hughes et al. (2009) also noted that interpretation increased compliance to desired behaviours. With respect to BBAM strategies,

Lackey and Ham (2003) found that addressing key beliefs was essential to increasing compliance in using food storage systems. Education strategies are often favoured over enforcement of regulations by managers and visitors (Hendee & Dawson, 2002; Marion, Dvorak & Manning, 2008; McCool & Christensen, 1996; Peterson & Lime, 1979), largely because visitors do not like enforcement, and they do not like to be told what they are not allowed to do (Marion & Reid, 2007). In addition, researchers argue that because education is effective in reducing HBC, it should be the foundation of all black bear management programs in the United States and Canada (Spencer, et al., 2007; Gore et al., 2006).

Although education strategies have a positive influence on mitigating HBC, research has noted some drawbacks. Specifically, some researchers argue that educational strategies are costly and that there is little evidence of its effectiveness (Baruch-Mordo, Breck, Wilson, & Broderick, 2011; Spencer, et al., 2007; Dunn, et al., 2008; Campbell, 2012; Gore, Knuth, Curtis & Shanahan, 2006a, Hvenegaard & Shultis, 2016). Park information programs have been studied extensively in the United States for their effectiveness in changing visitor behaviour and the results are often inconclusive or contradictory (Eagles & McCool, 2003). Bath and Enck (2003) and Gore (2004) suggest there is a need for more research to assess the effect of interpretive programs and outreach education efforts. Unfortunately, the cost of educational materials leaves little money to study their efficacy (Baruch-Mordo, Breck, Wilson, & Broderick, 2009). Many studies indicate little to no evidence that knowledge affects behaviour (Ham, 2007; Vicente-Molina; Fernandez-Sainz; Izagirre Olaizola, 2013; Malone, 2004; Meinhold & Malkus, 2005; Jackson, 2005; Schultz, 2011; Michalos, et al., 2012; Hwang, Kim & Jeng, 2000; Ward, 2013; Schultz, 2002). Vicente-Molina,et al. (2013) examined the factors that influence pro-environmental behaviour of university students in two countries and noted that it is difficult to

establish a link between education and pro-environmental behaviour. Conversely, Alessa, Bennett, and Kliskey (2003) found that people with higher knowledge engaged in the most depreciative behaviour. Despite the conflicting evidence of education's impact on HBC, it remains a strategic component in mitigating HBC.

## Bear Proof Infrastructure

Effectively managing bear attractants involves having access to proper bear proof infrastructure (Matthews, et al., 2003). Infrastructure is understood as the equipment and structures utilized to mitigate HBC. In this study, I use the term infrastructure to represent bear proof garbage and recycle receptacles and bear proof food caches to store food and other attractants (Graber & White, N.D; Madison, 2008; Matthews, et al., 2003). Researchers have reported that HBC can be greatly reduced through the use of bear-proof waste management systems (Hristienko & McDonald, 2007; Matthews, et al., 2003). In fact, Herrero et al. (2011) found through their research that poorly secured food or garbage can contribute to fatal HBC on some occasions, and attest the need for bear-resistant management of people's food and garbage. Human's unsecured food or garbage is recognized as being a root cause of HBC (Beckmann, Lackey, & Berger, 2004; Herrero 1985, 2002; Matthews, et al., 2003).

## Summary

As seen within the literature, mitigating HBC is dependent upon a combination of strategies including, reducing availability of bear attractants, education, enforcement, and infrastructure (Madison, 2008; Pettigrew et al., 2012; Dunn, Elwell & Tunberg, 2008). Researchers have found that education should be coupled with enforcement in management strategies (Arocena, Nepal & Rutherford, 2006; Baruch-Mordo, et al., 2011; Dubois and Fraser, 2013). Similarly, Madison (2008) found that HBC was seen to increase when infrastructure was used as a stand-alone strategy. Therefore, HBC management should be approached using every

tool available, as there is no support in the literature to resolve HBC with a single intervention (Beckman, 2002; Gore, et al., 2008).

# Chapter 3 Methodology

To explore the bear management attractant strategies in Vancouver Island campgrounds, this study utilized a mixed methods research design. The following chapter includes a description of the research setting, details of the mixed methods research design, sampling techniques, methods for data collection, and data analysis procedures.

## Research Setting

Vancouver Island is located off the west coast of Canada, with a population of approximately 726,000 and an area of 32,000 square kilometres/12,355 square miles (Hello BC-Vancouver Island, 2015). The two coasts of the island are very unique from one another. On the east coast are the larger urban centres like Nanaimo and Victoria. Ferries carry people back and forth from Vancouver on the mainland of British Columbia to both cities. However, the west coast of Vancouver Island is less populated and more rugged, and as a result, a popular tourist destination for adventure and eco tourists. With slogans like "Life on the Edge", "Take a Walk on the Wildside", and "Welcome to the end of the Road", the west coast island communities of Ucluelet and Tofino attract over 800,000 visitors annually (by tourism estimates, and PCA traffic studies) to experience wildlife, surfing, hiking, kayaking, and camping. Parks Canada's Pacific Rim National Park Reserve with its three units – Long Beach, The West Coast Trail, and Broken Group Islands – are highlights for tourists on the west coast.


[1]Figure 3.1 *Study regions*

British Columbia's tourism motto is "Super, Natural". Vancouver Island could be described as "extra super, natural" with one of the world's most diverse ecosystems including rainforests, marshes, beaches, mountains, lake, oceans, and rivers (Hello BC-Vancouver Island, 2015). *Travel + Leisure* magazine named Vancouver Island one of the world's top ten islands in 2014, in part due to the abundance of wildlife. Black bears make up a substantial part of the wildlife on Vancouver Island. The Institute for Coastal and Oceans Research (ICOR) at the University of Victoria, British Columbia estimates that there are 7,000 black bears on Vancouver Island, which is considered one of the highest population densities of black bears in the world (VI-Wilds, N.D.). This results in frequent contact with humans and conflict is common when bears seek anthropogenic food sources (VI-Wilds, N.D.). While bears on Vancouver Island were

[1] *Copyright Town of Lake Cowichan. Circles indicate general areas of study sites Retrieved February 1, 2015 from* [http://www.town.lakecowichan.bc.ca/maps.shtml](http://www.town.lakecowichan.bc.ca/maps.shtml)

thought to have no natural predators, it has now been documented by ICOR (VI-Wilds,N.D.) that humans are the biggest threat to bears and also notes that this endemic subspecies is a unique part of the ecosystem on the island.

The campgrounds in this study are situated in the mid island area and are in or near noted black bear habitat (Figure 3.1) (WildSafe B.C., N.D.). They are a mixture of privately owned and government owned and vary in size from 40 campsites to over 200 campsites. Some of the campgrounds are semi-urban and some are rural. Further details of the campgrounds will be described later in this chapter.

## Pragmatic Paradigm

This research is aligned with a pragmatic paradigm. Pragmatist researchers focus on the 'what' and 'how' of the research problem (Creswell, 2014, p.11). Pragmatism is seen as the model that offers the underlying philosophical framework for mixed-methods research (Tashakkori & Teddlie, 2003; Somekh & Lewin, 2005). Given the nature of this research, using pragmatism is appropriate, as Creswell and Plano Clark (2007) state that pragmatism positions itself towards solving real world problems. Human-wildlife conflict is a global problem and HBC affects every species of bear on all four continents where bears exist (Can, 2014). Thus, this research has the potential to support mitigating HBC wherever it occurs. Specifically, human-bear conflict is an issue for many campgrounds, municipalities, and government agencies in British Columbia.

## Mixed Method Research

Mixed method research was utilized in this study, to include "unobtrusive quantitative observations" (BARE Campsite Assessment; Bear proof infrastructure audit, signage audit, website audit); , and semi-structured interviews . It involves the collection of both quantitative and qualitative data. This research used a convergent parallel mixed methods approach, which involves using both qualitative and quantitative methods to collect data. Once the data was

collected it is then analyzed separately and the results of each method reported in the context of the study's broad research question.

Mixed methods were chosen because using both qualitative and quantitative data allows for a more complete understanding of BBAM strategies than if using only one or the other method (Creswell, 2003). In addition, BBAM involves multiple strategies that no one method alone could provide enough information. Mixed methods research is useful for comparing different findings derived from qualitative and quantitative data, which in this study was useful when exploring different BBAM strategies. Using mixed methods is effective as each method has its strengths and limitations; the strengths can be combined into a stronger understanding of the research question (Creswell, 2003). Mixed methods research allows for the chance to make up for characteristic weaknesses in this method, and make the most of the method strengths (Greene, 2007). Weaknesses of a mixed method approach include the fact that it is time consuming and that it can be challenging to appropriately mix quantitative and qualitative data (Johnson, 2006). Despite the weakness, a mixed method approach allowed for a deeper exploration into the multiple strategies associated with BBAM.

## Sampling

To explore what BBAM strategies Vancouver Island campgrounds are implementing, a purposeful sampling technique was employed. Purposeful sampling was utilized to ensure the campgrounds selected were located in various regions of black bear habitats and where BBAM strategies would most likely be utilized. For the purpose of this study, an appropriate campground was located mid-Vancouver Island Region within black bear habitat (WildSafe B.C., N.D.). The Institute for Coastal and Oceans Research (ICOR) at the University of Victoria, B.C. noted that the black bear is usually found in the lower reaches of the island, and typically do not inhabit areas densely populated by humans, but are not reluctant about coming into rural areas to forage

for food. For these reasons, the chosen campgrounds are appropriate for this study. To select the campgrounds, a key informant was relied upon who specializes in HBC on Vancouver Island.

A key informant is an expert source of information (Fisher, 1997). The key informant technique is used extensively in several branches of social science investigation (Fisher, 1997). Key informants can work one-on-one with researchers introducing them to potential study participants, and shaping research and intervention agendas (Fisher, 1997). Key informants provide focused information on a topic about which they have expert knowledge (McKenna, Iwasaki, Stewart, & Main, 2011). A key informant who could provide relevant information, given his or her skills and background (Marshall, 1996), was identified prior to data collection in this study.

The key informant for this study is an expert in the area of human-wildlife conflict and has had a great deal of experience with mitigating HBC, specifically in national parks and campgrounds contexts. Based on the key informant's expertise, 10 campgrounds were selected. The campgrounds were located across central Vancouver Island and were considered popular campgrounds. The sample consisted of seven private, and three government campgrounds. In addition to the private or government ownership of the campground, there was variation in the size of the campground (small, medium & large), whether it was positioned in a rural setting or urban centre, and level of remoteness. Campgrounds with 50 or fewer sites were considered small; campgrounds with 51 – 99 sites were considered medium sized; and campgrounds with 100 and more sites was considered large. Further, campgrounds near a small urban centre were considered semi-urban; those at a distance from the urban centres were considered rural (Table 3.1).

It was important to include a variety of campgrounds to understand what is happening across all campgrounds in relation to BBAM. Detailed descriptions of the campgrounds are limited to ensure confidentiality. Prior to collecting data, a number (code) was assigned to each campground to ensure anonymity. Only the researcher is aware of the numbering system. The data collection took place between May 2014 and February 2015. Ethics approval from the Vancouver Island University ethics review board was received prior to starting data collection.

Table 3.1 *Campground Descriptions*

| **Campground Code** | **Government (G) or Private (P)** | **General Description** |
|---|---|---|
| 1 | G | Semi-urban, large, near beach |
| 2 | G | Rural, Medium |
| 3 | G | Rural, large, furthest from municipality |
| 4 | P | Rural, |
| 5 | P | Rural, Small, Furthest from municipality |
| 6 | P | Rural, Medium |
| 7 | P | Semi-urban, Medium |
| 8 | P | Semi-urban, Medium |
| 9 | P | Semi-urban, Large |
| 10 | P | Rural, Small |

Note: Large = 100+ sites, Medium=51-99 sites, Small = < 50 sites

## Methods

Several data collection methods were used to explore BBAM strategies within Vancouver Island campgrounds. Each method was developed specifically in relation to the theoretical framework. The data collection began with assessing the bear attractiveness of the campgrounds, using the Bare Campsite scale. This assessment coincided with an on-site assessment of campground infrastructure and HBC signage using a checklist, which was then followed up by an

assessment of campground website messaging on HBC. I utilized unobtrusive methods to collect data associated with the bear proof infrastructure, signage and website information. Unobtrusive methods can be valuable because they address criteria in a study that are not easily measured by traditional methods (Henderson & Bialeschki, 2010). Simple and direct, inconspicuous and easily combinable with other approaches, these methods can offer clues to what people are doing (Henderson & Bialeschki, 2010). For this research, physical evidence was sought in terms of signage, infrastructure, and website information and so unobtrusive methods were practical. The drawback to such methods can be the lack of information about the nature of the people doing what is being measured (Henderson & Bialeschki, 2010). However, this research was exploratory, looking for exactly what was happening at one point in time in campgrounds and consequently, this way of collecting data was useful.

Once all quantitative data was collected, I finalized my data collection with semi-structured interviews with campground owner/operators and my key informant. Each method is described in detail below. While convergent mixed methods research is generally characterized by concurrent collection of qualitative and quantitative data, I collected it sequentially, with the quantitative gathered first (Creswell, 2003). It was a strategic process, meaning it made sense to begin with assessing campgrounds and their websites during the season where bears are more frequent and when campgrounds are in full use. During this period of time campground operators are very busy, so semi-structured interviews took place later, specifically after the busy season.

**Bare campsite bear attractant assessment.** To determine the level of bear attractiveness of a campground, I employed a method developed by Parks Canada (Theberge, 1998) to assess the implementation and effectiveness of their "Bare Campsite" program. The implementation protocol calls for twice-daily assessment of all the campsites. The Bare campsite scoring system

was selected as the unit of measuring individual campsites and their attractiveness to bears. The purpose is to then see how many campsites at a campground have unattended attractants of high and medium scores. Parks Canada has set a performance target of less than 5% high and medium, with the enforcement of rules taking place at non-compliant sites (Arlene Armstrong, Personal Communication).

The assessments were conducted during the months of July, August, and September of 2014 to take advantage of the high tourist season and higher bear activity levels due to warmer weather conditions (Van Tighem, 2013). The selected campgrounds were observed either in the early morning when most visitors were asleep or in the afternoon when visitors tend to be away from their sites for the day. Being as discrete as possible, I entered each campground as a visitor, either camping or parking and walking through the campground. As I walked around the campground I utilized a digital voice recorder to identify specific bear attractants at each campsite. I first noted if the campsite was vacant (e.g. no camping equipment or other sign of currently being in use); if so, it was ineligible. If the campsite was occupied and people were present (e.g. up and about in the site), it was also ineligible. If the people were asleep or away from an occupied site, any attractants were noted on the checklist or voice recorder. As per the Bare Campsite assessment protocols, the campsites were scrutinized for the items noted below, which are items commonly associated with the activity of camping:

- garbage and recyclables;
- coolers;
- dishes (clean);
- dishes (dirty)
- water containers;

- open food;
- closed food and containers;
- pet food;
- cooking appliances;
- soap;
- empty alcoholic beverage containers;
- containers;
- insect repellant:

Each campground was visited three times—two mornings and one afternoon. The reason for these times was that generally people would be asleep in the morning and away from their sites recreating in the afternoon. Unattended attractants make campsites attractive to bears. Due to time constraints, there were two exceptions to the above noted three-visit method. Two of the campgrounds were only visited twice (campground 7 &10).

There is a high turnover in most campgrounds so the likelihood of having different visitors from day to day and from morning to afternoon is good. The non-consecutive visits were spread out over a six-week period. After each assessment, the information from the digital recorder was transcribed into an excel spreadsheet and the recording was erased. The data was then analyzed using a specific scoring system developed by Jen Theberge —see analysis section below.

**Bear proof infrastructure audit.** Human food is a well-known bear attractant, therefore proper bear proof infrastructure available and in working condition in the campground is critical to reducing HBC (Spencer, et al., 2007). Lack of necessary infrastructure can be one of the most important barriers to ensuring proper storage of bear attractants (Timlett and Williams, 2009).

Doing an infrastructure assessment allowed for further insight into whether campgrounds had bear proof infrastructure—a key component to BBAM.

To assess the BBAM strategies associated with bear proof infrastructure, I developed an audit checklist—see Appendix I. The audit checklist was developed from the literature and assessed the presence and functioning of bear proof garbage bins, recycles containers and food caches. While on site tracking bear attractants in individual campsites, I assessed the availability and working conditions of bear proof infrastructure in the campgrounds. Specifically, I tracked on a checklist the following components associated with the infrastructure:

- the presence or absence of functioning, bear proof garbage containers,
- the presence or absence and functioning of bear proof recycle receptacles;
- presence or absence and functioning of bear proof food caches; and,

As I walked through the campgrounds assessing bear attractants in campsites, I noted presence of infrastructure, stopping when I saw the receptacles. Each was checked based on the criteria noted above. If the locks were not engaged, they were tested to see if they could be engaged if closed properly. Such containers may latch and not lock allowing a bear to still have access. Further, the presence of bear proof food caches was noted and each was checked to ensure proper functioning. The infrastructure audits were carried out at the same time as the bear attractant assessment, which was early in the morning or late in the afternoon. The audit itself took approximately 5 minutes per bin or cache. The information was noted on a hand held digital recording device and later transcribed onto the audit assessment tool.

**Signage audit.** Education can be an effective tool in changing human behaviour to reduce HBC (Ajzen & Fishbein 1980; Gore, 2004), and messaging can affect visitor behaviour (Marion & Reid, 2007). Therefore, I looked for educative signs within the campgrounds, specifically with

respect to managing bear attractants and enforcement of rules. Further, because signs are less conspicuous and more economical and effective in enhancing visitor knowledge, they have become the preferred visitor management tool worldwide (Marion & Reid, 2007; Ballantyne & Packer, 2011; Hughes & Morrison-Saunders, 2002). Spencer, et al. (2007) stated that all black bear management programs should have education as their fundamental basis, one tool of which is signage.

Based on the literature, there should be interpretive signs for awareness and education (Hughes & Morrison-Saunders, 2005; Moscardo, 2003); and signs that are used for enforcement (Lackey & Ham, 2014; Manning, 2003). Therefore, I tracked the following types of signage:

- Enforcement – warning about following rules, for example, if food and garbage are not properly stored, camping permits may be revoked;
- Education – naming attractants and how to secure them. Other signs noted the slogan, "a fed bear is a dead bear"; some signs advised that a bear had been sighted.

The signage audit was conducted during the same visits for bear attractant assessments and the infrastructure audit. When a sign was observed, information about that sign was noted on a handheld digital recording device and later transcribed onto a signage audit assessment tool (Appendix I). The time needed was dependent upon the size of the campground. Some were much larger than others, but typically in one hour, the infrastructure audit, sign audit and campsite assessments could be completed.

**Website audit.** Many visitors use the Internet for pre-trip information so it is important to be aware of what pre-trip messages potential campground visitors are receiving. The reason for this is their expectations can be shaped prior to arrival at a campground (Eagles & McCool, 2003; Moyle & Croy, 2009). While the pre-visit phase has not been widely studied (Moyle & Croy,

2009), Stolton and Dudley (1999) noted that the key to managing large numbers of visitors includes ample pre-trip information. Because visitors often access the Internet for information prior to their campground experience, campground websites would be a practical place for education, awareness, end enforcement messages that visitors see before their trip. Websites are tools for transmitting information and could be very useful for preparing visitors to act appropriately in bear habitat. In other words, campground websites could be gateways for influence in terms of BBAM. Because of the influencing factor of websites, the websites of the campgrounds were examined and the presence or absence of the following information was noted:

- Bear information. If the website includes information about being bear aware, this could send the message that the campground is serious about reducing human-bear conflict (HBC), therefore, the websites were analyzed for any content related to bear information.
- Rules and regulations**.** Providing education on rules and regulations regarding HBC, to campers before they arrive can help set them up to follow the rules, therefore, the website was examined to determine if rules were outlined with respect to managing attractants while camping.

I looked at the website for each campground, noting the presence of the above noted information on a chart. Every link on the webpage was analyzed. Each audit took approximately thirty minutes.

**Semi-structured interviews**. To gain deeper information on the BBAM strategies that the study campgrounds employed, I conducted semi-structured interviews with five campground owner/operators, which included contracted operators, on-site managers and/or staff. Three of

the operators interviewed were operators at government campgrounds (one Federal and two Provincial); one operator was also the owner of a private campground, and the fifth was the operator of a private campground. For the purposes of this study, these individuals support the operation of the campground and have responsibilities associated with implementing BBAM strategies. These interviews were utilized to capture campground's BBAM strategies, and to better understand the owner/operators' perceptions of constraints and opportunities in relation to employing BBAM and reducing HBC.

Following the campground assessments (bear attractants, infrastructure, signage and websites), I contacted campground owner/operators to invite them to participate in the interviews. The initial contact with the campgrounds was made via email found on the campground website. If no reply was received, a message was sent via private Facebook message. If no answer was received, a phone call was made requesting an interview. All 10 campground owner/operators were invited to participate in the study, with five of the operators agreeing to participate in the study. Once contact had been made, a formal request for an interview was sent via email, which included a cover letter introducing the researcher, explaining the research being conducted, and the consent form. The five operators that agreed to interviews were from government (N=3) campgrounds and privately owned campgrounds (N=2). The interviews took place at location chosen by the interviewee. Prior to conducting the interviews all participants were asked to sign the printed consent form. The interviews ranged from 30 to 60 minutes and were digitally recorder and transcribed verbatim. After the interviews were transcribed, each interviewee received a copy of the transcript for verification. In addition to the campground owner/operators, I also interviewed my key informant prior to interviewing the other participants. This person had knowledge about the entire mid-island region with respect to bears and while I was getting

information about bears, I also asked about BBAM and HBC. This interview gave me a better understanding of how bears habituate and become food-conditioned in one area and then move on to other areas, possibly becoming a problem for humans.

The interview questions were designed to discuss enforcement protocols and the constraints and opportunities associated with bear attractant management strategies they experience. —(see Appendix II for interview guide. )

## Data Analysis

Below is a detailed description of the analysis of each method. The data is then described and discussed in further details in the findings section—chapter four.

**Bare campsite bear attractant assessment.** The bare campsite scoring system was developed by Jen Theberge, a wildlife ecologist with Parks Canada (Key Informant). According to her protocol, each of the eligible sites was assigned a score for each attractant and the scores for each campsite were totaled. Food, garbage, coolers, and pet food were considered highly attractive to bears and scored 24 points each; cooking utensils, dishes, empties, soap, and suntan lotion were assigned a score of 12 points each; containers, and insect spray scored 4; and water containers and briquettes scored one point each. Once a total score was determined for each campsite, each was labeled high, medium, low, or not at all attractive based on Table 3.2. This assessment is used twice daily by Parks Canada in their Green Point Campground to measure the efficacy of their bear attractant management protocols.

*Table 3.2 Scoring Individual Campsites*

| Campsite Rating | Raw Score |
|---|---|
| High | >24 |
| Medium | 12 – 23 |
| Low | 1-11 |
| No attractants left unattended | 0 |

The total number of all sites in each campground for each visit was determined using a binary code with "0" representing all no, low, or minimally attractive sites and "1" representing all sites determined to be medium or highly attractive to bears. A percentage of high and medium sites out of the eligible sites was then calculated to reveal the attractant level of the site. The raw data from each campsite was then entered into a spreadsheet in excel. A summary was created noting the total number of individual attractants per campsite per visit and another noting the total score per campsite per visit. The ineligible campsites were removed from the data set. The level of campsite attractiveness was calculated and compiled with all other eligible campsites for all visits. The average of the three (or two) visits was calculated. Some of the study campgrounds had confusing layouts and because of this, sometimes a campsite was not observed. This was not noticed until the recording was transcribed. Any campsite that was inadvertently overlooked during the campground walk-around was considered null or ineligible.

**Infrastructure, signage, and website audit analysis.** It was noted which campgrounds had bear proof garbage receptacles, recycle receptacles, and food caches. This information was noted in an excel spreadsheet. As with the infrastructure audit, data about awareness, enforcement, and education signage in each campsite (yes/no) was noted in an excel spreadsheet. For the infrastructure audit, if a campground had more than one garbage or recycling receptacle and one was not bear proof and the other was bear proof, it was recorded that the campground had a bear proof receptacle—see frequency chart in chapter four.

The data collected was to provide a description, meaning to find out and describe what is (Veal, 2011). In this study, to describe the BBAM strategies Vancouver Island campgrounds employ. Therefore, descriptive statistics was used for the three audits. Descriptive statistics are used to measure central tendencies and in the case of this research, I am presenting the mean, or

average, of what the campgrounds are doing with respect to BBAM. The results of the audits were simply described to give a snapshot of what was seen. In order to analyze and interpret the data, the following steps were taken:

1. Note how many campgrounds were visited (a well defined sample);
2. Identify statistical procedure—create an excel worksheet indicating campground code and results of sign, infrastructure, and website audit (yes/no). Added up the number and divided by the number of values.
3. Present the results in a table and interpret them.

**Semi-structured interviews analysis.** Prior to analysis, I had to prepare the transcripts, which involved listening to the audio recordings and typing the interviews verbatim into a word document. Once each transcript was prepared, they were labeled with the campground number. The transcripts were then read and sent by email to the corresponding interviewee for review and approval. After receiving participants' approval**,** I followed Creswell's six-step analysis process (Creswell, 2014)**.**

**1.** Transcribe interviews;

**2.** Read all of the transcripts to get a general sense of what was said and reflect on the meaning;

**3.** Code the data. The transcripts were sorted and evaluated in relation to the concepts in the theoretical framework and the research questions. This involved finding words and phrases used frequently. Similar kinds of information were grouped together in categories. Different themes and ideas were related to one another and overarching themes were noted (O'Connor & Gibson, 2003). Emergent themes were noted which included themes not derived from the theoretical framework—such as visitor apathy. The

themes across the interviews were flagged by highlighting and Post it notes marked important sections.

4. Generate description of categories or themes for analysis. Lists were made of themes and interview statements associated with those themes were noted, along with the campground code. All of the themes and related concepts from the interviews were written on a large whiteboard to help identify connections. To ensure reliability in my findings, I tested the emergent themes by going back through the transcripts to look for outliers (negative instances of patterns). In addition, I compared my codes with a second reviewer, my supervisor.
5. Theme description. Themes were then expanded and described through narratives that are found in chapter four the results section.
6. Interpret the findings. The final step to analysis involves interpreting the study's findings in the broader context of the literature—chapter five discussion and conclusion.

# Chapter 4 Results

The purpose of this study is to explore BBAM strategies in Vancouver Island campgrounds. Through the data analysis it became apparent that Vancouver Island campground operators share a number of strategies, challenges, and solutions associated with bear attractant management across the campgrounds. Specifically, the results indicated three general themes associated with the study's BBAM theoretical framework: 1) current practices in bear attractant management; 2) challenges in bear attractant management; and 3) solutions for improving bear attractant management. Each theme is expanded below.

## Current Practices in Bear Attractant Management

Managing bear attractants is a crucial strategy for reducing HBC. Every campground in this study utilized at least one form of bear attractant management. The results below indicate, how enforcement was employed, what education strategies were utilized, and the extent of bear-proof infrastructure that is in place at each campground. The last section highlights the average scores associated with the availability of bear attractants for each campground.

**Enforcement.** All of the campground owner/operators noted that they use some form of enforcement. In regards communicating enforcement prior to arrival, 40% of the campgrounds in the study used the Internet to communicate their bear attractant management rules on the websites. While other campgrounds' enforcement began at check-in when rules were verbally summarized for the visitor. Essentially, enforcement looks like presentation of the rules along with penalties for not following the rules. In one campground, visitors were informed of the rules and then asked to sign a form acknowledging them. The operator of this campground stated that "we verbalize it at check-in – we go over the rules and they sign something saying that they understand the rules".

In order to compel observance of rules and impose the desired behaviour, one of the most used enforcement strategies was patrolling. Specifically, participants discussed how they patrol the campgrounds looking for unattended attractants in campsites. These patrols are conducted by grounds staff and in the case of campground three, uniformed grounds staff. This required either walking or driving through the campground, examining each site for attractants. Three of the operators advised that if unattended attractants were identified, staff would remove them from the site. Following the removal of the materials, a note was left for the visitor informing them where they could retrieve their belongings. One owner/operator reported what they do when patrolling, "what happens is our grounds staff does loops and if a cooler or something is left out, typically what should happen is they put it in our golf cart and we have a pink slip." Another operator noted that visitors were asked by the campground managers to tidy up their sites and then the site would be checked again on another patrol to ensure compliance. If attractants were still present, they may be gathered up at that point. This operator stated, "we'll check in when we're doing another patrol and make sure they complied. If they didn't, we'll leave them a note and if it's really bad, we'll take matters into our own hands and maybe start packing up." In another campground, if attractants are seen during early morning patrols, the visitors are woken up and told to clean up their site.

Another on-site strategy for enforcement was signage. Signs stated the potential penalties for not complying with the bare campsite rules. Fifty-percent of the campgrounds in this study used signage indicating that bear attractant management rules are enforced.

Although signage was used to enforce BBAM policies and procedures, some campgrounds were more proactive in their enforcement. For example, some campgrounds revoked permits. Generally, a three-strike rule was used where the visitor was given two chances

and on the third offence, their camping permit was revoked and they were asked to leave. Some operators advised that camping permits had been revoked at their campground, "what we do is we take away the attractants in a golf cart and leave a pink slip. They come and pick it up and they are told that they get one more warning. Then we have to kick them out." While another operator advised, "If someone is doing something blatantly ignorant, the only thing you can really do is to say 'it's time for you to leave'.

**Education.** Current practices in education strategies was captured through the website audit, the signage audit and interviews with campground owner/operators. Education was considered an important component to BBAM for campground operators In fact, all participants reported that they used some form of education to inform their visitors about being bear aware. For example, a few campgrounds offered information at check-in. This information involved a conversation about the importance of reducing HBC by properly storing attractants when the visitors leave their sites. As the operator of one campground indicated, "we tell them at check-in what our bear rules are – basically, put everything away".

In addition to having conversations at check-in, two campgrounds handed out information in the form of pamphlets or brochures and talked about managing attractants in order to reduce HBC. The owner/operator of campground one said that there is "an information sheet that goes out with everybody that comes in; the classic bear-aware information is in there." In some cases, campgrounds employed interpretive programs that intertwined education with entertainment. One of these campgrounds had a nature house that provided an educational program for children that teaches them how they should be camping and what they should pay attention to. As the owner/operator of campground one noted, "when the kids go out and do their programs, they

come back to the campsites and tell their parents what they've learned. I think it's a good long term thing for the next generation".

In addition to the interpretive programs, campgrounds also relied on signage to educate visitors. Signs were used to create awareness of a bear in the area. In fact, 60% of the campgrounds had signs indicating that there was a bear in the area. These signs help owner/operators convey messages about bear sightings. For example, the owner/operator of campground two noted, "if we have a bear in the area, we have a protocol for putting up our warning signs". In addition, to signs reporting bear sightings, 40% of campgrounds had signs posted with messages about how to manage bear attractants. Participants discussed that these signs communicated messages around what materials attract bears and how to manage attractants. One owner/operator reported that their campground signs state, "these are attractants" and beside a picture of a bear "I even eat soap and beer cans are delicious".

The owner/operators also confirmed websites as a source of pre-trip education. Operator two advised their campground has a "know before you go on [their] website". This is meant to educate the visitor on what to expect when they arrive at the campground, information such as campground check-in procedure and BBAM rules. Despite the website being used as a source of education, only 30% of the campgrounds had information about bears and attractant management on their websites, while 50% of the websites contained rules and regulations with respect to BBAM.

An important component to education was consistent messaging. This means that the same message is offered in different media such as signs, brochures, websites, and verbal communications such that the visitors are saturated with the same message as opposed to one message diluting the efficacy of another**.** This was best described by campground three operator,

"we try to keep all of our messaging really consistent throughout all of the different communications – website, interpretive panels, wildlife attraction pamphlets". This is important because consistent messages are easier to remember**.**

Although approaches to education varied, there were campgrounds that did not engage in any education strategies. For example, one campground stated that information was provided only upon request, or when a bear sighting was reported. This operator advised, "We don't have pamphlets or brochures. The only time we really bring it up is if they ask about wildlife". This operator further stated that "if a bear is spotted two or three times, we put signs up". In another campground, one participant noted that there was no bear information on their signs but they planned to post bear aware information in the future.

**Bear proof infrastructure.** The type of infrastructure and the working conditions of the infrastructure varied among the campgrounds in terms of having access to infrastructure that was bear proof. Only two campgrounds assessed had bear proof garbage receptacles, recycle receptacles, and food caches. The infrastructure audit indicated that 50% of the campgrounds had bear-proof garbage receptacles, while only 40% had bear-proof recycle receptacles. Twenty percent of the campgrounds surveyed had bear-proof food caches.

The owner/operator of campground three, one of the campgrounds that had all three types of bear proof infrastructure, reported that their campground was adding more bear proof storage lockers (food caches). As this individual noted, "we're adding more bear proof storage lockers around the campground just to give more access to campers who want to use these tools to help mitigate the risks of attractants".

Conversely, one campground owner/operator (campground one) reported that their campground used non-bear proof bins for garbage and recycling and had no bear proof food

caches due to the low risk of bear encounters. This operator advised, “our bins were approved by BC Parks because there is so low of an issue with bears”. In some cases, campgrounds didn’t have bear proof infrastructure available across the entire campground. As campground owner/operator two noted, “that is an issue that is going to be fixed this coming winter and they’re going to put in bear proof bins which will be nice, because the tin cans, which are probably the biggest issue we have as far as attractants”. This operator further advised, “one time a bear got into one of them [tin garbage can] and you could see the claw marks and it looked like it just cut through butter”.

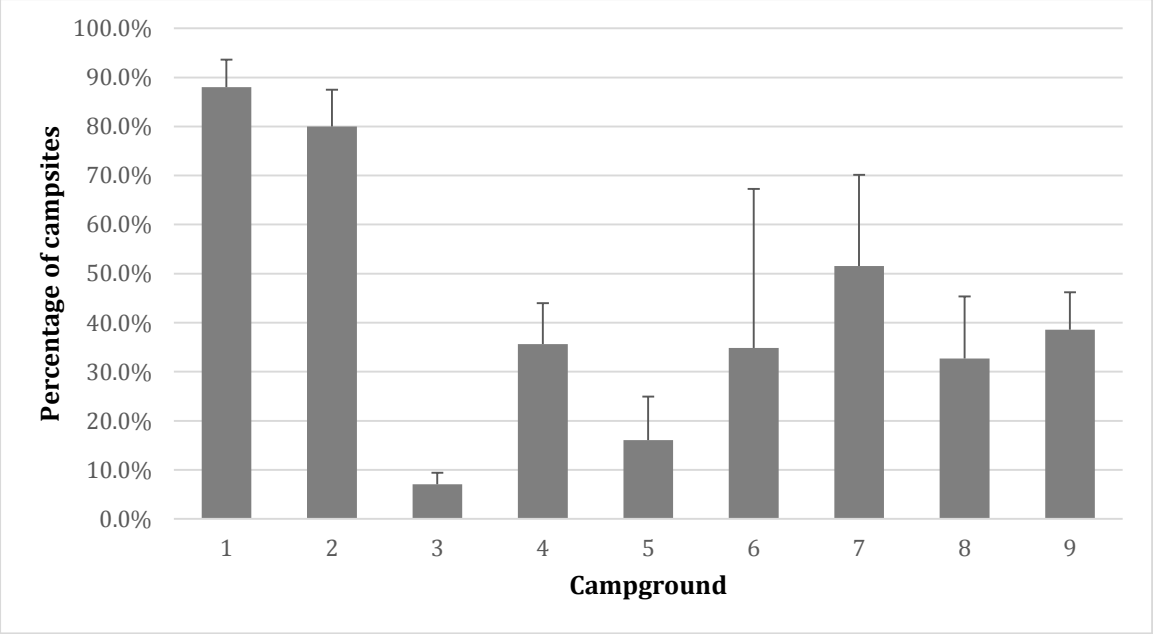
**Campgrounds and bear attractants.** Managing bear attractants is a critical component in reducing HBC. For the purposes of this study, it was important to gain a clear picture of how campgrounds were doing in terms of the existence of bear attractants. The “Bare Campsite” protocol was used to ascertain a snapshot of the attractiveness of campsites to bears. Campground one had a high number of highly attractive sites, as well as a high number of sites that were of medium attractiveness, with very few minimally or not attractive sites. Campground four had a very large amount of highly attractive campsites with very few medium and lower. Five of the campgrounds had fairly equal high and minimally attractive sites. Two of the campgrounds had a much larger proportion of low or minimally attractive sites compared to highly attractive. Of the 10 campgrounds surveyed for bear attractants, seven of them had an average overall bear attractiveness score of “high”, while one was minimal and two were considered of medium attraction to bears (Table 4.1).

Table 4.1
*Average attractant scores*

| Campground | Bear Attractant Average Score | Attractiveness |
|---|---|---|
| 1 | 171.6 | High |
| 2 | 78.0 | High |
| 3 | 4.0 | Low |
| 4 | 52.8 | High |
| 5 | 10.5 | Low |
| 6 | 51.9 | High |
| *7 | 61.2 | High |
| 8 | 53.0 | High |
| 9 | 30.5 | High |
| *10 | 16.0 | Medium |

**Campgrounds 7 and 10 were only visited twice vs three times*.

Figure 4.1 indicates what percentage of the eligible campsites in each of the campgrounds were rated as high or medium on the scale of attractiveness to bears.



The percentage of eligible campsites rated as high or medium attractive to black bears is shown in Figure 4.1. The T-bar indicates the standard deviation among visits

Table 4.2 Frequency Chart

| CP | BA | Education | | Infrastructure | | | Enforcement | |
|---|---|---|---|---|---|---|---|---|
| | | **Educational** (signs) | **Awareness** Bear info (web) | **Garbage** | **Recycle** | **Cache** | **Enforcement** (signs) | **Rules & Regulations** (website) |
| 1 | 171.6 High | No | No | No | Yes | No | No | No |
| 2 | 78.0 High | No | No | Yes | Yes | No | No | No |
| 3 | 4.0 Min | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 4 | 52.8 High | Yes | Yes | Yes | No | No | Yes | Yes |
| 5 | 10.5 Low | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 6 | 51.9 High | No | No | No | No | No | Yes | No |
| 7 | 61.2 High | Yes | No | Yes | No | No | No | Yes |
| 8 | 53.0 High | No | No | No | No | No | No | No |
| 9 | 30.5 High | No | No | Yes | No | No | Yes | Yes |
| 10 | 16.0 Med | Yes | No | No | No | No | Yes | No |
| | | 5=Y 5=N | 3=Y 7=N | 6=Y 4=N | 4 = Y 6 = N | 2=Y 8=N | 6=Y 4=N | 5=Y 5=N |

The campgrounds with the lowest numbers of unattended bear attractants performed well in other areas – education, enforcement, and infrastructure (Figure 4.2). Campgrounds with high numbers of attractants were inconsistent in other BBAM strategies. All of the campgrounds where the numbers of unattended attractants were between the highest and lowest were privately owned.

## Challenges in Bear Attractant Management

Despite the varied practices in BBAM, the owner/operators noted a number of challenges they face when implementing BBAM. Each of the challenges is described below in the context of the theoretical framework—enforcement, education and infrastructure. In addition, one theme emerged outside the theoretical framework, visitor apathy, which is also discussed.

**Enforcement**. Operators noted the challenge of striking a balance between visitor experience and protecting the bears. Some made comments indicating they felt that sometimes the concern for conserving bears encroaches upon the enjoyment of paying visitors and that the visitors may feel their actions are restricted. Since both visitors and bears are important to the ecotourism experience, it was important to many of the owner/operators to balance the needs of both. As campground four owner/operator discussed, "it's really just the customer service, visitor experience, and balancing out how strict we want to be and finding that common ground". For some participants the importance of finding this balance was to prioritize the safety of visitors and the wildlife. As one campground owner/operator shared, "one of the challenges we face is to ensure whatever we do, our visitors are front and centre [a priority], just as important as wildlife."

Part of the challenge for balance was in regard to staff entering sites to remove attractants when visitors had left them unattended. One element of enforcing bear attractant rules is ensuring nothing known to attract bears is left unattended in a campsite. Some visitors feel upset when they return to their sites and find things missing. The need to mitigate risk must be balanced with the desire to please the visitors, as the operator of campground two reported, "we want to avoid people getting really upset, so we do what we can to mitigate risk and at the same time to protect ourselves". In other words, this operator hesitatingly enters campsites to remove items when necessary but is very concerned with visitor reaction. Another reported challenge

was avoiding being too strict and pushing the visitors away. As the operator of campground four stated, “if you’re too much of a big jerk about it, people get upset. It’s tough”.

The inability to properly enforce rules was also a challenge, as campground operator two explained, “because we are not peace officers, we can’t enforce. It’s a fine line to straddle – if you get too strict, you don’t have the ability to enforce”. This same operator believed that in some cases visitors disregarded the rules because they knew the operators at this campground had no jurisdiction to enforce the policies; and commented, “some people think that we can’t enforce, so they can do whatever they want”. While campground operator four noted that rules are enforced in their campground, it was also stated “if people aren’t following the clean campsite rules, they’re typically not following other rules”.

Another challenge to enforcing, as noted by the operators, was lack of adequate time to get out and patrol. The owner/operators acknowledged that during the busy summer season, staff was occupied with many other tasks associated with running a campground. As the owner/operator of campground four noted, “when the campground is packed and there’s a million things to do, the bear aware thing is forgotten because it gets too busy”.

Financial capacity to enforce properly was a concern for some owner/operators. Specifically, participants discussed not having an adequate budget for regular patrols to assess campsites for attractants and enforce rules. Related to financial challenges is the challenge of being under staffed for the task of enforcement. Most campground owner/perators noted that their staff was small and they were often busy with one task and had no time to get out and patrol the campground. As the owner/operator of campground six declared, “we have a very small crew and we can’t be at two places at once”.

**Education.** The participants reported a number of challenges to bear attractant management that related to education. For example, campground one owner/operator stated, "that's the challenge – making sure people are aware and getting them to know it's important". As the literature notes, signs are one way to educate visitors to campgrounds. Educational messages can be posted on signs for everyone to see. The owner/operators noted several challenges related to signage. One campground owner/operator noted that signs do not always work because "people comply when you're around and when you're not, a sign is only so helpful". Part of the challenge around signage was figuring out how many signs should be posted in the campground. One owner/operator thought too many signs was not helpful, "there is such a thing as too many signs. If you have too many signs, people start ignoring them because they see it as just another sign". While another owner/operator thought more signs were needed to be more effective with educating their visitors—"we could have a bit more signage".

The messaging on signs was another challenge. Some participants felt that the wording needed improvement in order to be effective. In other words, visitors do not heed the messages as they are presented. As owner/operator of campground two stated, "stern sounding—generally works better. It makes it a very serious thing [message]". Balancing messages with a stern tone was important because participants discussed how they didn't want to scare away people because of the potential of bear encounters. Ensuring the educative message is blended with a stern tone while and messaging that highlights the risks associated with not complying with bear attractant rules. As campground owner/operator six discussed, "it's about providing information – it's about education – it's not scaring…it's just to promote great camping practices in a way that you're not going to scare them". Another owner/operator noted the challenge of how educational messages are delivered to the public and if they are reaching the necessary audience:

> That's where the new challenge is – it's not in the science; it's in how we're going to get the message across. We're constantly having to ensure that we're moving those messages along as well. So, how we deliver – we have to be cautious.

Timing for displaying educational signs was also a noted challenge because some owner/operators felt that visitors may panic and leave if they thought a bear was in the area. Most campgrounds posted signs regarding a bear sighting as soon as one was found to be in the area. Such signs can emphasize the need to properly store attractants, as there is now an imminent threat of campsite visitation if attractants are left unattended. As one campground owner/operator stated, "if a bear is spotted two or three times, we put signs up…to mitigate risk to the bear". The risk referred to by this owner/operator was calling the Conservation Officer too soon and potentially having the bear destroyed. The owner/operator felt that one sighting could not justify making this call. Conversely, this same owner/operator noted that visitors who had seen a bear became very concerned when no signs were posted and advised "we get people who have seen a bear asking us the next day why we haven't put the signs up". This owner/operator also stated that there is a balance that must be maintained between being over-cautious and not cautious enough.

Another challenge to bear attractant management education was cost, as one campground owner/operator stated, "having the time and resources to take on more educational roles. There's a lot of man hours going into the delivery – there's certainly barriers in that regard". Another owner/operator acknowledged, "[we] work with such a small budget, we have a very small crew and we can't be two places at once". While the ower/operator of campground four did not specifically note a financial challenge with respect to education, this individual did say in response to whether expense is an issue for educating campers, "just when the campground is

packed […] the bear aware thing is forgotten because it gets too busy". This individual indicated that there was not enough staff to educate visitors when the campground was busy.

Turnover in staffing and visitors are challenges to BBAM, as well as any changes made to the campground. Campground one owner/operator stated, "you can have a fully educated public this week but next week, you have a whole brand new public, so it's not like we have the same user so we have to educate over and over again". This individual also advised, "we do have new people [staff] all the time and that's something I'm working on is just improving the knowledge that the staff always have". Further to this, owner/operator of campground three noted, "when your [amenities or facilities] change, your message and how you deliver it needs to change. We're constantly having to ensure that we're moving those messages along as well". As campgrounds (also called offers) and their infrastructure change, visitors' change, and the message also must change. "If you change your offer, you can expect you're going to change your visitors. So these are some of the things we have to be cognizant of" (owner/operator of campground three).

**Bear proof infrastructure**. The owner/operators noted difficulties to managing infrastructure. One of the owner/operators noted the need for more bear proof bins. The owner/operator of campground two said, "the garbage cans are very old. The tin cans, which are probably the biggest issue we have as far as attractants". The key informant also discussed the challenges with infrastructure, specifically when the locks fail to work properly, either because the visitor does not ensure that the lock is engaged or because damage was caused when the dumpster was emptied. Lastly, budget and approval were revealed as challenges. Bear proof infrastructure is costly and budgetary approval often needs to be sought for large purchases. Furthermore, some campgrounds are not owner/operated and any changes must be approved by a

governing body or association. As campground owner/operator one noted, "we have to go through a process to get approval, to get the budget. One of our big barriers is budget. To get approval on the budget to improve facilities is always tricky".

**Visitor apathy.** Although not a component of the theoretical framework, visitor apathy was discussed often as a constraint to BBAM. All of the operators noted that some visitors exhibited a clear lack of care or disengagement with respect to BBAM information and rules. The owner/operator of campground six noted that a barrier to getting information across to the visitors was, "people not being engaged – whether its' apathy – not caring about nature, [or] just there to party. Those people don't care that their actions may destroy a bear". Similar sentiments were reported by the owner/operator of campground four, "a lot of campers around here don't really want to hear it [the warnings and information]".

Disengaged visitors often meant they were also not aware that bear safety measures were part of their responsibility. Campground owner/operators often described that visitors don't see that bear safety was associated with their own behaviours and that they just wanted to be left alone to camp. Campground two owner/operator described the situation at their campground:

> It's trying to get people to take the initiative…but people won't go for it and it's a little frustrating. A lot of people won't read the signs. People don't understand that they actually need to know certain things. We get so many people who are so misinformed or not informed at all and they won't take the initiative to do it themselves. Some people just don't care. They just want to be left alone and they're going to do what they want to do. They know what you're trying to tell them but they don't care.

In some ways the participants felt that visitors were lacking education (misinformed) or had the wrong information. This was best described by the owner/operator of campground two,

"we get so many people who are so misinformed or not informed at all. They won't take the initiative to do it themselves". Further, the owner/operator of campground six declared, "no one reads anymore, so people just stand there as you're pointing out what's appropriate and what's not and all they think about is getting to their site and cracking a cold beer. So we are dealing with a very desensitized visitor". Visitor apathy left the campground owner/operators frustrated because they were made to feel helpless. The owner/operator of campground three best described their feelings, "we're providing the knowledge but unless they're willing to adapt their behaviour, there's not a lot we can do".

## Solutions for Improving Bear Attractant Management

When asked about ways to improve BBAM, every owner/operator provided solutions in the context of enforcement, education, and infrastructure.

**Enforcement**. In terms of enforcement, the operators noted several possible ways to improve BBAM. One example that was discussed included having more ground patrols to enforce the policies and procedures, specifically when the procedure requires close surveillance of campers. This was best described by campground owner/operator six, "increasing on the ground patrols, we can actually enforce our two strikes and you're asked to leave the campground".

Similar to having more ground patrols, some owner/operators specifically discussed having a park ranger onsite. Some individuals felt shackled by the lack of ability to enforce rules and the belief that some of their visitors do as they please since they view campground owner/operators as unable to enforce. These owner/operators felt that a park ranger would be viewed as the authority figure and the "face" of enforcement. As campground owner/operator two noted, "I wish we had a park ranger so that we could enforce [our BBAM strategies]".

A third enforcement strategy included staff training and preparation. It is important for campground staff to be aware of attractant rules, be able to communicate the rules effectively, and understand the importance of observing the regulations in relation to mitigating HBC. The operator of campground four stated, "I think making sure that our grounds staff takes it seriously and focuses on keeping campsites clear of attractants". Further to this, another operator thought that if staff were properly trained, they could start at check-in and "weed out" questionable people, which would improve the situation.

A final strategy campground operators discussed was stricter enforcement practices. Enforcement of bear attractant rules conveys the importance of following them. If there are no consequences to ignoring regulations, visitors may be tempted to do as they please. Further, visitors who have experienced enforcement efforts do not forget the consequences they were dealt. As one campground owner/operator stated, "I think with just a year of stricter enforcement, people would remember." This same owner/operator thought that better enforcement had to be coupled with better education – not one or the other, meaning, "it can't be just around education or enforcement; it has to be a collage of both. Education will do a lot more for the average person and some people just don't care".

**Education**. All of the owner/operators acknowledged that more could be done in terms of employing education strategies that could improve BBAM. Signs are often used as educational tools and some of the participants thought that more signs would be helpful. Campground two owner/operator stated, "we could have a little bit more signage, without going overboard".

Every owner/operator felt that messaging could be improved upon, specifically changing the messaging and how often it is communicated. Owner/operator of campground three stated

that the tools available for reducing attractants have not changed, but that the way that the messages are communicated need to change, noting, "I think what we're going to see is the way that we communicate the information so that it is digestible by the public". Owner/operator six felt that "beefing up the message" by offering multiple delivery modes would be the best way of getting the message across. This individual also stated:

> Send people to our website when we're on the phone with them – take a look at the website, make sure you understand – go through the [details of BBAM protocols] that we are bear aware and what that means and our policies on that. Maybe an app or bear video that they have to watch before they check in.

Part of enhancing the education strategy is increasing how often messages are delivered to the visitor. One campground owner/operator felt saturating the visitors with information was needed:

> They [visitors] would get that when we talk with them on the phone and when they are checking in and then having people patrol and signage. I mean it's over the top saturation but you can't just put one pretty sign up and hope for the best.

In addition to changing the messages, owner/operators suggested changing their education procedures, specifically creating a procedures manual to ensure consistency of delivery across staff and time. The information that is delivered to the visitor needs to be consistent so that they hear the same message from one staff member to the next and from one visit to the next. This change in process was best described by campground three owner/operator, "something we are looking at this year is actually having a procedure manual to deliver the [BBAM program] so that it's consistent throughout whoever [staff person] is doing it [delivering]".

Another owner/operator thought that the BBAM information needs to come from the top. Specifically, if governing bodies such as municipal leaders and heads of tourism associations encouraged or mandated proper BBAM, or at least disseminated information about the importance of properly managing bear attractants, there may be a trickle down effect. To this point, one participant stated, "more needs to be done in a tourist based industry place….messaging needs to come from the top….[city] councils, [tourism organizations], …through messaging, maybe turning it up a little bit to say we are a wild place – setting the tone for the behaviour".

**Bear proof infrastructure.** The owner/operators noted few solutions with respect to infrastructure. One owner/operator noted the need for more bear proof garbage bins in one area of the campground. When campground two owner/operator was asked what more could be done to mitigate HBC, the response was "the garbage bins which are very old". When asked the same question, the owner/operator of campground three (b) noted that more bear proof food caches were going to be installed to help mitigate the risk of attractants.

Another solution suggested with respect to infrastructure was having a gatehouse for check-in and information dissemination. This would allow staff to share information at first contact with the visitors and it would make enforcement easier because the visitors would be informed of the rules. As the owner/operator of campground two commented, "so that way as you come in, everything is explained and if you screw up once, you get a warning – you screw up twice, you're gone".

## Summary

The results of this research indicate that all of the campgrounds in the study utilize different levels of BBAM strategies including enforcement, education, and infrastructure. The operators noted several challenges to BBAM using these strategies and an outlier emerged when

visitor apathy was identified as a major challenge. Lastly the campground operators' perspectives for improving BBAM were identified.

# Chapter Five Discussion and Conclusion

This chapter discusses my research findings in the context of the literature associated with this study and the theoretical framework, which is then followed by a conclusion with recommendations, limitations, and future research suggestions. The discussion is presented in relation to the theoretical framework—bear attractants, enforcement, education, and bear proof infrastructure, the outlying finding, visitor apathy, and sustainable leisure.

## Bear Attractants

Despite that this study was not trying to establish a causality relationship between bear attractant scores and BBAM strategies, it is interesting to note that the campgrounds that had all three BBAM strategies in place had the lowest scores in terms of bear attractant averages and in terms of overall campground attractiveness (Table 4.2). The low attraction to bears indicates good performance on the part of the campgrounds in terms of having BBAM strategies in place. It was interesting to note that some campgrounds had BBAM enforcement signs posted quite near to campsites that had several unattended attractants, suggesting that rules were not being enforced at the time of the survey. The two campgrounds with the highest bear attractants scores had no enforcement signs while most of the campgrounds with the lower scores had enforcement signs. One campground with a high score had signs but had no other BBAM strategies in place, perhaps indicating that enforcement signs alone are not enough. Managing bear attractants at campsites is essential to reducing HBC and while campgrounds may have other BBAM strategies in place, unattended attractants in campsites speak to a problem with education and/or enforcement or perhaps to a lack of convenience in using any available infrastructure.

## Enforcement

Research indicates that enforcement strategies ensure BBAM policies are applied (Gibson, Williams, & Ostrom, 2004; Keane, et al., 2008). For example, "soft enforcement" such as signs and verbal requests for proper storage of attractants, applying fines, and revoking permits

are useful for encouraging compliance of BBAM rules (Pendleton, 1998) and that these actions positively affected HBC (Pendleton, 1996; Pendleton, 1997; Pendleton, 2000; Hristienko & McDonald, 2007). Similar to this research, the campground owner/operators in this study used some form of soft enforcement such as patrols, removal of attractants from unattended campsites, or permit revocation to manage bear attractants; but each campground used a different approach.

Despite the variety of enforcement protocols campground owner/operators used, they noted a number of challenges to this BBAM strategy. The owner/operators in this study noted a lack of time and financial capacity for enforcement follow-through. Researchers have reported that enforcement is challenged by lack of resources to follow through on policies and procedures (McKay, 2007; Tobias, 1998). The literature also revealed that while rules about BBAM may be evident in ecotourism offers, actually applying the associated punishment is weak (Lawson & MacFaul, 2010; Sander, 2014). This research also noted issues with applying punishments such as lack of authority and training; and the need to strike a balance between visitor experience and protecting bears.

The literature documents the need for upholding the regulations (Pendleton, 2000) and, somewhat conversely, also notes that regulations in a leisure outdoor setting can be irritating to visitors instead of encouraging them to support regulations (Marion & Reid, 2007). The research findings in this study echo similar solutions to the challenges of BBAM, specifically the need for more enforcement to ensure compliance. For example, owner/operators suggested increasing ground patrols and better staff training and preparation for situations where enforcement is necessary. Many of the owner/operators in this study supported educational programs to aid enforcement, they felt that further education of staff and visitors would make enforcement easier (Thompson, Shirreffs, & McPhail, 2003).

## Education

> In the end we will conserve only what we love. We will love only what we understand. We will understand only what we are taught. Baba Dioum, 1968, spoken to the general assembly of the International Union for Conservation of Nature in 1968 (Jager & Halpenny, 2012).

Researchers have indicated that education is a key strategy that ecotourism operators are utilizing to manage HBC (Gore, Knuth, Curtis, & Shanahan, 2006; Spencer, Beausoleil & Martorello, 2007; Ballantyne & Packer, 2013). Similar to these findings, this research found a number of education strategies associated with BBAM that were utilized in Vancouver Island campgrounds. For example, most of the campgrounds handed out brochures and had conversations with visitors on BBAM. The intent was to educate visitors on how they can reduce HBC.

In addition to handing out brochures and having conversations, campground owner/operators educated their visitors by utilizing on-site signage. On-site signage is an important component of BBAM. The literature notes that signs may even be more effective than enforcement in areas with large numbers of visitor facilities because it is difficult to have enough people to staff all areas (Ham & Weiler, 2002; Orams, 1996). Other research suggests that signs contribute to conservation practices (Tsang, Yeung, & Cheung, 2011). Similar to this research, my findings highlight the use of signs as a form of education in campgrounds. Every campground in this study used signs to varying degrees for education; some signs merely stated that a bear had been seen in the area, while other signs spelled out how to manage bear attractants, and still others educated visitors about penalties for breaking BBAM rules.

Interpretive programs are also effective BBAM education strategies noted in the literature to influence visitor behaviour (Gore, 2004; Wearing & Neil, 2009). Newsome, et al. (2005) confirm

that visitor expectations and behaviour can be modified using education and interpretation programs. Interpretation aims to stimulate emotions (Newsome, et al, 2005) and it is defined as an educational approach that invokes meaning (Orams, 1996). Most campgrounds in this study did not utilize extensive education or interpretive programs, whereas, surprisingly, the two that used interpretive programs had varying degrees of difference in terms of the number of BBAM strategies utilized (see Table 4.2).

Education can improve visitor knowledge associated with HBC and reduces environmental impacts (Ajzen & Fishbein 1980; Gore, 2004). Moreover, researchers have found education is more effective than the use of deterrents (Beckmann, Lackey & Berger, 2004). This would mean that education can be useful for BBAM. In this study, it was noted that all campground operators were eager to share information and many did so at check-in both verbally and with brochures or other handouts; on patrols; and through their websites, although one campground only shared information upon visitor request. Given the importance of education as a BBAM strategy, more can be done in nearly all cases.

Despite the strengths and utility of education, some research indicates that there is little evidence of the efficacy of all types of education on BBAM (Baruch-Mordo, et al., 2011; Spencer, et al., 2007; Dunn, Elwell & Tunberg, 2008; Campbell, 2012; Gore, Knuth, Curtis & Shanahan, 2006a). This apparent contradiction and need for research is echoed in the concerns of the campground owner/operators who discussed not knowing if signs are effective in terms of messaging, quantity of signs in the campgrounds, and whether messaging changes behaviour. Even though research indicates that enhancing visitors' knowledge through education reduces a park's budget for rule enforcement associated with BBAM (Papageorgiou, 2001; Roggenbuck & Ham, 1987; Alder, 1996), the owner/operators in this study noted costs as a challenge to

delivering education strategies. This has also been reported in other HWC studies (Baruch-Mordo et al., 2011). Extra staff, new staff, and changes in visitors mean re-educating or changing education, which is costly.

The literature is divided about the effectiveness of education for BBAM. The operators in this research all utilized education in some manner. Signage was the most noted educational strategy, whether it was increasing the number of onsite signs or changing the messaging on the signs. Multiple modes of delivery such as using brochures or verbal delivery were also suggested along with ensuring saturation of the message, which echoes other researchers support for aggressive education campaigns (Eagles & McCool, 2003). The research also supports using education over enforcement (Hendee & Dawson, 2002; Marion, Dvorak & Manning, 2008; McCool & Christensen, 1996; Peterson & Lime, 1979), which was also supported as a solution by operators in this research.

Although not noted in the literature, my research found that having a procedures manual for BBAM was a way to ensure consistency among campgrounds, and for consistency when there are changes in staff and visitors. Another possible solution offered by the operators was the dissemination of information from the top down (Eagles & McCool, 2003). In other words, if government or tourism agencies were to embrace the need for BBAM strategies, and require it in campgrounds on Vancouver Island, there might be policies put in place to ensure the establishment of educational programs. While this one owner/operator of a private campground was embracing BBAM strategies and seeking to improve upon them in their campground, they felt support from governing agencies would shore up what was being done. In other words, they felt that regional programs championing the importance of BBAM strategies would bolster their efforts in the campground.

## Infrastructure

A common and very effective practice in BBAM is proper bear proof infrastructure (Matthews, et al., 2003). Specifically, researchers have reported the need for securing food and garbage properly in bear proof food caches, garbage and recycle receptacles (Graber & White, N.D; Madison, 2008; Matthews, et al., 2003; Beckmann, Lackey, & Berger, 2004; Herrero 1985, 2002). However, most of the campgrounds involved in this study did not use bear-proof infrastructure: and only two campgrounds had bear-proof food caches.

Although bear proof infrastructure is a common practice in BBAM, the high cost of bear proof infrastructure has been reported as a challenge (Spencer, et al., 2007). Similar to this research, owner/operators discussed the challenges of purchasing bear proof infrastructure, specifically having the budget approved for these expenses. In some cases, the size of the infrastructure can be a challenge because the bins are not large enough to hold all the materials visitors are disposing of (Matthews, et al, 2003). This was also evident in this study, where campground owner/operators noted garbage left hanging out of bear-proof receptacles. This is problematic as these materials around garbage and recycling containers can attract bears (Matthews, et al, 2003), and ironically attract bears to the places where visitors are recreating nd trying to securely dispose of attractants.

## Visitor Apathy

The literature did not specifically note visitor apathy as a challenge to mitigating HBC, however it was noted that apathy can kill a park or wild area (Potts, 2007). Interestingly, every owner/operator noted challenges with visitors, whether it was their reaction to rules, their reaction to enforcement, or their arrogance. While each operator noted that most people are expecting rules and are willing to cooperate with policies, there were many reports of uncooperative and sometimes belligerent visitors who are impatient, uninformed, or with a “know-it-all attitude”.

## Conclusion

HBC is escalating in British Columbia with the trend expected to continue (Spencer, et al, 2007); and reducing bear attractants is a critical strategy (Herrero, 1985; Hopkins III, et al., 2010; Spencer, et al., 2007). In order to reduce conflict, and risk to animals and humans, it appears important to adopt BBAM strategies in campgrounds on Vancouver Island where bears exist, . The literature notes the high costs associated with damage from bears as well as the cost of managing bears in British Columbia, and combined, the economic toll is high. Mitigating HBC in campgrounds will affect HBC across the island, reducing their impacts and associated costs. The problem of HBC needs to be taken seriously and it may be that the operators need to understand the implications of ignoring it or underestimating the negative impacts.

Bears play an important role in ecotourism and wildlife tourism in British Columbia and wherever bears exist, which are rapidly growing sectors of tourism. In order to sustain tourism opportunities, it is important to ensure a healthy population of bears. This can be achieved utilizing BBAM strategies to reduce HBC. Currently, the strategies are not consistent across all campgrounds and this can have dangerous consequences for neighbouring areas. Most of the campgrounds in the study had highly attractive campsites. My key informant advised that some bears have become food-conditioned in an area without BBAM strategies and then moved on to other campgrounds as habituated, food-conditioned bears putting themselves and visitors at risk. This speaks to a need for consistency in BBAM strategies throughout the campgrounds on Vancouver Island and indeed across other jurisdictions (municipalities and regional districts as many of these campgrounds are located in semi-urban environments). If BBAM strategies were

the same across all ecotourism offers, perhaps visitors would become accustomed to them and comply as needed. Following the strategies becomes a habit and the need for enforcement may be reduced.

As a result of this study, I would suggest some changes with respect to BBAM in Vancouver Island Campgrounds. These include educating the educators; taking a regional approach to BBAM; and broader education programs for the public and owner/operators. In fact, several of the owner/operators had misconceptions about other campgrounds and how they enforce BBAM rules. Thus, educating the owner/operators who educate the visitors may be a place to begin. They should be educated on all of the BBAM strategies and their limitations as well as the impacts of HBC and how they may be contributing to it. This would create consistency across the campgrounds. The literature supports providing operators with a scientific basis for imposing rules as it will validate their concerns and allow them to communicate more convincingly with visitors (Arocena, Nepal, & Rutherford, 2006). Having all of the campground owner/operators in a region treat HBC and BBAM strategies similarly lends itself naturally to a regional approach to BBAM. This could be via an association of campground owners and operators where representatives of each campground come together learn from one another and push for change together.

Many British Columbia municipalities, and specifically Vancouver Island municipalities, are becoming certified by the British Columbia Ministry of Environment as Bear Smart Communities (a specific BBAM program). This multi-pronged program is aimed at tackling the root causes of HBC. Perhaps encouraging campgrounds to become Bear Smart certified is another way to reduce HBC.

This research has raised further questions such as how to secure the commitment of

campground and other ecotourism owner/operators in a region to operate in a manner that respects the environment and wildlife. A regional approach to BBAM that goes beyond the BC Wildlife Act could create consistency in all of the campgrounds in an area. Messages coming from the top down and policies supporting BBAM strategies would encourage campgrounds to make changes. For example, having bear-proof food caches in place is very important and a regional approach could include mandating the use of bear-proof food caches in campgrounds, with the expectancy that the campground owner/operators would in turn regulate usage of them by visitors. Funding for expensive infrastructure may also be a result of this approach. Furthermore, a regional approach could address all stakeholders involved with wildlife tourism, ecotourism and mitigating HBC. All stakeholders need to be invested in the solution and to do this they need to understand the problem and how they might be contributing to it.

The owner/operators frequently mentioned the need for improved or supplementary visitor education as a solution to BBAM challenges. Creating strong and consistent messages based on the demographic of the campground is another recommendation. Perhaps a regional education board could be created which would include the development of an interpretive program that moves from campground to campground during the summer. Further to this, rules regarding campgrounds enforcing BBAM rules may need to be implemented and followed through by "secret" campers or spot checks. A secret camper is similar to a secret shopper, where a person enters an establishment as a consumer and reports their observations to the store's owner or manager. In this case, a "camper" would observe and report on whether BBAM rules were being followed.

Despite the in-depth knowledge that was gain through this study, there are limitations to this study that need to be discussed. First, the research was limited to 10 campgrounds, which

limits other campground owner/operator perspectives on Vancouver Island that also deal with HBC. The lack of participation of all operators in the interviews is another limitation. Second, the bear attractant assessment, bear proof infrastructure audit, and sign audit were all observed at one moment in time, the results were merely a snapshot and the results may have been different later in the season, or different later in the day in the case of bear attractants. In addition, campground 7 and 10 were not visited three times, therefore, their score calculations are not averaged over three visits like the rest of the campgrounds. Next, the exact number of signs was not recorded; therefore, the signage audit description is limited in this study. Lastly, it should be noted that the bear attractant scores are not a management strategy per say, however, the attractant scores provide important context to this research study. The scores could, however, indicate the effectiveness of utilizing BBAM strategies. They represent implementation monitoring. Bare Campsite scores are only a method of assessing campgrounds using a common measurement. This measure was chosen because it has a proven track record in reducing black bear attractants. Therefore, it is important to note that this study was not designed to investigate causality between bear attractant scores and education, bear proof infrastructure, and enforcement, but was limited to exploring campgrounds BBAM.

**Future Research.** Based on my findings I feel there is opportunity to learn more in the context of BBAM and campgrounds. In particular, looking at education in campgrounds and what messages work would be useful as all of the owner/operators noted this as a challenge and a great deal of research stresses the influence of education. Second, it would be valuable to interview campers and get their perspectives on BBAM strategies and their feeling of connection to HBC. Further, it would also be informative and important to ascertain what drives a visitor to follow rules and in a broader context, causes and cures for visitor apathy. The perspectives

framed in this study do not involve visitors to campgrounds, or their perspectives of BBAM. Broadening the research in the future could incorporate visitor experiences with BBAM. Lastly, exploring the causality between bear attractant scores and education, bear proof infrastructure and enforcement is recommended.

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# Appendix I: Audits

## Signage Audit Checklist

The purpose of this checklist is to be able to assess campground signage with respect to managing human-bear conflict. The assessment tool will focus on four types of signs that influence visitor experience.

**Educational signage** – is used for teaching visitors on managing bear attractants (i.e. what an attractant is, how to store attractants, and the potential negative consequences to feeding bears). These signs also inform visitors of bear sightings .

**Enforcement signage -** advises visitors about the penalties for rule infraction.

**Other signage** – any other signs that may influence visitor experience.

**Tips on use**

- *Note each sign*
- *Consider recording sign locations*

| **CP 1 Sign Identification:** | **Yes** | **No** |
|---|---|---|
| Educational | | |
| Enforcement | | |
| Other | | |

| **CP 2 Sign Identification:** | **Yes** | **No** |
|---|---|---|
| Educational | | |
| Enforcement | | |
| Other | | |

| **CP 3 Sign Identification:** | **Yes** | **No** |
|---|---|---|
| Educational | | |
| Enforcement | | |
| Other | | |

| **CP 4 Sign Identification:** | **Yes** | **No** |
|---|---|---|
| Educational | | |
| Enforcement | | |
| Other | | |

| CP 5 Sign Identification: | Yes | No |
|---|---|---|
| Educational | | |
| Enforcement | | |
| Other | | |

| CP 6 Sign Identification: | Yes | No |
|---|---|---|
| Educational | | |
| Enforcement | | |
| Other | | |

| CP 7 Sign Identification: | Yes | No |
|---|---|---|
| Educational | | |
| Enforcement | | |
| Other | | |

| CP 8 Sign Identification: | Yes | No |
|---|---|---|
| Educational | | |
| Enforcement | | |
| Other | | |

| CP 9 Sign Identification: | Yes | No |
|---|---|---|
| Educational | | |
| Enforcement | | |
| Other | | |

| CP 10 Sign Identification: | Yes | No |
|---|---|---|
| Educational | | |
| Enforcement | | |
| Other | | |

**Comments:** (location of sign inadequate, difficult to read, identify "other" signs)

# Infrastructure Audit Checklist

The purpose of this tool is to be able to assess campground infrastructure with respect to managing human-bear conflict. The assessment tool will focus on three types of infrastructure that can reduce human-bear conflict.

**Bear proof garbage receptacles** – refuse dumpster with latching lid.

**Bear proof recycle receptacles** – repository for recyclable items such as refundable cans and bottles; and paper.

**Bear proof food caches** – buildings or receptacles created specifically for storing food and other bear attractants.

**Tips on use**

- *Note each receptacle*
- *Consider recording receptacle and cache locations*
- *Confirm that each locking device is functioning*

| **CP 1 Infrastructure:** | **Yes** | **No** | **Functioning?** | **Convenient Location?** |
|---|---|---|---|---|
| Bear proof garbage | | | | |
| Bear proof recycle | | | | |
| Bear proof food cache | | | | |

| **CP 2 Infrastructure:** | **Yes** | **No** | **Functioning?** | **Convenient Location?** |
|---|---|---|---|---|
| Bear proof garbage | | | | |
| Bear proof recycle | | | | |
| Bear proof food cache | | | | |

| **CP 3 Infrastructure:** | **Yes** | **No** | **Functioning?** | **Convenient Location?** |
|---|---|---|---|---|
| Bear proof garbage | | | | |
| Bear proof recycle | | | | |
| Bear proof food cache | | | | |

| **CP 4 Infrastructure:** | **Yes** | **No** | **Functioning?** | **Convenient Location?** |
|---|---|---|---|---|
| Bear proof garbage | | | | |
| Bear proof recycle | | | | |
| Bear proof food cache | | | | |

| **CP 5 1 Infrastructure:** | **Yes** | **No** | **Functioning?** | **Convenient Location?** |
|---|---|---|---|---|
| Bear proof garbage | | | | |
| Bear proof recycle | | | | |
| Bear proof food cache | | | | |

| **CP 6 Infrastructure:** | **Yes** | **No** | **Functioning?** | **Convenient Location?** |
|---|---|---|---|---|
| Bear proof garbage | | | | |
| Bear proof recycle | | | | |
| Bear proof food cache | | | | |

| **CP 7 Infrastructure:** | **Yes** | **No** | **Functioning?** | **Convenient Location?** |
|---|---|---|---|---|
| Bear proof garbage | | | | |
| Bear proof recycle | | | | |
| Bear proof food cache | | | | |

| **CP 8 Infrastructure:** | **Yes** | **No** | **Functioning?** | **Convenient Location?** |
|---|---|---|---|---|
| Bear proof garbage | | | | |
| Bear proof recycle | | | | |
| Bear proof food cache | | | | |

| **CP 9 Infrastructure:** | **Yes** | **No** | **Functioning?** | **Convenient Location?** |
|---|---|---|---|---|
| Bear proof garbage | | | | |
| Bear proof recycle | | | | |
| Bear proof food cache | | | | |

| **CP 10 Infrastructure:** | **Yes** | **No** | **Functioning?** | **Convenient Location?** |
|---|---|---|---|---|
| Bear proof garbage | | | | |
| Bear proof recycle | | | | |
| Bear proof food cache | | | | |

**Comments:** (location of infrastructure, note multiples)

# Website Audit Checklist

The purpose of this tool is to be able to analyze information on the campgrounds' websites with respect to mitigating human-bear conflict. The assessment tool will focus on three areas of information that may influence visitor behaviour with respect to bear attractant management.

**Bear information** - Is there any content related to bears? Is the campground noted to be in bear habitat? Is there mention made of bears on the website? Does the website note that there is a bear in the area?

**Rules and regulations** – Does the website have a section outlining their campground rules, specifically rules around proper storage of food and garbage; and handling of other bear attractants?

| **CP 1 Website analysis:** | **Yes** | **No** |
|---|---|---|
| Bear information | | |
| Rules and regulations | | |

| **CP 2 Website analysis:** | **Yes** | **No** |
|---|---|---|
| Bear information | | |
| Rules and regulations | | |

| **CP 3 Website analysis:** | **Yes** | **No** |
|---|---|---|
| Bear information | | |
| Rules and regulations | | |

| **CP 4 Website analysis:** | **Yes** | **No** |
|---|---|---|
| Bear information | | |
| Rules and regulations | | |

| **CP 5 Website analysis:** | **Yes** | **No** |
|---|---|---|
| Bear information | | |
| Rules and regulations | | |

| **CP 6 Website analysis:** | **Yes** | **No** |
|---|---|---|
| Bear information | | |
| Rules and regulations | | |

| **CP 7 Website analysis:** | **Yes** | **No** |
|---|---|---|
| B7ar information | | |
| Rules and regulations | | |

| CP 8 Website analysis: | Yes | No |
|---|---|---|
| Bear information | | |
| Rules and regulations | | |

| CP 9 Website analysis: | Yes | No |
|---|---|---|
| Bear information | | |
| Rules and regulations | | |

| CP 10 Website analysis: | Yes | No |
|---|---|---|
| Bear information | | |
| Rules and regulations | | |

**Comments:**

# Appendix II: Questions for Campground Operators

What encounters do people have with wildlife at your campground?
Are human-bear conflicts experienced in your campground? How often?
How/why do they happen?
Are records kept about such interactions?
How are these conflicts responded to? Eg. Consequences for campers
How do you manage human-wildlife interactions?
Do you believe that is effective?
Do you think more should be done or could be done?
Do you know about "bear aware"? Do you agree with it? What do you do in support of it?
What information is provided to tourists with respect to HWI? Wildlife?
How is it provided?
Is it easy to locate? (i.e. brochures, website, signs)
Are you focused on providing information?
Do you request feedback?
What do you consider as bear attractants?
What do you think is the most useful information to provide to campers?
In what form should the information be in order to reduce HWC?
Are there other ways that you attempt to structure human wildlife interactions?
What stops you from providing information?
Do you think that is a barrier for many of the ecotourism (offers)?
What do you wish could be done in terms of informing tourists in order to shape their behaviour around wildlife?
Do you think more needs to be done in your campground with respect to mitigating human-bear conflicts?
Are you concerned about welfare of bears? Does conserving biodiversity maintain or increase your business/income?
Does more need to be done in campgrounds in general to support bear aware?
What else should be done?
What stands in the way of doing more?
Are you aware of fruit bushes in your campground? Wildlife corridors?
Is there anything else you would like to add?