Responding to Human-Black Bear Conflicts:

A Guide to Non-lethal Bear Management Techniques

Prepared by Get Bear Smart Society
for Bear Managers and Police Officers

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And, lastly to the Whistler's bears that inspire me every day to learn more about them, enjoy their presence and honour their contribution to making Whistler such a special place to live, work and play in.

In memory of S/Sgt. Hilton Haider

This guide is dedicated to the memory of S/Sgt. Hilton Haider of the Royal Canadian Mounted Police in sincere appreciation for his contribution towards the implementation of non-lethal alternatives in managing human-bear conflicts in Whistler. His passion for bears assisted him in making an enormous difference and a significant contribution. He will be fondly remembered for his generous spirit and open minded nature. The community of Whistler will always be indebted to S/Sgt. Haider for his passion and love of these majestic animals. Hilton was truly a great man and the Get Bear Smart Society is proud that his legacy will live on with this guide.

1950 - 2007

Proviso

The information in this booklet is based on the advice and knowledge of specialists with thousands of hours of behavioural observation of bears and extensive experience managing bear and human interactions and conflicts. However, no one may be sure what any particular bear will do in any particular situation. For this reason, readers of this manual interact with bears at their own risk. The Get Bear Smart Society and its contributing writers accept no liability for use or application of the information contained therein.

A word of caution: Grizzlies are inherently more risky to work with than black bears, therefore we recommend extreme safety precautions (as noted in red throughout the manual). The two bear species have evolved different strategies for survival. Black bears have evolved to live in forests and thus are more likely to retreat to safe cover when threatened. On the other hand, grizzlies have adapted to life in treeless, open environments; with no place to retreat to, they are more likely to defend themselves when threatened.

In addition, the information in this manual is intended only for developed areas, where bears are entering human territory. The wilderness constitutes the bear's backyard or territory and therefore, bear encounters in the wilderness require a completely different approach (see Appendix 15.3 or visit ww.bearsmart.com).

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Overview

Goal

This guide will provide you with a better understanding of bear behaviour and an understanding of various techniques for responding to human-bear conflicts, including an introductory level working knowledge of bear aversion methodology. The knowledge gained through this guide will enable you to better understand and diffuse human-bear conflict situations in a manner that increases safety for the public, the bear manager/police officer and bears.

Manual Sections

Section 1: Provides a Glossary of Terms used throughout the guide.

Section 2: Introduces bear management techniques past and present; discusses the need for a new approach.

Section 3: Provides an overview of black bear and grizzly bear ecology.

Section 4: Examines why human-bear conflicts occur as well as why bears enter human-use areas and how they become habituated and food-conditioned.

Section 5: Briefly discusses traditional bear management techniques including humane destruction.

Section 6: This section will empower you with the basics of interpreting black bear communication and understanding it, so that, when possible, your understanding can be applied to manipulate bear behaviour in the field.

Section 7: Discusses the concept behind aversion techniques

Section 8: Presents aversion techniques including human dominance, noise deterrents, physical deterrents and passive bear aversion.

Section 9: Reviews the protocol to be used in applying non-lethal tools in the field. Discusses assessing the site and safety risks, the suitability of the bear as well as methodology for applying techniques effectively. Provides a Bear Management Action Chart as a guide for determining the response required in different situations and under different circumstances.

Section 10: Presents case studies and how to handle typical situations that arise.

Section 11: Indicators of a successful program are reviewed.

Section 12: Examines conditions that attract bears to human-use areas and how to minimize them.

Section 13: Reviews the use of municipal and provincial legislation to decrease human-bear conflicts.

Section 14: Closing Remarks

Appendices: Additional information is provided on Guidelines for bear calls; sample Occurrence Report; backcountry bear encounters; and references.

1 Glossary

Anthropogenic Foods: Foods generally derived directly or indirectly from humans – usually non-natural (e.g. garbage), but can also be natural e.g. orchard fruit, artificially planted landscaping like berry bushes or trees that bear nuts.

Attractants: Refers to any material that appeals to bears and draws them to an area. This includes garbage, birdseed, and human/pet food, smells, and non-food items, such as petroleum products or citronella. Attractants may also include natural foods, like berry bushes, or clover.

Aggressive Behaviour: Actual or symbolic attack (threats), often ritualized, to settle conflict between two individuals (Herrero 1983) – bear to bear or bear to human. See Section 6.2.2 for further explanation.

Aversive Conditioning: A structured program applying deterrents consistently and sustainably over an identified period of time to achieve modification of an animal's behaviour by pairing the undesired behaviour with pain or an unpleasant stimuli (Morrison 2005).

Bear Aversion (Non-lethal Bear Management): A term used to describe various bear behaviour modification methods including active approaches like aversive conditioning, human dominance techniques, bear shepherding, and hazing, as well as passive methods such as electric fencing.

Bear Shepherding: A behavior modification method developed by Carrie Hunt based on punishment using noise deterrents, physical projectiles and dogs .With Bear Shepherding, bears learn that their actions determine what happens to them. Bears get a clear message that if they choose to come into the presence of humans, things will go badly (negative event); and, if they choose to leave, things will get instantly better (punishment ends). These "lessons" teach bears to respond to humans and their personal space as they would to a dominant bear in the wild. It attempts to mimic natural bear behaviour more effectively than traditional aversive conditioning can.

Bluff or False Charge: A type of defensive or dominance behaviour exhibited by bears which can be characterized by a bear running or moving towards a person but veering off or stopping before making physical contact; this is almost always accompanied by other ritualized displays, like huffing, jaw popping or slapping the ground.

Capture Myopathy: A disease complex associated with capture or handling of any wild species of mammals or birds. The key feature is hyperthermia - in other words an increase in body temperature. It will occur when an animal is unable to cool itself and may result from a variety of factors including hot weather and direct sunlight, overexertion, drugs, a heavy coat, and reduced blood flow. The result is often death which may occur immediately or hours, days or weeks later.

Conditioned Taste Aversion (CTA): CTA occurs when an animal eats a bait with a nausea-causing substance concealed in it, so that in subsequent encounters the animal avoids the bait (Baker *et al.* 2005).

Defensive or Dominance Behaviour (in bears): Body language and vocalizations used by bears to establish dominance hierarchies; <u>designed to avoid a physical confrontation</u>. Bears may also use this behaviour when interacting with people. The behaviour includes direct eye contact, jaw

popping, huffing, swatting, lunging and bluff or false charges. This behaviour is considered ritualized posturing rather than aggressive.

Destroy: Refers to the killing of a bear involved in a human-bear conflict, normally either by a conservation or police officer.

Deterrent: A negative stimulus intended to discourage or prevent unwanted behaviour.

Dominance Hierarchy: A social ranking within a group in which some individuals give way to others, often conceding access to desirable resources (food, mates) without a fight.

Emetic Compound: A compound that causes vomiting.

Food Conditioned: Bears that have formed an association between people or human-use areas and food. Food-conditioning has been frequently misquoted as "food-habituation", a term that does not exist (it is not possible to become "habituated" to food: an animal can only "habituate" to a stimulus or event).

Grizzly: Brown bear (*Ursus arctos*).

Habituation (Tolerance): Habituation is the waning of response to a situation that brings neither positive nor negative outcomes for an animal. When bears are repeatedly exposed to a neutral situation, such as a person observing them from a certain distance, they conserve energy by muting their reaction. Tolerance, as opposed to habituation, is the baseline degree to which animals are willing to co-exist with humans or their infrastructure before responses have waned or increased due to learning – in other words, the level of acceptance for people an "individual" bear is born with (Herrero et al 2005, Smith et al. 2005).

Hazing: An immediate management response to a conflict situation, by using negative reinforcement, to move an animal out of an area or discourage an undesirable activity. Further application is not implied (Morrison 2005, Hunt 2003).

Human-Use Area: An area of human development, either urban or rural, but could also include a campground or an established remote work camp.

Hyperphagia: In the fall, the bear's biological clock shifts into an exaggerated eating mode, and their caloric intake is much higher than the early summer months. The amount of time spent feeding each day increases to about 20 hrs/day, and they consume as many as 15,000 to 20,000 calories daily, in order to gain sufficient weight to survive the denning months without eating.

Operant Conditioning: A term used by B.F. Skinner to describe the effects of the consequences of a particular behaviour on the future occurrence of that behaviour i.e. a behaviour will increase if it is followed by positive reinforcement; and will decrease if it is followed by negative reinforcement or punishment.

Passive Bear Aversion: Delivery of a deterrent caused by the action of the animal itself e.g. triggering a motion sensor that in turn activates a siren; or making contact with an electric fence (Hunt 2003). It can be accomplished instantaneously in the absence of people.

Relocation: Moving a bear a short distance i.e. within its estimated home range. Also see definition for translocation.

Removal: Destruction or translocation of a bear.

Submissive behaviour: To act or react in a manner that shows willingness to yield or give way and accept the dominance of another in a particular situation.

Translocation: Moving a bear a long distance i.e. outside its estimated home range. Also see definition for relocation.

2 Introduction

As human development has increased, so has the number of human-bear conflicts. Often, the areas where people settle, such as in lush valley bottoms or along salmon spawning streams, are prime bear habitat – a healthy environment for people is a healthy environment for bears. The potential for human-bear conflicts is greatly amplified in these areas where human and bear habitat overlap, particularly when people make anthropogenic foods readily available to bears.

In the past, human-bear conflicts were generally viewed as being caused by "problem" bears. But the truth is that most bears that come into conflict with humans are simply looking for food not trouble. The role that individuals and communities played in creating human-bear conflicts has been recognized for some time, but rarely were residents held accountable for removing the source of the problem. As a result, wildlife agencies receive thousands of complaints annually and hundreds of bears are destroyed each year.

Traditionally, human-bear conflicts have been managed reactively by relocating or destroying bears, or by initiating hunting seasons to try to reduce the numbers of bears in the surrounding area. Conventional methods like relocation and destruction may work to reduce human-bear conflicts over the short term by temporarily removing bears, but they do not resolve the problem over the long term. A sport harvest is also an ineffective method of reducing conflict.[1]

Today, communities across North America are being encouraged to participate in Bear Smart/Wise/Aware Community Programs. These are generally proactive conservation strategies that encourage efforts by communities, businesses and individuals to reduce human-bear conflicts; reduce safety risks and the number of bears that are killed by addressing the root causes of conflict and availability of bear attractants. To achieve these goals, communities must address a number of proactive measures like bear-proofing waste systems and eliminating attractants, as well as initiating effective and consistent educational programs; and stepping up enforcement. Yet, no matter how bear smart a community is, human-bear conflicts may still occur on occasion (especially in poor natural food years). The resulting conflicts can be dealt with using non-lethal bear management techniques.

Bear Aversion or Non-lethal Bear Management is recognized as a useful component of an overall wildlife conflict prevention strategy, when used in combination with bear smart techniques to reduce anthropogenic food attractants. It allows officers to address a situation that requires immediate action, by simply hazing the bear to avoid the use of lethal force.

To ensure that bear aversion techniques are delivered in an effective, safe and consistent manner throughout a region, and among various agencies, the following guidelines have been developed.

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[1] The Ontario Nuisance Bear Review Committee found no connection between the cancellation of the spring bear hunt and increases in nuisance activity (Poulin et al, 2003). Furthermore, Manitoba also reported increases in nuisance activity (over the same time frame), despite the fact that they continued to offer a spring and fall hunt for bears. There are a couple of possible explanations for this. First of all, sport hunting does not target urban conflict bears. A sport harvest (especially in the spring) targets wild adult males, creating vacancies in the habitat that attracts sub-adult males. Subadult males are more inclined to enter human-use areas and become involved in conflict activity because their energetic demands are higher than adult bears, and they are not as familiar with the location of high quality natural foods.

3 Bear Ecology

Understanding basic bear biology and behaviour is essential to the effective mitigation of human-bear conflict because it provides insight into the reasons why bears develop unwanted behaviour.

3.1 Bear Species

There are three species of bears found in North America; the black bear (*Ursus americanus*), the brown bear or grizzly (*Ursus arctos*) and the polar bear (*Ursus maritimus*). Although many of the techniques described in this guide are effective with all bears, the advice is geared toward working with **black bears**. This guide does not provide any information on polar bears. While there is some information provided on grizzly bears, we remind you to take additional safety precautions (as noted in red throughout this guide).

3.2 Distinguishing Black and Grizzly Bears

Although the two species are similar in appearance, there are a number of physical traits that can be used to reliably distinguish black and grizzly bears in the field. Bear managers and police officers working in eastern & southern North America, can skip sub-section 3.2 as grizzly bears do not inhabit areas east of Alberta or south of Wyoming.

Many people rely on colour and size – neither of which is a dependable feature. Colour is not a reliable characteristic in distinguishing black and grizzly bears due to the great range of colours present in both species. Size is also not a dependable feature: while, on average, the grizzly is the larger of the two species, individual bears vary greatly in size. For example, a young grizzly will be smaller than an adult black bear. Factors affecting size include age, sex, food availability, time of year and the location of populations.

The following are reliable features to identify the species of bear:

3.2.1 Shoulder Hump/Highest Point

Grizzlies have a large hump over their shoulders: a large muscle mass that powers the front legs and enables the grizzly to be such a strong digger. The black bear does not have this pronounced shoulder hump. While the grizzly's highest point when standing on all fours on flat ground is its shoulder hump, the black bear's highest point is its rear. However, it should be noted that the black bear may appear to have a shoulder hump in certain situations such as when it is standing on a slope facing downhill or with its front legs on a rock or log. In this case, make careful note of other identifying features such as the facial profile and ears as well as claws (when possible).

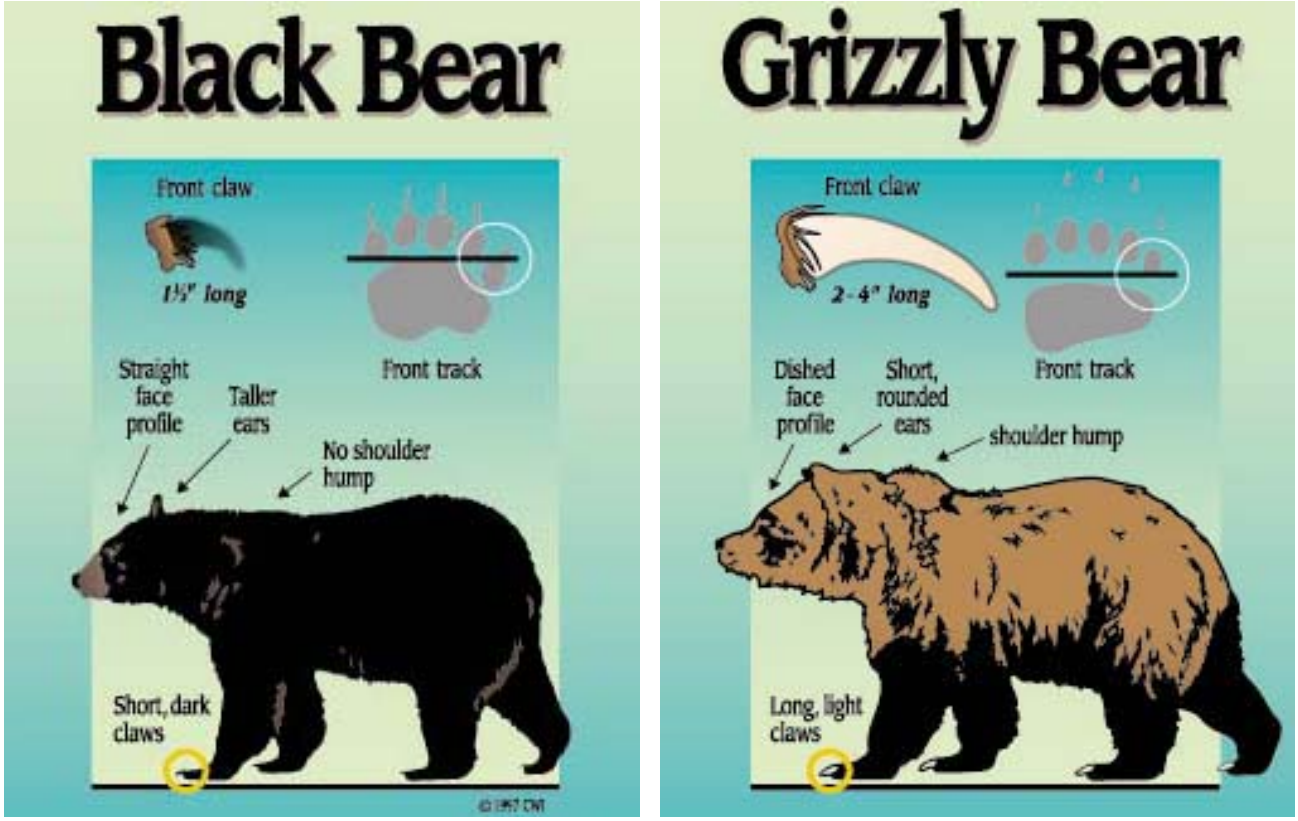
3.2.2 Facial Profile and Ears

The grizzly has a concave or dished facial profile that extends from between its eyes to the tip of its nose. This dished-face profile of the grizzly makes its face appear broader and rounder when seen from the front. In comparison, black bears have a flatter, fairly straight, "Roman-nosed" profile from their forehead to their noses.

Grizzlies also have much smaller ears than black bears, that are spaced further apart. Keep in mind that all young bears have large ears in proportion to their head/body size.

3.2.3 Front Claws

The front claws of grizzlies can be up to 10 cm (4 in.) in length and are usually light in colour. Black bears have dark, curved claws about 3-4 cm (1-1.5 in) in length.



Courtesy of Center for Wildlife Information – Graphic Arts Fund

3.2.4 Reliable Distinguishing Features of the Grizzly and Black Bear

Grizzly Bear	Black Bear
Hump over front shoulder	No hump (although when standing in certain positions they can appear to have a hump)
Highest point on body = shoulder hump	Highest point on body = rear while standing on flat ground
Concave or dished facial profile, smaller ears spaced further apart	Straight (Roman-nosed) facial profile, larger ears
Front Claws = 8-10 cm (3-4 in.) Usually light-coloured Slightly curved	Front Claws = Shorter than 3-4 cm (1-1.5 in.) Dark-coloured Sharply curved

3.3 Range and Distribution

Black bears are widely distributed throughout the forested areas of North America; they are presently found in all the provinces and territories of Canada, except Prince Edward Island. They also inhabit forty states in the United States as well as northern Mexico.

The grizzly bear has a circumpolar distribution and the widest range of all species of bears. In North America, grizzly bears are found in western Canada, Alaska, and in the states of Wyoming, Montana, Idaho and Washington.

In North America today, the black bear is by far the more numerous of the two species. Blacks have been more successful at making a living close to people and adapting in the face of human development. In North America, the black bear population is estimated to be approximately 900,000 (Herrero pers. comm.).

The grizzly has not fared well in close proximity to humans. The numbers of grizzlies have been dramatically reduced since the arrival of the Europeans, and their range has shrunk to less than half of what it once was in North America. The grizzly population in North America is estimated to be 60,000 (Servheen 1989).

The size of a bear's home range varies greatly depending upon the species, quality of the habitat, food availability, the density of individuals, and the sex and age of the bear. Usually, the poorer the habitat is, the larger the home range has to be in order to sustain a bear. The home range of the male bear is normally larger than that of the female overlapping the home range of 4 - 6 females.

Bears are territorial in that dominant animals actively exclude certain other individual bears from the area in which they live (Rogers 1987, Czetwertynsk et al 2007). Bears also have amicable relationships. While they may spend much of their time alone, bears can be quite social, enjoying alliances with other bears and tolerating each-other's close proximity at concentrated food sources.

3.4 Habitat

Black bear and grizzly bear habitat may overlap, but there are differences in their preferred environment. Grizzlies tend to favour open areas, including subalpine and alpine regions, open slopes and forest edges. In contrast, black bears inhabit forested areas with a dense shrub understory, which provides both food and cover. These differences in habitat selection have resulted in the evolution of distinct behavioural characteristics. Because grizzlies evolved in treeless environments where there was little escape cover, they may react more aggressively in some confrontational situations. While the black bear is more tolerant and will usually retreat from conflict or "tree" if given the chance.

Typical black bear habitat

Notwithstanding some differences in habitat preferences, all bears are constantly on the move in search of their next meal and thus may travel through a variety of habitats, including human-use areas.

3.5 Diet

The life of a bear revolves around the search for food. Because most bears hibernate and do not eat for a number of months over the winter, they must accumulate sufficient energy reserves, beyond maintenance, during the fall foraging season. Although classified as carnivores, bears are actually opportunistic omnivores which means that they will eat both meat and plants. Bears maximize their food acquisition by being generalist feeders and by traveling widely to access an extensive variety of food resources at their seasonal peak of nutrition. They have the physiological ability to digest a broad range of foods, which makes them able to adapt to a variety of environmental conditions. Plant matter makes up between 75-90% of their diet, but they select higher calorie foods such as insects, carrion, fish, birds and mammals when they can find them. Nutrition affects many aspects a bear's life including size, age of first reproduction, and litter size.

It is their desire to locate the most calorie-rich foods that tends to bring bears into conflict with people. Because human foods, pet foods and garbage are often much higher in calories and more concentrated than the natural foods found in the wilderness, bears may be tempted to overcome their innate uneasiness around people and enter human developments to access such foods.

3.6 Senses

Bears depend on their acute sense of smell to gain information about the world around them. Their smelling ability is exceptionally good, with one hundred times more nasal membranes, or scent receptors, than a human.

It is important to understand that bears respond to the world differently than humans. While bears see in colour and have good vision, similar to humans, they are not nearly as visually oriented as people. For example, bears will respond immediately to an odour, while a visual clue often requires a second piece of evidence, such as movement, sound or smell to elicit a change in behaviour.

Bears also have excellent hearing similar to dogs, far exceeding the frequency range of humans.

3.7 Denning

Underground root den

Bears have evolved denning as a response to a lack of food. Factors that may affect the timing of denning include the bear's age, fat reserves and reproductive status, the number of hours of daylight, temperature, snow cover, and altitude and latitude. In northern areas, bears hibernate for a longer time (5-7 months) than in southern or coastal areas (2-5 months). However, some bears that have access to human food sources throughout the winter may not den at all. The number and frequency of winter-active bears seems to be increasing in many parts of North America. And of course, bears living in the most southern of states do not hibernate at all.

Depending on the species and region, bears utilize a number of different habitat and denning structures varying from the hollow interiors of large, old-growth trees, earth dens dug under the roots of trees and dry caves.

3.8 Reproduction

The breeding season for both species takes places from mid-May to early-July. Pairs may remain together from a few hours up to several days during courtship and mating.

Over the course of the summer and fall, a female must attain sufficient fat reserves to sustain her through her pregnancy and the nursing of her cubs in the den. Bears have a system of delayed implantation, which means that although females are impregnated in the spring, the fertilized egg remains dormant in the cavity of the female's uterus until late November or early December. If conditions are right, the embryo implants at this time and the pregnancy proceeds to completion. If the female's fat reserves are insufficient, the egg(s) will not implant and the pregnancy is aborted.

A female bear's nutritional condition also determines the size of her litter. Over the long term, the size of a bear population is therefore proportional to food availability. This adaptive trait can be influenced by unnatural food availability, potentially resulting in unnaturally large populations of bears around human-use centres (Ciarniello 1997).

Cubs are born in the den in January or February. Black bear young stay with their mothers for the first 1.5-2.5 years, while grizzly young remain with their mothers for up to 3.5-4.5 years.

When the young disperse, daughters are often allowed to remain within or adjacent to their mother's home range, while sons are usually discouraged from remaining in their natal range. In searching for a home range of their own, young adolescent males sometimes end up in urban areas which can lead to conflict situations.

3.9 Strength and Mobility

Bears are extraordinarily powerful animals, capable of moving large boulders to look for small prey or ripping a rotting log into pieces to get at insects. They have been known to bend open car doors and rip into buildings in their search for food. Bears that find freezers stored outside have no problem flipping them and prying open the lid to access the food stored inside. Bears are also able to move quickly, running downhill and uphill at speeds exceeding 15 m/sec (50 ft/sec).

3.10 Intelligence and Learning

With intelligence comparable to that of the great apes, bears are highly evolved social animals - they show insight, planning and intentional communication. Bears often share friendship, resources and security. They form hierarchies and have structured kinship relationships (Kilham 2002). They're all individuals.

Of all the carnivores, bears have the highest brain to body-mass ratio (Howe et al. 2003). In fact, as the most intelligent native non-human animals in North America, bears can generalize to the simple concept level [2] (Rogers 1993). They have an extraordinary capacity to learn and have an excellent long-term memory.

Bears also have amazing navigational abilities, superior to humans, and are able to travel widely without becoming lost. Because they travel such long distances and through a variety of habitats to find food, learning and remembering is very valuable to bears. They remember what they have learned, especially with respect to the locations of food sources (Rogers 1993).

As a result, bears readily form associations between the presence of people or developed areas and the likelihood that food will also be present and available. When natural foods are scarce, they are likely to become highly adept at accessing anthropogenic foods, even if it means going through the kitchen window to investigate the contents of the refrigerator. Bears seem to be able to outsmart us at every turn, with time, opportunity and motivation, learning how to turn door knobs and even penetrate so-called bear-proof waste containers. From an ursine perspective, where there's a will, there's a way.

[2] An example of this type of learning might be a bear smelling formic acid from ant colonies and then biting into insulation made with formaldehyde that gives off formic acid as it breaks down. That insulation is in refrigerators, hot tub covers, snowmobile seats, etc. (Rogers pers. comm.)

4 Why Human-Bear Conflicts Occur

Human-bear conflicts are most likely to occur where human development and high quality bear habitat overlap such as in suburban neighbourhoods, recreational destinations or where cover and topography combine to provide bear travel corridors such as in riparian zones. The problem, however, is greatly exacerbated when anthropogenic food and other attractants draw bears close to humans.

4.1 Why Bears Enter Areas of Human Development

There are a number of reasons why bears enter human communities:

4.1.1 Failed Natural Crops

The quantity of natural food crops can vary greatly in timing and quantity from one year to another, resulting in adequate food resources in some years and food shortages in other years. During shortages, bears suffer from nutritional stress and expand their ranges in search of food. If this extension in range includes human-use areas, they may come into increasing conflict with people (Hatler 1967, Knight et al. 1988, Gunther et al. 2004). During some winters following a food shortage, cubs as well as aging bears, have been known to appear in communities in below zero temperatures, because they were starving to death in their dens (Mike Peters, BC Conservation Officer Service pers. comm.).

4.1.2 Hyperphagia

During the late summer, bears enter a period of intensive feeding called hyperphagia. During this period, they may eat as many as 20,000 calories a day in an effort to increase their fat reserves before denning. Some studies have shown that conflicts may increase at this time (Hatler 1967, Gunther et al. 2004). This is particularly true when the bears are under nutritional stress due to a lack of natural foods (Gunther et al. 2004).

4.1.3 Anthropogenic Bear Attractants and Lack of Preventive Measures

Bears are likely attracted to human communities, even from long distances, by the smell of easy-to-access, high calorie foods (Herrero 1989, Graf et al. 1992). Some people intentionally feed bears, while other homeowners or businesses attract them unintentionally by leaving garbage or food outside, feeding birds in the summer, or leaving fallen fruit around trees. Once a bear feeds on these high calorie foods, it is likely to repeatedly check that site or similar sites for more food (Hunt 1984, Gunther et al. 2000).

4.1.4 Human Development, Habitat Loss and Fragmentation

Human development has increasingly encroached on bear habitat. Often the areas that are attractive to people, such as waterways, wetlands and valleys where the soils are rich and the plant life abundant, are also prime bear habitat (Fuhr & Demarchi 1990). Since bears are usually on the move in search of food, those that have home ranges near developed areas are likely to pass through them at some point in their lives.

Habitat loss and fragmentation, and the physical and psychological barriers to movement that roads and railways create all have the potential to negatively impact bear populations. Roadside bears also cause safety issues for vehicular traffic.

4.1.5 Bear Social Factors

While all ages and both sexes of bears have been found in human-use areas, it appears that certain social factors may increase the likelihood of some sex and age classes entering human-use areas more frequently. For example, less dominant bears, including black bears in grizzly habitat, subadults (particularly dispersing males) and females with cubs, may utilize human-use areas to provide a buffer from more dominant bears (Mattson 1990).

4.1.6 Opportunistic and Curious

Bears are highly mobile, opportunistic feeders who remain curious throughout their lives and thus sometimes enter human communities simply out of curiosity. Curiosity is an adaptive trait in bears: their inquisitiveness enables them to continually locate the most nutritious food available (Herrero 2002).

4.2 Creating Human-Bear Conflicts

It is important to understand that when we allow bears to access human food or garbage, we "train" them to become a conflict animal. The root cause of conflict bear activity is the reward bears get by accessing food when they interact with humans and their property (Hunt 1984, Howe et al. 2003). At first, most bears are wary in human-use areas, not venturing close to people or their homes, or only traveling under the cover of darkness. Eventually, if a bear discovers that people are generally non-threatening, it becomes willing to move closer and closer to find a meal – potentially causing property damage or entering buildings (Hunt 2003).

Bears learn how to respond to humans based on the nature of their interactions with them. A bear that is positively reinforced by food is likely to return to that area and repeat its behaviour, eventually becoming food conditioned. Negative experiences with people involving pain or discomfort may prevent future conflicts (Hunt 1984, Gilbert 1989). Neutral experiences can result in bears losing fear of humans and becoming habituated.

4.3 Human Habituation/Tolerance and Food Conditioning

These terms are frequently misused by the media and even wildlife professionals. Bears are often incorrectly referred to as being food habituated – by definition, this is not possible – they can be human habituated and/or food conditioned. The word "tolerance" is also misused as a lay term. The correct definitions follow, as they relate to bears.

4.3.1 Tolerance: The baseline degree to which an animal is willing to coexist with humans or their infrastructure before responses have waned or increased due to learning (Herrero et al 2005, Smith et al. 2005). Basically, tolerance refers to the level of acceptance for people an "individual" bear is born with.

4.3.2 Habituation: A bear who has repeated contact with people, without negative experiences, may learn to accept the presence of people beyond its innate level of tolerance. A bear who is not tolerant or habituated is likely to flee when encountering people. A habituated bear, that has learned to accept people in its habitat, becomes less likely to flee. These bears have not necessarily lost their fear of humans as much as they have become skilled at observing our body

language as non-threatening, a natural extension of the way they study each other (Kilham 2002). Habituation in bears is an evolutionary response designed to conserve energy by muting their reaction (Herrero et al 2005).

The level of habituation to humans varies with individual bears and their past experiences with people (Herrero 2002). Tolerance and habituation may set the stage for food-conditioning (Hunt 1984, Herrero 2002, Herrero et al 2005, Smith et al. 2005).

4.3.3 Food Conditioned: Finding food is a high priority in the life of a bear and they remember the location where food is found and how they got it. Bears are creative and intelligent especially in seeking food. Unfortunately, this means that they may cause a lot of property damage as they become willing to go to increasingly greater lengths to get food.

Human food-conditioning is a type of associative learning. A bear eats peoples' food or garbage and receives a positive reward. The bear may then seek out situations leading to these types of "rewards" in the future. Just relate it to dog training – if you want your dog to “sit”, you reward the correct behaviour with a biscuit and the dog will perform on command in the future.

Food or garbage conditioned bears are those that associate humans or human-use areas with the availability of non-natural food sources. The level of human food use can vary greatly from one individual to another and from one year to another. Some bears may choose to use anthropogenic foods more regularly and others only sporadically, like a female with underweight cubs during late fall of a poor natural food year.

It is important to note that a bear that eats people’s food behaves differently from a bear that is only habituated to people (Herrero 2002, Smith et al. 2005). These bears are more likely to approach people and structures for food increasing the likelihood of human-bear conflicts (Ciarniello 1997, Peine 2001). Food conditioned bears also exhibit a higher level of conflict behaviour (Hunt 2003). Still, even habituated and food conditioned bears seldom injure people (Herrero 2002).

In addition, even in the short term, eating from garbage may be injurious or fatal to bears as they have been known to eat items such as plastic bags and broken glass.

5 Traditional Management Techniques

The information provided in this section is a brief overview of the traditional options available to conservation officers and wildlife managers. Some of these techniques are also used in combination with bear aversion tactics.

5.1 Capture Techniques

Under certain circumstances, it is necessary for wildlife managers to capture a bear in order to move them out of conflict situations. Bears can be released on-site with negative conditioning or translocated to a more suitable area with a "soft" release (when the bear is simply released from the trap without human interference). There are various techniques used to capture bears e.g. live traps, leg snares and free-range darting. Capture poles can also be used to catch cubs under 16 kg (35 lbs).

Photo Credit: OMNR, 2005. Example of injuries that can occur when inappropriate wire mesh is used. NOTE: OMNR's policy is to only use humane wire mesh (where openings are too small for claws or teeth).

These techniques are often used to avoid lethal approaches. However, capture and handling can cause long-term tissue injury – resulting from dart trauma, leg hold snares, tooth extraction, and attachment of telemetric devices. There is also a risk of capture myopathy resulting in mortality in approximately 2% of animals (Cattet et al 2005). Mortality may occur within minutes or may take several days, weeks or even months.

5.1.1 Live Trap

A live trap is essentially a large cage intended to catch bears without causing harm or death. The trap is baited to encourage the bear to enter. When the bear takes the bait, the trap door automatically closes and locks the bear inside. Most live traps are mounted on a trailer with wheels so that they can be towed by a vehicle. Live trap styles vary greatly – culvert traps and barrel traps are still widely used. However, it's critical that a child/bear-friendly trap be used to avoid injury to bears and people. Family units must be live-trapped and released together. See: www.bearsmart.com/bear-management/capturing-bears/live-trap.

Box traps are another viable alternative to culvert traps for bears that are wary or trap-shy. Like the trap above, the mesh wire construction may reduce wariness by allowing the bears to view their surroundings while they are entering the trap. The wire mesh must be tightly woven to prevent the bears from biting the wire and damaging their teeth and claws. The box trap also offers greater stability as it is placed on the ground – making it easier for trap-shy bears to enter.

The primary advantages of using a mesh-wire box trap are their usefulness in catching "trap-shy" bears, and minimal risk of injury to the bears. The primary disadvantages involve the logistical considerations in moving the trap from location to location, and loading an occupied trap into a vehicle (Beecham pers. comm. 2007).

Other considerations include the weather, both too hot and too cold. During the summer, to be safe, wildlife managers often start closing traps when it gets over 20°C or 70°F. If traps can be checked every 2 – 3 hours and placed fully in the shade where there is a breeze, more latitude can be considered. If a bear must be held in a trap in hot weather, the trap should be placed in the shade and the bear should be hosed down hourly and provided with water to drink. Straw should be used to line the trap, especially during the late fall or winter (to ensure the cold metal cage does not draw heat out of the body). Traps must be kept out of the wind in cold conditions. They should be checked every 2 – 3 hours. Traps must not be used when outdoor temperatures dip below -20°C or -4°F; or when temperatures rise above 30°C or 86°F.

5.1.2 Leg Snares

A leg snare is comprised of a spring, a circle of [.5 cm (3/16”) for black bears or .6 cm (1/4”) for grizzlies] aircraft cable and a locking mechanism. It is designed to catch the bear by the leg.

Leg snares must be signed, alarmed and monitored frequently (at least every two hours) to minimize injury and stress to the bear or accidental snaring of cubs, people, pets or other animals. Unfortunately, most injuries occur shortly after being caught. Snares must be properly set to reduce injury rates and should only be used by people with adequate training in their safe use. Leg snares should be used, only as a last resort, to catch bears that could not be live-trapped and would otherwise be killed.

Snare Injury. Photo Credit: OMNR, 2005. Due to the concern for injury, the Ontario Ministry of Natural Resources prohibits the use of snares to capture conflict bears.

5.1.3 Darting - Chemical Immobilization (Tranquilization)

Chemical immobilization is used to temporarily immobilize a bear through the injection of a drug which temporarily affects the ability of the bear to use its muscles or comprehend what is happening. It is most frequently administered to bears by a dart gun. A jab-pole or blow pipe can be used with a bear in a live trap or tree (the syringe is inserted in the end of a specially designed

pole to extend the officer's reach). In situations where the bear is already immobilized, chemical immobilization is sometimes given by needle, similar to the way in which a person is given an injection. Proper certification is necessary to administer any type of chemical immobilization.

5.1.4 Catch Pole

A catch pole can be used to capture cubs-of-the-year that are under 16 kg (35 lbs). Be sure that the pole cable ensnares at least one shoulder of the cub along with the neck; or the whole body. Don't ensnare the neck alone. Cubs are often stronger than anticipated. It may be quite difficult to use a catch pole to remove a cub from a tree, unless you use a jab stick to "lightly" tranquilize them first (using Ketamine alone; no Rompun) (Beecham pers. comm. 2007).

Once caught, the cub can be contained and/or transported in a dog carrier. If you suspect the cub is orphaned, contact the local wildlife agency to make arrangements to take the cub to a certified rehabilitation centre. Generally speaking, cubs can be assumed to be orphaned if a sow has not returned to care for her cubs during an 8 hour period.

5.2 Relocation and Translocation

Translocation involves capturing a bear and "soft" releasing (i.e. without the use of human dominance techniques or any noise or physical deterrents) it in a safer or more suitable area away from potential conflict with humans, outside of its home range.

It is important to appreciate the limitations of translocation as an alternative management technique. Ideally, bear behaviour should be modified using bear aversion tactics, so that the resident bears can learn to coexist within the community by coming to an understanding of the rules dictated by the human inhabitants. Otherwise, the vacated habitat niche left by the translocated animal will only be filled by another bear – if attractants remain, the original problem will persist.

Nonetheless, wildlife managers may determine that capturing and moving a bear from an area is necessary and may be the only option in busy human-use areas or when a bear is just in the wrong place at the wrong time. Short Distance Relocation may also be considered. It involves capturing a bear in an <u>in</u>appropriate location and then releasing it in a safer or more suitable area within its estimated home range. The bear is trapped, immobilized and ear-tagged by wildlife managers. Once it fully regains consciousness, it is released.

Various factors should be taken into account before translocating a bear long distance including the age and sex of the animal, the type, location and [history] of "conflict" behavior, where the animal is to be released, and the desired outcome of the translocation (Maryland Department of Natural Resources 2004).

More research is needed to determine the best methods to increase the efficacy of translocation. Some studies have shown good success with young sub adult males, likely because they are naturally displaced from their mother's natal range anyway (Landriault 1998). Drawbacks related to translocation include the cost. Translocated bears can also experience considerable stress associated with locating new food sources, security, bedding and denning sites within the release

area, potentially affecting their survival. Placing a bear in habitat used by other bears may lead to competition and social conflict, and result in the injury or death of the less dominant bear.

Translocation is a reactive management strategy and does not address the reason why a bear was attracted to the area in the first place. As such, another bear frequently takes the place of the one that has been removed. Often residents are either unwilling to change their own behaviour by removing attractants or are unaware of the need to do so because they believe that trapping and relocating a bear is a viable resolution to the human-bear conflict (Howe et al. 2003).

Nonetheless, translocating a bear may "buy" sufficient time to rectify the attractant problem.

5.3 Destruction

Destroying a bear is a reactive response that does not address the root of the problem (availability of attractants). As such, another bear is likely to take the place of the one destroyed, creating a cycle of killing.

If bears are not receiving a readily available food reward within communities, the need for lethal response will be reduced. Conflicts that still do occur within "Bear Smart" Communities will then be good opportunities to attempt aversion techniques.

On occasion, it will be necessary to lethally remove a bear. Any bear that poses an immediate or imminent threat to human safety should be destroyed. Also, a bear that suffers from life-threatening injuries such as those caused in motor vehicle accidents may have to be put down for humane reasons. Legally, the destruction of a bear remains at the discretion of the officer and may be deemed necessary when the amount of bear caused property damage exceeds the community's tolerance level and/or non-lethal methods have failed. It is imperative that destruction be conducted humanely and efficiently. Under no circumstances, should a mother bear be shot in the presence of her cubs (even if they are immobilized); this can be a very traumatic experience for cubs with *unknown* consequences.

Although lethal management will continue to be a necessary option, bears should not be destroyed simply for being in the wrong place at the wrong time. Every effort should be made to use hazing tactics to encourage the bear to leave the area. When hazing is not appropriate because of site and safety risks, contact the local wildlife agency for assistance or advice.

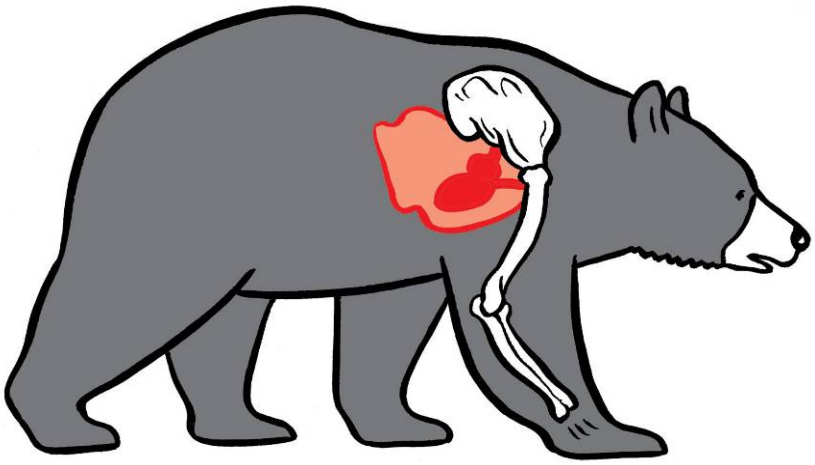
Extreme care must be taken when making a decision to remove a female to avoid orphaning cubs. In some situations, the cubs may not be immediately apparent and the female may appear to be alone. A mother bear may, once in a while, leave the cubs on their own. During spring, when the cubs are young, mothers sometimes leave them in the den or in the security of a tree while she goes to search for food. Once the cubs are more independent, mother bears occasionally leave them to forage by themselves. In early spring and summer, swollen teats can indicate that the sow still has cubs, but in late summer and fall, the cubs may no longer be nursing from their mothers. If cubs are orphaned for any reason, they should be sent to a certified rehabilitation centre in the area for later release back to the wild.

It is also important to note that a bear found feeding on a livestock carcass may not be the animal that killed the livestock. Bears are opportunistic feeders and will feed on any carcass they come upon. A thorough investigation must be conducted. There may also be a program in place in your

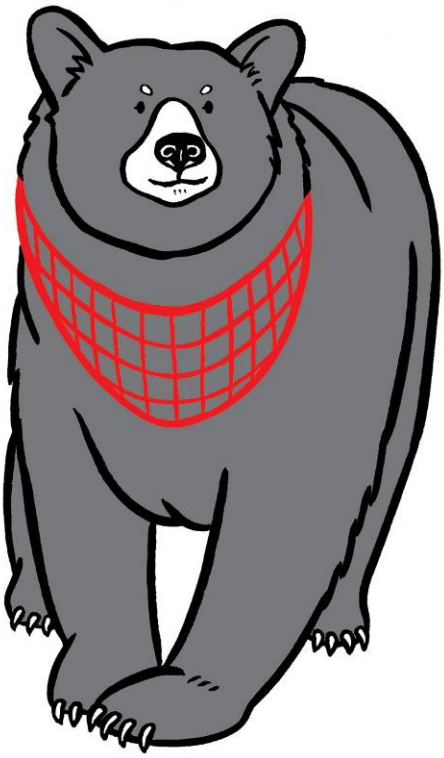
area to compensate the farmer/rancher. That may appease the situation and reduce the need to eliminate the bear. The farmer/rancher must initiate a program to protect his livestock. (See Section 12.12)

If there are no alternatives to destroying a bear, the following guidelines should be followed in the use of lethal force:

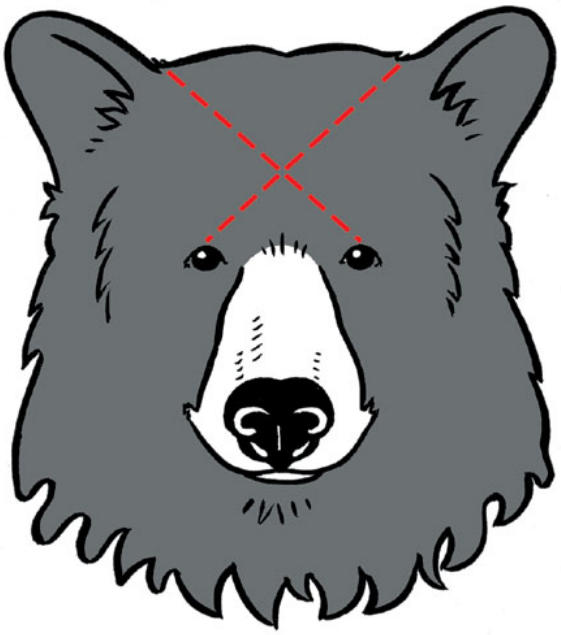
- control the public
- never compromise officer or public safety
- use the appropriate weapon – a shotgun with slugs or a 30 calibre rifle is suitable to destroy a bear – if unavailable, a large calibre handgun (.357, .44 mag, or .45 caliber) or a shotgun loaded with buckshot (minimum size should be 00) can be used if the bear is immobile or you can get a close range shot (<5 m) to the head or thoracic region. Buckshot should be used only as a last resort (if no rifle or slug is available); for example, to put down a bear that is critically injured as a result of a MVA. It should never be used to destroy a bear that is mobile i.e. up a tree, or in a residential area etc.
- be aware of your surroundings and line of fire
- ensure your weapon is "sighted in" - if you are not confident enough, do not shoot
- mobile wildlife should be shot below the shoulder and slightly to the rear of it (this is where the heart and top of the lungs are located)
- immobilized wildlife should be shot in the head – draw an "X" between the ears and the eyes and aim for the centre
- ensure the occurrence is documented, reported to the Wildlife Agency in charge, and all public enquiries are answered



Side shot – wait for the near leg to move forward



Front shot – shoot in crosshatched area



Head shot – for immobilized or injured bears only - shoot in middle of “X”

6 The First Step: Understanding Bear Behaviour

This section will empower you with the basics of interpreting black bear communication and understanding it, so that your understanding can be applied to manipulate bear behaviour in the field.

6.1 Introduction

The safest way to reduce risk when dealing with bears is to have knowledge and understanding of their behaviour and motivation (Hunt 1984, Safety in Bear Country Society 2001). Therefore, an understanding of bear communication is essential to mitigating conflict situations and maintaining human safety. Recently, the understanding of bear behaviour has changed as bear experts learned to recognize the characteristics and predictability of defensive and aggressive behaviour patterns.

Because bear's home ranges often overlap, they have evolved a structured but flexible society that enables them to interact while keeping serious conflict, and thus the risk of injury, to a minimum. Bears have a dominance hierarchy and communicate their dominance and submission to other bears through vocalizations and body language also known as "posturing". When two bears meet, each quickly assesses the situation and chooses how it will respond to avoid a physical confrontation.

Bears rank in the hierarchy based on sex, age, size, physical condition and individual temperament. Frequently, large, mature, confident males are dominant while sub-adults are lowest in the hierarchy. Dominance is important because it determines access to food resources and mates (Hunt 1984, Safety in Bear Country Society 2001, Herrero 2002).

Bears typically use the same behaviours when responding to humans as they use when communicating with other bears (Hunt 1984, Staying Safe in Bear Country 2001, Kilham 2002, Herrero 2002). Unfortunately, people with limited expertise in bear behaviour often respond with fear and frequently misinterpret the ritualized displays as aggressive behaviour – often with deadly consequences for the bear.

Nonetheless, there is potential for minor or serious injury when bears and people come into very close contact (less than a metre). Bears can be very physical when communicating and injuries can arise from being swatted or bitten; the intent on the bear's part is not necessarily threatening. Although the bites and paw swats are intended to deliver a serious message, this type of defensive behaviour can be "disarmed" (see Section 8.3).

It is essential to recognize the difference between defensive displays and aggressive or offensive actions; and further recognize that there is a difference between front-country, or human-use areas, and backcountry encounters (Safety in Bear Country Society 2001). See Appendix 15.3 for more information on encountering a bear in the backcountry.

6.2 Interpreting Black Bear Communication (Kilham 2007)

To understand bears, we must first understand the basic principles of animal behaviour, which are common to all species, including humans. For example, from observing the behaviour of a fish, we can learn how a bear or a human will react under certain conditions. Bears are not aliens from Mars, nor are we. We are all animals. This needs to be stressed because from our own experiences with other people and our pets, we can draw an understanding of how that behaviour applies to bears.

Since the time of Charles Darwin, it has been recognized that any sound generated through the larynx of any bird or mammal is an "honest" sound. These sounds are emotional communications tied directly to the central nervous system.

> "*The signaling behaviour of animals can be compared with the crying of a human baby, or with the involuntary expressions of anger or fear in humans of all ages. We know that such 'emotional language' in Man is different from deliberate speech. The 'language' of animals is of the level of our 'emotional language'.*" (Tinbergen, 1974)

As humans, we pay little attention to this means of communication because of our fondness for intentional language and culture; yet, subconsciously, we receive and emit these emotional messages all the time. When enraged, all animals make harsh sounds; in contrast, they use soft-toned noises to make appeasement vocalizations.

This form of communication also includes body language; we can sit down with other humans throughout the world and communicate our emotional states without any knowledge of each other's language. The ear movements of a horse and those of a bear have the same meaning. Basic expressions on the face of humans and bears have the same general meaning, whether it is a pleasant facial expression, a frown or pure stink-eye. The mood of the bear can therefore be determined by observation.

Once we understand how bears communicate emotionally and honestly, we can take a look at how and why they communicate intentionally and how they lie or bluff. Intentional communications intended to bluff, deceive or to alter another's behaviour are generated through mechanical sounds or actions. The "squared-off lip" is the switch (i.e. the lip is drawn forward and appears square; the face looks long), which is followed by any of the following actions in varying degrees of intensity: the chomping of teeth or lips, snorting or woofing (blowing air through the nose or mouth), huffing (inhaling and exhaling air rapidly), the swat, lunge and the false charge.

This behaviour has developed over the last six million years, through the evolutionary process, as ritualistic displays that help reduce the chance of attack. Behaviourist Niko Tinbergen notes that these types of displays are used to intimidate an opponent or simply to increase or maintain distance from another animal. However, this behaviour does not reflect the bear's true mood. Bears are able to turn this behaviour on and off like a light switch. It is deliberate.

Bears also use these same behaviours for intentional communication in a number of different contexts; they can be used to intimidate, to modify behaviour, or show displeasure. Applied with a wide range of intensity, these behaviours reflect the level of the bear's concern.

Moods, on the other hand, come and go very slowly. For example, once angry, it may take us a bit of time to cool off. It is, therefore, necessary to analyze the bear's mood when it is not displaying these behaviours; its intentions when it is; and then apply both to the context of the situation. This may be a tough concept to apply in the field, but a necessary and important one. It is actually a good thing when faced with a bear that bluffs or false charges as it means that you have time to analyze the bear's intentions and modify its displeasure or fear.

One reason that bears perform these ritualistic or intentional displays is to inhibit aggressiveness. Because bears occupy very extensive areas and meet face-to-face infrequently, the ritual use of chomps, huffs and false charges actually serves to deter attacks that might otherwise occur if these displays are lacking. Humans and other animals also have rituals to repress aggressiveness. For example, we may greet a strange dog with a slow approach and a kind word – while observing the response. If the response is friendly (i.e. the tail is wagging), we may choose to pet the dog. If, on the other hand, the dog growls and bares its teeth, we would likely refrain from trying to pet the dog. Similarly, we might offer a smile or a handshake to strangers or people we haven't seen for a while. This gives us an opportunity to gauge the response of the individual we just met and react accordingly. Granted, the bear's rituals of snorting, chomping, huffing and false charging are not as cordial as ours, but both serve the same purpose, i.e. they inhibit potential aggressiveness and buy some time in order to gauge the situation.

Such ritualistic or intentional behaviour in bears occurs whenever two unfamiliar individuals come together. Scientists have tried for years to define this behaviour as belonging to various distinct categories, including aggressiveness, threat and even fear. In reality, it is not possible to draw one single specific meaning from this behaviour because of the wide range of circumstances under which these displays are used. These acts are context specific.

Some examples of ritualized displays include the following examples:

In a captive situation, when a new cub is placed into a cage with other unrelated individuals, they will all display initially. But within hours, they become friends. The display inhibits initial aggression and allows time for communication and friendship to take place.

When a female bear first meets a mate, they are both unfamiliar with each other. As a result, they are likely to both display with chomps, huffs and false charges. These displays may last for an extended period of time. At some point, however, they start making soft inviting vocalizations while still displaying, and eventually, they end up mating. Again, the display inhibits aggression, which allows for communication and mating.

When a person gets too close to a mother with young cubs, the sow will usually display, letting the person know her displeasure without having to attack. If the person disregards her signals, she may kick it up a notch by cocking her ears, charging and vocalizing a face-to-face "huh,huh,huh,huh". Often the sow will also use a greatly modified false charge or swat to the ground in an attempt to persuade an intruder to back away. These gestures constitute a motivational use of ritualistic displays. The intentional display is used to convey a message or prevent an attack. Some bears have even had great success in using these displays to intentionally motivate people to drop food or knapsacks.

6.2.1 Defensive Display or Dominance Behaviour

Bears exhibiting dominance behaviour or defensive displays are usually good candidates for aversion techniques. Still, the officer must assess safety risks, the suitability of the site, as well as other factors relating to the suitability of the bear (see Section 9 for detailed protocol).

Bears may exhibit any of the following behaviours in any order of sequence (Herrero 2002):

Frontal orientation: bear's body is directly facing the person

Jaw popping or teeth clacking: moving its jaw rapidly to click or pop its teeth

Snorting or Woofing: blowing air through the nose or mouth

Huffing: inhaling and exhaling air rapidly

Staring: maintaining direct eye contact

Standing its ground: rather than moving away, the bear stands still, usually facing the person

Paw swatting: slapping the ground or surrounding vegetation

Lunging: one or two quick steps toward a person; often ending with a slap to the ground

Bluff or false charge: the bear runs straight at a person but veers off or stops before making physical contact; this is almost always accompanied by other ritualized displays, like huffing, jaw popping or slapping the ground. The vast majority of charges by bears are bluff charges and only rarely lead to contact or human injury.

Note: A bear that stands upright on its back legs is not exhibiting defensive or aggressive behaviour. Usually a bear rises up on its hind legs out of curiosity. Standing up allows the bear to get a better view or to better catch the scent of something in order to identify it.

6.2.2 Offensive Aggressive Behaviour

By definition, aggression is actual or symbolic attack (threats), often ritualized, to settle conflict between two individuals (Herrero 1983). Posturing is a common component of aggression, particularly in defensive attacks by grizzly bears. When a bear feels threatened it often uses threats to suggest it may attack if the disturbance continues. However, physical attack in such defensive situations is rare in bears interacting with humans – and particularly rare in human-use areas where bears are likely to be feeling a certain level of uneasiness because they know they are out of their element. The further away a bear (or any mammal) is from the center of its home range (such as being in the midst of a human-use area), the more uncomfortable it tends to feel

and the less likely it is to exhibit aggressive behaviour (Tinbergen 1953, Lorenz 1963, Kilham 2002).

Evaluating bear behaviour and communication involves assessing vocalizations, head, ear and body postures and movements. Offensive aggression is the most difficult to determine. Nonetheless, it's important not to confuse a bear that is behaving aggressively with a bear that has kicked its defensive behaviour up a notch or two.

Offensive aggression may include (Wayne McCrory, Steve Herrero, pers. comm.):

- intentness (particularly intense and continuously maintained direct eye contact, where the bear's focus on you is unrelenting)
- ears laid back against the head, but in some cases, as in potentially predatory behaviour, the ears may be forward the whole time (as a predatory bear may not feel threatened); ears may also be turned backward to listen in that direction; look for more than one sign to determine aggression.
- loud guttural (honest)vocalizations
- any action that might be followed by attack if appeasement is not given (in some cases, usually in backcountry situations, you can push a bear too far and cause an attack by not backing down)

Note: Bears exhibiting offensive aggression could have predatory intent. Consequently, we highly recommend using extreme caution when managing offensive, aggressive bears. Only highly experienced professionals should determine if a bear exhibiting offensive aggressive behaviour is a candidate for aversion techniques. It is up to the discretion of this individual on whether to proceed with non-lethal methods. Importantly, these bears will require additional follow-up monitoring for signs of further aggression.

6.2.2.1 Normal Dominance Testing of Young Male Bears

Dominant male bears often exhibit the highest level of defensive displays – sometimes their assertiveness is mistaken for offensive aggression. Younger males will also exhibit dominance testing behaviour. When male bears first leave their mothers, they have little self-confidence and are prone to be propelled into dispersal after almost any conflict. As they grow and mature they must develop a high enough level of confidence to challenge the largest and most dominant males in order to have an opportunity to mate. As a result, between the ages of 2 and 7, they will actively challenge each other, and sometimes other species (i.e. "you"), in order to test their own levels of self-confidence or dominance. This behaviour is not unlike the behaviour of some high school aged boys as their testosterone level begins to rise in puberty. This type of behaviour must be challenged by the wildlife manager. It's not a good idea to allow bears to push people around.

6.2.2.2 Preconditioned Attacks

A bear that is surprised while its senses are compromised (e.g. while eating) may strike out without warning. Dogs do the same thing. Normally, bears signal their intentions (through the ritualized displays noted above). In situations where bears are feeding on a carcass, they are concerned about other bears that may be attracted to the carcass by smell. If a human suddenly

appears in this situation, it may trigger a preconditioned attack because the bear initially had the expectation that another bear might be attracted to the carcass.

6.2.2.3 Predatory Behaviour

The most insidious case of an aggressive bear is one that attempts a predatory attack on a human. Importantly, a predatory attack is usually silent and involves stalking. It is almost never accompanied by the ritualized displays of huffing and jaw popping discussed above in Section 6.2.1.

A predacious bear may follow a person for some distance before moving in directly toward them keeping his eyes *intently* on the person and then may rush the person making full physical contact. Such attacks may persist for hours or until the person being attacked somehow deters the bear. For more information on attacks, please refer to Steve Herrero's book - Bear Attacks: Their Causes and Avoidance.

Predaceous attacks are very rare in both black and grizzly bears. There is some evidence that food-conditioning can be one of the circumstances predisposing this type of behaviour, particularly with grizzly bears (Herrero and Fleck 1990) but less so with black bears. Predaceous black bear attacks usually occur in rural or remote areas where black bears have not had a lot of association with people (Herrero 2002). Furthermore, where the sex could be identified, male black bears appeared to be responsible for 93% of predacious attacks. Persons most at risk have been those hiking, fishing, berry-picking or working in remote areas (Herrero 2002).

7 Aversion Techniques

Bear Aversion uses various behaviour modification methods to control or alter the behaviour of a bear by creating a negative association with people, a situation, and/or human-use area. Non-lethal techniques include both active approaches, such as human dominance techniques (voice and body postures), noise or physical deterrents, as well as passive methods such as electric fencing.

7.1 The Development of Aversion Techniques

Aversion methods were originally based on the concept of operant conditioning, which developed out of the work of various theorists such as B.F. Skinner in the field of psychology in the 1950's. In aversive conditioning, the individual is exposed to an unpleasant stimulus while engaging in the targeted behavior, the goal being to create an aversion to it. As humans, we use aversive conditioning in our everyday interactions: a child is given a time-out for not listening; a speeder is given a ticket; or a car buzzer turns on when the seatbelt is left unbuckled.

Wildlife managers began experimenting with aversion techniques in the 1960's, as an alternative to limitations of traditional management techniques that involved translocating or killing bears involved in conflict. Many of these early efforts examined the effectiveness of emetic compounds (that cause nausea) in bait for producing Conditioned Taste Aversion (CTA) in wildlife. While early results were mixed, recent tests show very promising results (discussed in more detail in Section 7.2.6).

In the 1980's, pepper spray was investigated, tested and developed for use with bears (Miller 1983, Hunt 1984, Rogers 1984), as well as, the first use of rubber bullets on wild, problem grizzly bears to deter them from areas where they were unwanted (Hunt 1988). The use of human dominance techniques in combination with the consistent application of negative stimuli to elicit non-aggressive avoidance of humans and human-use areas was tested (Hunt 1988) over a span of 10 years and became known as "Bear Shepherding" (Hunt 1997, Hunt 2003). The use of Karelian Bear Dogs to aid as a tool in Bear Shepherding was also developed during this time (Hunt 2003).

The use of aversion techniques by wildlife agencies seems to have increased in recent years. Currently, these techniques are being used as part of bear management programs in many areas including Alberta, British Columbia (Manning Provincial Park, Whistler, North and West Vancouver), Ontario, Montana, Washington, California, Louisiana, New York, New Jersey, Michigan, Maryland and even Japan.

Bear Aversion is a developing methodology for managing bears. Standardizing procedures, comparing techniques for efficacy and sharing information among agencies implementing aversion techniques will result in better techniques over time.

7.2 The Theory behind Aversion Techniques

Aversive conditioning (AC) is a form of operant conditioning used to reduce undesirable behaviour by using physical or psychological discomfort (Shivik *et al.* 2003). Its applications to bears involve the administration of negative stimuli, the goal of which is to teach the bear to associate humans, human developments and human food sources with negative stimuli and avoid them.

Bears seem to quickly understand aversion methods because these techniques capitalize evolutionary principles and on the natural awareness of boundaries that bears have evolved over eons of interacting within the bear dominance hierarchy (Hunt 2003). Bears show an inborn avoidance of people and some evidence suggests that they defer to people in a similar manner as they do to dominant bears (Hunt 1984, Herrero 2002). This makes it easy for people to use body posture and tone of voice to communicate to a bear that it is not welcome in the area and, if necessary, to reinforce that message with additional deterrents. Application of various aversion techniques can thus be effective in establishing and maintaining human dominance over bears (Hunt 2003).

Early theorists were concerned that applying negative conditioning techniques, especially pain deterrents, might cause bears to respond aggressively. However, research has consistently found that bears do not react with aggression, but rather choose escape or avoidance (providing that the bear is not trapped nor unnecessarily punished) (Hunt 1985, 1986, Hunt et al. 1988, Hunt 1997, 2003, Leigh and Chamberlain 2008, Honeyman 2008, Mazur 2010).

In order to really understand when aversion techniques are likely to work and when another approach is warranted, one must understand the basic theory behind how animals learn. Aversion techniques usually attempt to exploit associative learning mechanisms. At its most basic level, associative learning holds that the more negative experiences a bear has while exhibiting a certain behaviour (e.g. entering a human-use area) the more likely it is that the bear would learn to avoid the area. The reverse also holds true - the more positive (food) rewards a bear gets, the more likely it is to repeat the behaviour that resulted in a (food) reward. In fact, positive association is about three times as effective as negative association. This is a good argument for minimizing available attractants.

Furthermore, aversion techniques are basically forms of punishment. According to Domjan (1996), punishment is most effective when it is applied immediately; consistently; initially intense; when alternative behaviour is rewarded; without contingencies signalling its application; and when it is evolutionarily relevant. Let's explore the theories for effective punishment in more detail.

7.2.1 Initial intensity

A punishment regime should begin before a bear's behaviour becomes a major management concern and that regime should be very intense right from the beginning (Domjan 1996). To better understand this concept, imagine a driver getting away with speeding for years and then getting a $25 ticket. Alternatively, imagine the same driver being fined $200 the very first time he speeds. He is more likely to continue risking tickets in the first scenerio when "punishment" is

minimal and he's gotten away with speeding many times before being fined. It works the same way for bears. A bear that receives intensive conditioning (often including pain stimuli) when it first starts exhibiting an unwanted behaviour is more likely to respond by stopping that behaviour than when it only receives a small dose of aversion, perhaps a few noise deterrents, once its habits are well engrained. Furthermore, escalating punishment with increasingly bad bear behaviour only results in the subject habituating to the punishment (Domjan 1996).

7.2.2 Immediacy

Immediate punishment means that the bear must be punished within a couple of seconds of exhibiting the unwanted behaviour. If the delay between the display of unwanted behaviour and punishment is any longer than a couple of seconds, the bear will not understand why it is being punished e.g. lobbing cracker shells at a bear that was roadside five minutes ago, but is now in security cover, probably won't teach the bear anything. Similarly you can't punish your dog for peeing on the carpet in the morning once you get home from work later in the day. He won't make the connection.

7.2.3 Consistency

It's important to ensure that all officers who are conditioning the bear do so according to the same standards. Consistent punishment delivers the same message every time the bear displays unwanted behaviour. For example, if the bear is only punished between 9 am and 5 pm, it will learn to operate outside of those hours (and sometimes that is perfectly acceptable).

7.2.4 Non-contingency

If a bear can predict when it will be punished, then punishment becomes contingent upon the predictor. Non-contingent punishment helps the bear to generalize the lesson as much as possible.

For example, research conducted in Whistler, BC suggests that bears often recognize officers by their shotgun, lights on the truck or perhaps the sound of reverse beacons on the truck. Based on past negative experiences with managers, they will flee from people carrying shotguns but ignore those who do not have a shotgun (Lori Homstol, Whistler Bear Research Team, pers.comm). This is likely because the only people who punish the bear were carrying a shotgun (punishment was contingent upon shotgun presence). If the goal is to make the bear more wary of the general public and not just bear managers, then managers must not appear to the bear to be different from the general public. This can be accomplished by using other tools in addition to shotguns (e.g. slingshots) as well as various different vehicles.

Additionally, when bears hear the distinctive click of a shotgun action, they will often flee even before the rubber bullet is fired. This is because in the past that sound consistently meant they were about to be hit. Just as dog trainers have great success with "clicker" training, bear managers can capitalize on the ease with which animals associate sound cues with external pain stimuli. Researchers in Whistler were able to teach bears to run after hearing a whistle blast (Lori Homstol, Whistler Bear Research Team, pers.comm). Thus, arming residents or business owners

with whistles would allow people other than wildlife managers to temporarily deter bears from conflict when necessary.

7.2.5 Reward alternative behaviour

Rewarding alternative behaviour vastly increases the effectiveness of punishment. While we can't offer bears a "treat" for responding correctly, we can use an appeasing tone of voice to indicate that their behaviour has become acceptable. Just as we would use a stern, firm tone with our pet dogs when they are not responding appropriately and then sweeten the tone (by speaking more softly and maybe even in a higher pitch) once they do respond as directed; we can actually do the same with bears.

7.2.6 Evolutionary relevance

Research on mammals has shown that using external pain to deter an animal from accessing food simply does not work (Garcia et al. 1974). Animals have no instinctual reason to expect external pain as a result of eating. Therefore, pain stimuli, like rubber bullets, should not be used to teach a bear to avoid garbage or other attractants. Pain stimuli can be used when teaching bears to avoid people – that is an association that animals are capable of making.

In the wild, however, bears could experience internal pain (nausea) as a result of eating something poisonous, and it is this response that is exploited in Conditioned Taste Aversion (CTA).

CTA can be an extremely effective long-term solution to deter animals from accessing difficult-to-secure attractants. CTA occurs when an animal eats a bait with a nausea-causing substance concealed in it, and as a result the animal subsequently avoids the bait (Baker et al 2005). Past success using CTA has been mixed, mostly because people have failed to conceal the nausea-causing substance in the bait. If animals detect it, they can differentiate between treated and untreated baits and will continue eating the untreated baits. CTA is only recommended for use on attractants that are extremely difficult to secure from bears, and is only likely to work on very specific attractants (like fruit from an apple tree or honey in a bee hive). Garbage, for example, has too many ingredients and a bear may only form a CTA to one of them.

The right approach:

Choosing the right approach depends upon your level of experience expertise in working with aversion tactics. Bear managers often develop their own style that suits their particular needs.

Some managers may prefer human dominance techniques because they can be highly effective and don't require carrying a tool box and shot gun along. Others may prefer to have tools to back themselves up.

Whether a manager chooses aversive conditioning or the similar practice of hazing depends on the situation, the manager's goals and available resources. We distinguish AC from hazing which typically involves deterring a bear from an immediate conflict situation but without follow-up

action. Aversive conditioning is a much more labour-intensive, longer-term approach to non-lethal management, but also resulting in a longer lasting and more effective outcome. Hazing is most appropriate when conflict is at a low level (e.g. a human-tolerant bear on the edge of a residential area) and not chronic; the bear is young or naïve; or when minimal hazing is likely to buy the manager enough time to resolve the root cause of conflict (e.g. fruit on a tree is about to be picked; or an electric fence is about to be erected around a bee hive). Hazing can also be used to resolve an immediate conflict situation without resorting to lethal means. Generally, aversive conditioning is more appropriate when the bear can be radio-collared and intensively monitored; the area it is active in is relatively small; or if the conflict occurs over a longer period of time (e.g. bears feeding roadside for four weeks every spring).

There are still mixed opinions on whether to use the minimum level of force necessary to achieve the desired result or to conduct "bearmageddon", in which all aversion actions are deployed to the maximum intensity possible by combining several deterrents and techniques until the bear ceases the unwanted behaviour, or seeks cover. Minimum level of force approach involves using only the force necessary to get the job done, holding a high level of force in reserve as a trump card in case you need it as an exclamation point or for a bear who tries to backslide (a more detailed description of the methodology can be found in Section 9.4). Conversely, the "bearmageddon" approach may be used to prevent bears from habituating to a minimum level of force. The above rules for effective punishment favour the "bearmageddon" approach, which is initially intense. That said, it is possible to use intense punishment and still hold a trump card. In other words, the action can begin at a high and intense level, but the officer can keep adding additional tools to increase the effectiveness of punishment.

There are many variables which may affect how well any aversion tactics work on a bear including the age, dominance, sex, breeding status, physical condition, personality of the bear, its prior experiences with humans, the continued availability of anthropogenic food sources and attractants, the availability of natural foods, and most importantly the manner in which aversion techniques are applied (Hunt 1985, Hammond et al. 1989, Ciarniello 1997, Hunt 2003).

While the proper application of the tools is an important factor affecting success, it is not enough to apply the tools in a technically correct manner; a person must be able to respond to the bear in a language that it can understand. It's all about ATTITUDE! The officer must be able to convince the bear that s/he is the dominant force and that s/he is in charge. This can be accomplished using the human dominance techniques described in Section 8.3. Knowledge and a correct understanding of the bear's communication, motivation and response will further aid the officer in constantly negotiating appropriate responses to changes in the bear's behaviour. Consequently, adequate training is essential before using aversion tactics, so that it can be delivered in a safe and effective manner.

Advanced training and prior experience working in close contact with black bears is mandatory for working with grizzly bears, recognizing that although many aversion tactics apply to all bears, both species have distinct behavioural differences and require different treatment. For more information on working with grizzlies, refer to "Bear Shepherding Guidelines: For Safe and Effective Treatment of Human-Bear Conflicts" (Hunt 2003).

One of the greatest problems in attempting to aversively condition a bear in a human-use area is the continued availability of anthropogenic food and attractants. Aversion techniques will

generally only work with food-conditioned bears if the negative reinforcement outweighs the positive reinforcement of getting food.

7.3 The Limitations and Benefits of Aversion Techniques

7.3.1 The Limitations of Aversion Techniques

Reactive: Many aversion techniques are reactive – i.e. initiated after the bear has carried out undesired behaviour – and thus do not address the root cause of human-bear conflicts such as allowing bears access to anthropogenic foods. This concern can be addressed by requiring that communities progress toward achieving "Bear Smart" status before they initiate an aversion program (recognizing that no community will ever be 100% bear smart and some attractants will always be available at some point, even if it is just the smell of food cooking, or natural/land-scaped berry bushes).

Manpower Intensive: Applying a planned aversive conditioning program can be time consuming – and thus costly. Even periodic hazing situations can be time intensive, as some bears may require repeated conditioning in order to change their behaviour over the long-term. Reluctance to devote the required manpower resources to aversion programs may contribute to an inconsistent application of the techniques, which may impact their effectiveness.

Motivation of the Bear: How desperate is the bear to obtain food? A lack of alternative sources of natural foods may affect the success of aversion efforts (Dorrance and Gilbert 1977, Stenhouse and Cattet 1984). In other words, if no alternative natural food sources are available for bears to eat, then it may be difficult to deter them from seeking human foods.

In addition, aversion tactics may not work on a bear that is in poor health and unable to fend for itself. Such a bear is highly motivated to find any food it can. Sub-ordinate animals, especially dispersing young males, may also be highly motivated to search for food in peopled areas, away from more dominant bears in prime habitats.

Context Specificity: Many variables can affect the conditioning of an animal in the field. For example, with *improper* application of the techniques, a bear may condition to something unexpected or very specific such as the officer in the green truck or may only condition to the specific context i.e. site where the conditioning took place.

The bear's prior experience with people, particularly members of the public, will also affect conditioning success e.g. if a bear is treated with submissiveness or indifference in peopled areas more often than he's getting treated negatively or with aversion tactics.

Habituation to Techniques: Bears may habituate to noise and, even, physical deterrents with over application. This is particularly true when deterrents are applied inconsistently on food-conditioned bears without using human dominance techniques (HDT).

Intelligence of Bears: Bears are highly intelligent and great at finding the weaknesses in various approaches. For example, teaching bears to avoid people may produce "sneaky" bears by becoming more active at night or only appearing when people are not around. Nonetheless, "sneaky" bears may actually result in decreased human-bear conflicts if attractants are controlled.

Misapplication: If aversion is not appropriately conducted, then it is likely to fail. Bear managers should be adequately trained before carrying out aversion techniques. Managers need a "take charge" ATTITUDE in order to effectively communicate their message to the bear.

Improper application may be exacerbated by poor timing of techniques. Ideally, negative reinforcement should occur within 2 sec. of the bear exhibiting undesirable behaviour (Kilham 2007). This will help the bear quickly make the association between the behaviour and the consequences.

Not a Silver Bullet: Aversion techniques provide a good tool once other Bear Smart elements are in place, but will not usually work alone. It should be considered as only one tool in the toolbox within a more holistic bear management program.

7.3.2 The Benefits of Aversion Techniques

Provides an Alternative to Translocation and Destruction: When a bear is removed, through translocation or destruction, the entire social hierarchy can be affected as another bear(s) moves into the vacated habitat. Unless the attractant is removed, the new bear is likely to exhibit the same unwanted behaviour as the bear that has been removed. With aversion techniques, however, a bear remains in its home range but is taught to avoid people and human-use areas. The presence of this bear (especially a dominant male) often keeps other "untrained" bears from coming into the area. Having a "trained" bear in the area decreases the management workload over the long-term by both reducing human-bear conflicts and eliminating the never-ending cycle of bears requiring removal. It also results in the bear continuing to live as a member of its community and produce young (a very important consideration for grizzly bears).

Buys Time: There is often a time lapse between eliminating a food attractant and the bear learning that the food is no longer available, during which the bear may make repeated return visits to check the site and even engage in more extreme behaviour in an attempt to access food. In this scenario, aversion methods may save bears that might otherwise end up being destroyed (Heuer 1993).

Changed Bear Behaviour: One of the benefits of aversion techniques is their ability to modify previously established behaviour (Hunt 1984, Hunt 2003). They may prevent bears from approaching people and human-use areas. Aversion tactics may also prevent the progressive trend of bears becoming increasingly bold in human-use areas (Yosemite 2001) and may reinstall the likelihood of having avoidance rather than conflict behaviour passed to the next generation (Heuer and LeBlanc 1993, Hunt in prep). Bears are long-lived animals and thus the investment in aversive methods yields long-term pay-offs.

Safer for People: Teaching bears the limits of unwanted behaviour creates a safer environment for people living near bear habitat because it teaches bears that they should not choose to enter human-use areas or approach people (Hunt 2003).

Better Public Relations: Particularly in larger urban centres, the destruction of a bear often results in negative media coverage and public outcry. Non-lethal management programs, in addition to proactive Bear Smart practices, will substantially reduce the number of bears destroyed within municipalities and allow officers to resolve human-bear conflicts without

resorting to lethal means. Non-lethal bear management programs throughout North America have been almost unanimously well-received by both land owners and tourists alike (Hunt 2003).

8 The Toolbox: Aversion Techniques

Aversion techniques include human dominance techniques such as voice and body postures; as well as the use of visual, noise, physical, and chemical deterrents; and even passive conditioning tools.

8.1 The Public's Role

For aversion techniques to be as effective as possible, negative conditioning should be immediate. Ideally, bears should not be left to wander around in a subdivision for an hour or two before an officer attends to work the bear. The general public can help - they should be encouraged to make bears feel as uncomfortable as possible in human-use areas. First, however, residents should make sure the bear isn't cornered, has a safe way to get out of their yard, and that when it leaves it won't be headed into traffic or the neighbour's yard where a birthday party for a dozen kids is in full swing.

The public should then be instructed to make lots of noise – stamp their feet, bang pots and pans, throw stones (see Section 8.5.2) at the bear's rump or empty tin cans that clatter on the cement, or better yet turn the garden hose on the bear (best to aim for the face, but not the eyes directly). People should also be encouraged to yell "Get out of here bear!" from a safe position, but where the bear can see the person (perhaps a 2nd floor balcony).

If possible, residents should look directly at the bear, staring at it, without sunglasses on. Direct eye-contact is the most powerful tool people have at their disposal – it speaks the language of the bear and communicates our dominance in human territory. The more residents in the neighbourhood that actively discourage bears from the area, the less likely bears are to even enter such areas. Passive bear aversion techniques should also be recommended to residents who are less apt to take an active role (see Section 8.8).

Residents should also be encouraged to call the local wildlife agency to report the incident.

8.2 Crowd Control

Sometimes, the only course of action necessary for officers is to maintain crowd control (especially when the bear is already treed), ensuring that members of the public do not have an opportunity to crowd the bear and prevent it from leaving. The bear will leave on its own if it has a safe and clear avenue of escape, sometimes waiting for nightfall. This is a good opportunity for officers to calm bystanders by educating them about bears and their natural behaviour.

8.3 Human Dominance Techniques (HDT)

All negative conditioning techniques are based on working with bears behaviourally, but human dominance techniques capitalize on the natural social behaviour of bears. In the wild, bears defer to more dominant individuals. Human dominance techniques try to mimic bear communication.

The person becomes the "dominant" or "alpha" animal in a human-bear interaction so that the bear retreats and learns to avoid people and human-use areas. Evidence suggests that black bears defer to people in a similar manner to the way they defer to more dominant bears (Herrero 1970; Jonkel 1978, Herrero 1983, Hunt et al. 1988) and that they read human body postures and respond to them predictably (Hunt 2003). In addition, bears within human-use areas generally feel a certain level of discomfort (unless very highly habituated) and are generally very reluctant to harm people (Herrero 2002).

Often, people who encounter bears show submissive behaviour such as backing away, whispering, crouching and quietly retreating into buildings – all actions that a bear is likely to interpret as submissive behaviour. In this way, people may inadvertently communicate to bears that they are welcome to remain within human-use areas. The use of human dominance techniques eliminates this problem as people communicate that they are the dominant animals in the area.

The most effective aversive agents are those that cause high levels of discomfort in the bear (Heuer 1993). Combining human dominance techniques with more traditional repellent and deterrent aversive techniques may increase the level of discomfort and therefore the efficacy of the latter. In addition, by pairing the deterrents with human dominance behaviour, bears are taught to associate the distressing experience with humans, thereby reinforcing the idea that humans rank higher in the heirarchy and inducing bears to avoid people.

Human dominance techniques appear to have great potential for conditioning bears to avoid people and thus may be considered a primary tool by trained people when working black bears.

However, human dominance techniques (other than yelling from a distance) are NOT recommended for use with grizzly bears at this time, due to the potential for grizzlies to respond with aggressive behaviour in confrontational situations. There currently has not been enough research or experience in using human dominance techniques with grizzlies. At present, it is recommended that grizzly bears be treated with passive aversion techniques or with visual, noise, and physical deterrents from a vehicle or other safe place ONLY.

8.3.1

8.3.1 ATTITUDE!

Officers need a "take charge" ATTITUDE or "command presence" in order to effectively communicate their message to the bear. The officer must be able to convince the bear that s/he is the dominant force and that s/he is in charge. Bears are masters at evaluating their opponent's intentions. The officer's "take charge" ATTITUDE must be reflected in every posture and voice command from the moment the officer arrives on scene.

As many dog and horse trainers know, the "power of intention" and the "energy" the officer relays is also critical. Bears will respond to the officer's energy and intent, eventhough it's not likely to be evident to other people. The officer must envision the desired outcome and project his/her intention and the desired result.

The results the officer will achieve are a direct reflection of their ability to respond convincingly and the ability to constantly negotiate with the bear in a dynamic situation. We can not stress enough the importance of bringing full attention to the action; the officer must bring his "A" game to the situation and act like s/he means it!

8.3.2 Human Presence, Direct Eye Contact and Body Posture

When a bear wants another bear or person to leave, it will lock his eyes on the animal, and then walk in their direction transmitting its mood with a purposeful or stiff walk (Kilham 2002).

By mimicking the behaviour of bears, people can assert human dominance. Sometimes, human presence is enough to deter a bear from a site. If not, human dominance needs to be communicated more assertively.

- The most effective tool available to people is direct eye contact because bears recognize eye contact as a position of strength (Kilham 2002). By looking directly at the eyes of a black bear, the hazer communicates his or her dominance. *Sunglasses should never be worn* by the person delivering human dominance because the bear will not be able to see the person's eyes and the tactic will be rendered ineffective.
- Standing tall and directly facing the bear are also recommended.

8.3.3 Voice

Because bears use vocalizations in their communications with one another, the human voice can also be used as a tool to deter bears (Hunt et al. 1988). A loud, firm and commanding tone of voice communicates to the bear that it is not welcome. Simple words such as "get out of here bear" are likely best and easiest for members of the public to repeat. Bears do not respond to the words, but rather the tone of voice. Females should try and lower the tone of their voice.

Often you only need to use your voice to get the bear's attention, allowing you to lock your eyes on the bear and demonstrate your intent.

A firm and commanding voice may be used with grizzly bears from a safe distance only, backed up with the ability to deliver further stimuli if the bear does not move off (Hunt 2003).

8.3.4 Pursuit

Assertively and deliberately pursuing a black bear is a very effective method of moving the bear from an unsuitable area. Bears communicate dominance to one another by walking with a stiff legged walk. This walk can be mimicked by strutting with a purposeful manner. Moving in the direction s/he wants the black bear to go, a person should move purposefully toward the bear. Whenever the black bear is facing the hazer, direct eye contact should be maintained. Pursuit can be silent or the hazer can continue to yell at the bear and stomp their feet.

Most black bears will leave the area if a person chases it, but two or more people pursuing a bear are recommended for safety and effectiveness (Yosemite National Park 2001).

Those involved in pursuit must maintain an adequate distance from the bear to ensure their and the bear's safety (Yosemite National Park 2001). The speed of pursuit should be gauged by the bear's reaction. Furthermore, in situations where pedestrian/vehicular traffic is a concern, the officer needs to "go bear speed" (Hunt 2003), that means not escalating the situation by pushing the bear faster than necessary and NOT using projectiles. The goal is to encourage the bear in the desired direction toward cover rather than inadvertently causing it to run away from you and into a potentially hazardous situation (see Section 9.4.8).

NOTE: A bear that is human habituated or food-conditioned is probably more likely to try to deter you by using dominance behaviour or defensive displays. It is critically important that you communicate your dominance in response. Do not let a black bear get the upper hand! Your safety depends on it.

8.3.5 Bluff Charges

Black bears often bluff charge and chase each other to assert their dominance. These displays are usually accompanied by swatting at the ground or a nearby object. IF the wildlife manager is bluff charged by a black bear AND the bear is a suitable candidate for aversion methods, the officer can assert their dominance in much the same manner by mimicking these actions. Stomping the feet, hitting a nearby bush or the ground with a stick, lunging forward a few steps or suddenly running several steps toward the black bear are all behaviours that can be used by those applying aversion tactics.

As a safety precaution, hazers should ensure that they have an avenue of escape such as quick access to a vehicle in case the situation escalates. Bear spray (not mace) should be in hand with the safety tab removed so that it is ready to use. It is also advisable to provide the bear with an obvious avenue of escape. Bluff charges by humans should only be considered when a second person is present to provide back-up and should NEVER be used on grizzly bears.

Caution must be used with this level of force. Working a bear is a constant negotiation based in the moment and requires the hazer to be continually responsive to the bear's behaviour and to understand that the bear's objective is to avoid potential threat and/or injury. Bluff charges

should only be attempted by individuals who have gained considerable training and experience working with black bears and ONLY if the bear bluff charges them first.

8.4 Noise Deterrents

Noise deterrents work by making a loud, unpleasant sound that causes the bear to be uneasy and move away. Noise deterrents are advantageous if you are a long distance away from the bear. Furthermore, they cause neither harm nor injury to the bear when correctly used.

In some cases, noise deterrents do not work either because the bear has habituated to human noise or because it has no natural fear of the noise. For example, a habituated bear is very unlikely to respond to a vehicle siren if officers remain in the vehicle. Unlike human dominance techniques which speak the language of the bear, a bear may have to be taught that noise deterrents are followed by an unpleasant or negative situation. However, once a bear makes the association, an officer may only have to cock his shotgun to make the bear leave.

To avoid habituating the bear to one sound, officers should not only vary the types of noise deterrents they use on a single bear, but also use them judiciously. Using noise deterrents in combination with human dominance techniques increases the effectiveness of aversion efforts and ensures that the noise deterrent is associated with people.

The following are examples of noise deterrents:

8.4.1 Air horn / Vehicle Siren / Vehicle Loud Speaker

Vehicle loud speakers can be used to amplify your voice as you approach the scene. Air horns and vehicle sirens emit approximately 80-120 decibels of sound. They can be effective when used in conjunction with human dominance techniques to move a bear off. Since no explosive is involved, these tools can be safely used in dry conditions.

8.4.2 Bangers

The most common and effective banger is a 15 mm cartridge fired from a .22 calibre single or multi-shot launcher. The flight pattern of the banger is consistent and when fired, travels about 30 m (100 ft) before exploding with a loud bang.

The disadvantages of bangers, used in a single shot revolver, are that they are slow to reload and cumbersome to use in low light conditions. As such, multi shot launchers are generally preferred over single launchers because they can be pre-loaded.

Because they use explosives, bangers must be used very carefully under dry conditions. Care should also be taken as the cartridges will ricochet if they hit an obstruction such as a tree branch.

To avoid injury to bears, bangers should only be fired from the proper distance so that they do NOT hit the bear. All shooters must know the optimal range of their rounds as they can cause death (Hunt 2003).

Blanks can also be used alone, without the pyro cartridges, as they deliver an extremely loud sound effect by themselves. Using the blank alone eliminates concerns of fire risk, ricochet and injury to the bear.

8.4.3 Screamers

A screamer is also a 15 mm cartridge that is fired from a .22 calibre single or multi-shot launcher. When fired, a screamer emits a loud, continuous screeching noise for approximately 100 m (335 ft). Unlike bangers, their flight pattern is very erratic and is therefore not considered the primary choice. Screamers should not be used in dry conditions adjacent to natural fuel supplies due to the fire hazard.

To avoid injury to bears, screamers should only be fired from the proper distance so that they do NOT hit the bear. All shooters must know the optimal range of their rounds as they can cause death (Hunt 2003).

8.4.4 12-Gauge Crackers

The cracker and whistle cracker are 12-gauge shotgun loads that travel about 100 m (335 ft) and explode with a loud bang, the whistler cracker also emits a loud screeching noise during flight. Their flight patterns are consistent. They are used for working bears at a long distance.

The design of the 12-gauge cracker and whistle cracker requires low velocity, and as a result, the over-powder wad may stick in the barrel of the shotgun. In order to prevent barrel obstruction, an un-choked shotgun must be used and the barrel of the gun must be checked after each shot to ensure there is no blockage.

Another concern with using 12-gauge cracker shells is that if they are used at too close a range, they will penetrate the skin of the bear and explode internally. There is also a risk of forest fire if the surrounding area is dry.

8.4.5 Guidelines for the Use of Noise Deterrents

The improper use of noise deterrents can cause injury to the officer, bystanders, the bear, or damage to property. The following guidelines MUST be followed to prevent problems:

- 12 gauge rounds should be used in un-choked barrels only - check the barrel of the gun after each shot to ensure there is no blockage that could result in a misfire.
- Always be aware of the line of fire and the backdrop.
- Be aware of the potential for a ricochet.
- Do not use screamers under fire hazard conditions (have a fire extinguisher available when using pyrotechnics under any conditions). Take extreme care with bangers if there is risk of fire.

- All shooters must know the optimal range of their rounds as they can cause death at close distances.
- Ensure the deterrent explodes between the operator and the bear – a noise deterrent that explodes behind the bear may drive him toward you or bystanders (unless you are working with a treed bear, in which case you would fire a noise deterrent above its head to encourage it to come down from the tree).
- NEVER fire noise deterrents directly at or under a bear as penetration may occur sometimes resulting in internal explosion (particularly with 12 gauge crackers used at a close distance).
- NEVER load 12 gauge crackers and impact projectiles (e.g. rubber bullets, bean bags) or lethal rounds into the same firearm. Confusion with regard to which round is chambered has and can cause death.
- Bear bangers discharged from a hand-held pen should be avoided as they are inaccurate and have been known to explode in people's hands.

8.5 Physical Deterrents

Physical deterrents include water, stones, paintball marker, bear spray, bean bags and rubber bullets. They work by creating pain and discomfort that a bear learns to avoid. Physical deterrents are usually necessary when working with grizzly bears, but should only be used when proper safety precautions are in place (see Section 9.1 for more details).

Extreme caution must be exercised with all types of projectiles. Improper use or firing at too close a range has resulted in serious injury and death (Hunt 1985). Projectiles must be used carefully around humans for the same reasons. Minimum distances will vary depending on the size of the bear. Never use rubber bullets on cubs. Only bean bags should be used for younger or smaller bears. It is also important to test the optimal range of new impact projectiles, especially if you are using a modified firearm. Note that rubber bullets harden over time and become lethal. Never use a hardened rubber bullet under any circumstances.

Physical deterrents should be accompanied by human dominance techniques; they should not be used passively.

8.5.1 Water

Turning a garden hose on a bear can be very effective. Unlike most physical deterrents, it is best to blast the bear in the face with the water (avoiding a direct blast into the eyes). A large toy water gun such as the "Super Soaker" can also be useful, especially when filled with vinegar diluted with water.

8.5.2 Stones/Marbles

Stones or marbles can be either thrown or sent out of a slingshot. Wooden balls are also available for use with a sling shot. They should NOT be aimed at the face due to the danger of hitting an eye, but rather aimed at the rump of a bear. The maximum size of stones/marbles/wooden balls should be the size of a golf ball (Yosemite National Park 2001). Slingshots also fulfil the criteria

for non-contingent punishment making them a highly effective tool (see Section 7.2.4 to learn why).

8.5.3 Paintball Marker

Paintball markers can also be used as a deterrent, avoiding injuring to the bear (when shot away from the face). They are particularly useful when used to move bears in a certain direction. Because the paint balls are released in a continuous stream, the officer can send a steady message to the bear as to the direction s/he wants the bear to travel (or more accurately, the direction the bear wants to avoid).

Note: Bears are attracted to paintball residue, therefore the area must be cleaned up after the operation. An alternative to paintballs are rubber balls. Rubber balls are extremely cost effective and can be used many times over. They just need to be swept up, rinsed, dried and put back in action. Best of all, they don't leave a paint mess behind. Ensure the paintball gun/marker accepts rubber balls. Pepper balls are also available, but we do not recommend them. Since pepper residue is only effective when it comes in contact with the bear's eyes, nose and throat and pepper balls can NOT be fired at the bear's face, they are an ineffective tool.

8.5.4 Bear Spray

Although bear spray is largely used as a defensive tool in the wilderness, it can also be used as a deterrent to create a negative experience for the bear and as back-up protection when conducting aversion techniques. Bear spray contains a red pepper oil called capsaicin, a derivative of cayenne peppers. Capsaicin causes intense irritation of sensory nerve endings, but does not cause blisters because it has little effect on capillaries or other blood vessels (Rogers 1984). The result is pain, but only temporary. Toxicity tests on capsaicin have shown no lasting harm to the skin or eyes of people or other animals.

Bear spray is most effective when working a black bear at distances of less than 3-6 m (10-20 ft), when other tools may cause penetration. To be effective, the spray must get into the eyes and nose of the bear. It can be used in a wide variety of situations (e.g. to evict bears from beneath buildings or to get them out of garbage containers). It should be noted that bear spray may temporarily incapacitate a bear and care must be taken in and around pedestrian or vehicular traffic, as you don't want to debilitate a bear that is about to run into traffic or bystanders.

Research suggests that bear spray on objects or the ground may actually act as an attractant to bears. Since bear spray is a stable weather-resistant compound, it may retain its attractant properties for days or months. Bear spray should be cleaned from objects and the ground after use to avoid attracting bears (Smith 1998). Canisters, that have been fired, should also be cleaned (particularly the nozzle) and stored in bear-proof locations.

Bear Spray should not be used inside homes or vehicles as it can cause permanent damage. Also when using it in a developed area, caution must be taken not to have spray drift into a schoolyard or window of a home.

8.5.5 Guidelines for the Use of Bear Spray

A word of caution….. Not all pepper sprays are the same. Ensure that you are using a bear deterrent spray, NOT a personal defence product designed for use on people or dogs. Follow the directions and check the product's shelf life.

Since bear spray products vary tremendously, the following guidelines are recommended when choosing a bear spray (Interagency Grizzly Bear Committee):

- The spray should have a minimum of 1.3 to 2.0 % capsaicin and related capsaicinoids derived from Oleoresin of Capsicum.
- The size of the container should be a minimum of 225 grams (7.9 ounces)
- The bear spray should spray in a shotgun-cloud pattern
- The spray should last a minimum of 6 seconds

When working with bears, the can of bear spray should be carried in your hand with the nozzle pointing away from you with the safety tab removed.

Should you need to use the bear spray, aim for the face of the bear. If a bear is charging, point the canister towards the charging bear, slightly upwards, and begin spraying when the bear gets within 40 feet so that the bear runs into the fog. The other option is to spray a 2-3 second burst in the bear's eyes and nose when the bear is 3-4 m (9-12 feet) from you. The latter option is useful in situations where there is a strong wind.

Many factors affect the effectiveness of bear spray including the spray distance, strong winds, wet or rainy weather, extremes of heat or cold, and the product shelf life. Caution should be taken in using bear spray on windy days as the wind can blow the spray back to the user and temporarily disable him.

Remember, bear spray should only be sprayed on the bear as pepper spray residue can be a strong bear attractant. There have been a number of incidents where people sprayed items such as tents or backpacks to keep bears away and instead bears were attracted and found licking and biting the items. In another situation, bears were found rolling in pepper spray residue on the ground.

Warning: the spray is explosive and extremely flammable and should be transported in an appropriate carrier. When transporting bear spray, always make sure the safety is securely in place and will not fall out. Bear spray should never be transported inside the passenger area of any vehicle or airplane unless in a fully sealed, enclosed container (like a Kozee-Tote from Counter Assault).

8.5.6 12 Gauge Bean Bags

The 12 gauge bean bag is a shotgun round that discharges a 2.5 cm (1 in) fabric bag filled with lead shot, with a muzzle velocity of about 90 m (300 ft)/sec. Caution should be exercised, as penetration or injury can generally occur if discharged at a distance of less than 10 m (30 ft), but individual product specifications should be checked. The maximum effective range is usually 25 m (85 ft) and the accuracy is reliable.

8.5.7 12 Gauge Rubber Slugs

The 12 gauge rubber slug is a shotgun round that discharges a 73 grain rubber baton. The muzzle velocity is 220 m (738 ft)/sec and extreme caution must be exercised, as penetration or injury can occur when used with smaller bears or if it is discharged at a distance less than 25 m (85 ft). The maximum effective range is usually 75 m (250 ft) and the accuracy is reliable. Check individual product specifications as they almost always vary from one slug to another.

There are various types of rubber slugs on the market ranging from rubber to hard plastic. When purchasing rubber slugs for use with bears, do not buy the hard plastic slug as a higher probability of penetration is associated with its use. Check all rubber slugs for hardening – they do harden over time (particularly if stored at temperatures of 1˚ C or less) and should be disposed of if they have become rigid as they can cause severe injury or death to bears.

To ensure the safety of bystanders, any projectile should be handled as if it were a lethal round, taking line of fire as well as a safe backdrop into account.

8.5.8 Guidelines for the Use of Physical Deterrents

Improper use of 12 gauge physical deterrents can cause serious injury or death to officers, bystanders or the bear as well as cause property damage. The following guidelines MUST be followed to prevent problems:

- 12 gauge rounds should be used in un-choked barrels only - check the barrel of the gun after each shot to ensure there is no blockage that could result in a misfire.
- Be aware of the line of fire and be sure you have a safe backdrop
- Be aware of ricochets
- Be aware of distances and do not discharge any closer than the recommended minimum distance for each round, usually 25 m (85 ft), but check the individual product specifications
- Impact rounds should be fired so they strike the bear in the hind-quarter only – NO head shots – physical deterrents can cause severe injury and even death when used improperly or too close.
- ALWAYS use bean bags over rubber slugs for small, thin or young bears. Do not use bean bags or rubber bullets on COY.
- To avoid injury to the bear or fatality, never load both lethal and non-lethal rounds in the same firearm. Bears have been killed during hazing actions when lethal rounds were confused with rubber bullets /bean bags and fired unintentionally.

8.6 On-site Release

Capture and on-site release has been used to create a negative experience for bears in conflict situations so that they avoid human-use areas (Brady and Maehr 1982, Wooding et al. 1988, Shull 1994, Hunt 1997, Clark et al. 2002). This technique resulted from researchers noticing that after release, the bears they had trapped and immobilized for research tended to keep away from the capture locations.

More recently, people have been experimenting with amplifying the negative experience of on-site releases by using aversion tactics upon the bear's release applying a combination of deterrents including human dominance, noise, pain and bear dogs (Hunt 1997, Hunt 2003). This is referred to as a "hard" release.

The goal is to convey a clear and useful message to the bear thereby increasing the likelihood of a successful outcome (Hunt 2003). If possible, "hard" release the bear on-site (where it was caught), in order to condition the bear to associate the site with a negative experience and avoid that site in the future. For example, if the bear has a long history of coming into campgrounds for food, the release site should be in a campground, preferably the same campsite where it was getting into trouble.

The location of the conflict usually dictates whether an on-site release is possible. An on-site release may require permission from the management agency or landowner. Safety aspects must also be considered, including the safety of the bear, the public or team members.

If an on-site release is not possible, use a pseudo-site which is similar in characteristics that you want the bear to associate with the conflict site. If, on the other hand, the bear is released away from its capture location or translocated, with the intent that the bear stay in the new area, it should be given a "soft" release (i.e. without the use of human dominance or deterrents). Off-site releases, or translocations, can be useful if the bear's actions are seasonal in nature or the bear is translocated as part of a population recovery effort. At the very least, this option buys time to allow attractants to be removed before the bear returns.

NEVER punish the bear while it is still inside the trap. Furthermore, ensure the trapped bear is kept away from the public – people who gather around a trap to see the bear or tease it can cause the bear a great deal of stress. The golden rule is to never stress or punish a bear if they are unable to leave or escape as it may cause the bear to react aggressively toward people in the future.

8.7 Bear Dogs

Dogs have been used by humans throughout history for hunting or to protect people and livestock from various species of carnivores. A number of canine breeds have been recognized for their potential to assist in bear aversion. In Arctic Canada, the Inuit have used the Canadian Eskimo Dog for centuries to attack and hold polar bears at bay (Carpenter 1989). In Louisiana, the Blackmouth cur has been used to teach persistent conflict bears to avoid certain areas (Davidson et al. 2003). The Great Pyrenees of France and Spain, the Akbash of Turkey, and the Konmondor of Spain have been used to reduce bear depredations on livestock and apiaries (Green and Woodruff 1989).

Currently, the most active work being done using dogs to deter bears is by Carrie Hunt with Karelian Bear Dogs (KBD). KBD's have been used for decades to track and bay game species, particularly grizzlies (the dogs were originally bred in Finland to hunt brown bears).

The KBD's shepherd bears by barking and chasing them from areas where they would come into conflict with people. The shepherding is combined with other aversive conditioning tools such as yelling, throwing stones, bear spray, and rubber bullets.

While much of the research has focused on finding the right breed of bear dog, it may be that the individual personality of the dog is more important than its breed. Many people who work around bears have used their own dogs as a deterrent. Some people have even used horses. The animal needs to be comfortable around bears showing no fear, trained to respond to voice control so that the handler remains in charge, and exceptionally trustworthy when interacting with the public (Hunt 2003).

The advantage of using bear dogs is that they provide an added "partner" and a "safety net" while conducting conditioning on bears. They are also an excellent ambassador for public education (Hunt 2003). Although conditioning can be done without bear dogs, the use of dogs as a tool increases the options available for training a bear. For example, dogs can find and work with uncollared animals; this is particularly useful for roadside bears and in finding bears in communities or campgrounds. They can also aid in pushing bears out of large open meadows or dense wooded areas that are beyond the range of non-lethal projectiles (Hunt 2003).

The disadvantages of using bear dogs include the time and cost of either training a dog or contracting one or more over an entire field season or several years. Dogs are also a higher maintenance tool: they can not be put back in the toolbox at the end of the day, but rather, require daily care.

Dogs used to conduct bear aversion require professional training. At minimum, the dog owner should acquire guidance and advice from a bear shepherding expert. We recommend contacting us or the Wind River Bear Institute (www.beardogs.org) for help.

8.8 Passive Conditioning

Passive conditioning involves the application of an unpleasant stimulus that is triggered by the bear's own actions - either in the presence or absence of humans (Hunt 2003) e.g. triggering a motion sensor that in turn activates a siren; releasing pepper spray by taking bait; or making contact with an electric fence.

One of the advantages of passive conditioning is that negative conditioning can be instantaneously accomplished in the absence of people. Thus, the manpower, and consequently the costs, required to condition a bear are less and a bear receives consistent conditioning every time it engages in an unwanted behaviour or visits a human-use site. Passive conditioning is therefore highly recommended. Another benefit of most passive conditioning mechanisms is their ease of use and the peace of mind they offer residents.

Because the conditioning works 24 hrs/day in the absence of people, bears become conditioned to be wary of human-use areas rather than people. As a result, passive conditioning may be useful in situations where bears have been aversively conditioned to people, but still try to access human food sources at night or at other times when people are not around.

Passive conditioning devices and techniques show great promise, particularly those that deliver an electric shock or a shot of pepper spray. However, bears may habituate to other sound/visual

methods over time, as they learn that these devices pose no real threat to them. Most equipment used to deliver passive aversion requires regular maintenance to remain effective. Warning signage or yellow caution tape should be placed with any passive deterrent that may cause harm to people.

For maximum effectiveness, passive deterrents should be installed prior to den emergence, so that bears never have the opportunity to become comfortable in the area. It is always best not to let bad habits develop in the first place, as opposed to trying to break them once they've become established.

Care must also be taken to ensure that bears are unable to distinguish "booby-trapped" items from regular ones either by sight, smell or sound. If they can distinguish between them, they will only avoid the rigged items. For example, a garbage bin rigged with bear spray worked only once on a bear that had already been getting in to garage bins regularly (Tim Manley, Montana Fish, Wildlife & Parks, pers. comm.). After being sprayed, the bear began carefully pulling the bait out of the bin and abandoned it as soon as she heard the click of the pepper spray canister engaging. She continued to access garbage from other bins because she had previous success with this. Had her "first" experience accessing garbage out of bins ended with bear spray, she may well have decided not to risk it with other bins. "Booby traps" are best set as soon as a bear begins exhibiting problem behaviour to prevent that behaviour from escalating. This is particularly true if the problem is very specific as many animals tend to specialize in one area when they are first learning about anthropogenic attractants (e.g. breaking into a specific model of car, or accessing golf carts). If a manager is able to address that specific conflict behaviour before the bear generalizes its behaviour to include, for example, breaking into all cars or moving from golf carts to golf bags on the backs of people, there is a much better chance of extinguishing the behaviour.

A number of passive bear aversion devices have been developed and are available on the market.

For current information on where to order these devices, see our website: www.bearsmart.com/bear-management/non-lethal/passive-conditioning

The following are examples of passive tools:

Electric Fencing: Electric fencing has been shown to be useful under a number of circumstances in preventing bears from accessing food, garbage and agricultural areas. Professionally installed electric fencing is particularly useful for areas where a bear attractant exists and cannot be removed such as landfills, orchards and apiaries.

Once a fence has been installed, it is essential that it be properly maintained in order for it to be effective as bears may periodically retest fences. Maintenance includes keeping the chargers working properly and removing weeds and other debris from touching and shorting out the fence. A good grounding rod is also essential.

Portable electric fence units have become fairly inexpensive and simple to erect. They have been used by field researchers and hunters for years to successfully deter bears from field camps. Even a backpacker's version is available, powered by solar or batteries. Chicken coups and even regular livestock fences have been successfully hot-wired to deter bears. In fact, a portable electric fence unit can be adapted to anything you want to keep a bear away from. e.g.

- **Electric Lunchbox:** a small cooler or garbage can is fitted with an apparatus (adapted from a portable electric fence unit) that gives the bear a shock when it goes after the bait.

bear investigates baited electric lunch box	*bear lifts off lid and gets shocked*	*bear leaves*

- **Nuisance Bear Controller:** The NBC is an inexpensive, portable, and adaptable system that can potentially be used in a variety of situations to deter bears from attaining concentrated food sources. It is powered by two 6-volt lantern batteries.
- **Electrified "Unwelcome" Mat:** You can construct an electrified pad using cattle and hog panels with horse stall mats. Pre-manufactured mats are available as well. These mats can be useful for keeping bears off of porches or decks, away from doors, out from underneath bird feeders, or away from dumpsters. Keep in mind that anything, or anyone, who steps onto the mat receives an "unwelcome" message! They probably would not be appropriate for areas where people or pets walk. Nonetheless, they are effective for modifying the behaviour of bears that routinely visit the same place over and over.

Instructions on how to erect portable electric fencing, as well as, how to electrify items to be avoided like coolers or garbage cans can be found at www.bearsmart.com/bear-management/non-lethal/passive-conditioning.

Scarecrow: This device is hooked up to a normal garden hose and mounted in the ground. When the motion detector senses movement, the Scarecrow sprays a 3-4 second burst of water and then resets itself. The spray head can be adjusted from 10°- 360° to cover a small or large area and has a 35 ft range for flexibility in placement. The Scarecrow is simple to use, safe and inexpensive.

Unwelcome Door/Window Mat: Unwelcome mats are basically boards full of nails pointing up, that are placed in front of doors and windows to discourage bears from entering buildings. They are

particularly useful at remote cabins that are not used for extended periods.
Unwelcome mats are simple and inexpensive to make. Instructions on how to build one can be found at: www.bearsmart.com/bear-management/non-lethal/passive-conditioning.

Critter Gitter: detects animals moving into an area up to 13.5 m (40ft) away using passive infrared, body heat or motion detection and then emits ear piercing sounds and flashes lights. This detector has been designed to change its sound and light patterns with each intrusion and automatically reset itself.

Even so, one of the disadvantages of the Critter Gitter is that bears may become acclimatized to the sound and lights over time and no longer move from the area. However, an advantage is that the device alerts homeowners when an intruder is around so that they can take the appropriate action. Keep in mind that the Critter Gitter will be triggered by any animal, including a raccoon, cat, dog, or coyote that passes by the sensor, day or night. This disturbance may not be acceptable to neighbours.

Bear Be Gone: has been designed to resemble a garbage can, but the bear receives a shot of bear spray in its face when it tries to take the bait. Bear Be Gone can be used to teach bears to avoid both garbage cans and specific areas.

Visual Deterrents: Flashlights, torches, flashbulbs and other bright lights have been used to deter wildlife at night; but research has shown that while these items can deter deer and wolves, they have little to no effect on bears (Shivik et al 2003). However, residents who are receiving nocturnal visits from bears may want to install motion sensitive outdoor lights to at least serve as a warning that an intruder has entered the property.

9 Field Application

This section outlines considerations that should be taken in the field prior to applying aversion tactics. Some factors are out of our control, like the influence of the natural environment, but still need to be considered when choosing the appropriate strategy to address a particular conflict situation. Environmental conditions like global warming or natural food failures (e.g., low water preventing salmon from spawning, berry crop failures) can have a major impact increasing the number of bear-human conflicts. Although further exploration into strategies is required; it is important just to understand that potential environmental factors also play into decision making.

Furthermore, bear management control methods near urban areas have traditionally influenced the urban/wild bear population. As less bears are destroyed or hunted near urban areas, the population dynamics are likely to change. It is hoped that a natural equilibrium will occur and the conflicts will be manageable due to "Bear Smart" practices. But, will this be the case everywhere? Only time will tell, if an increased population coupled with environmental factors reducing food availability, will result in bears frequenting urban areas regardless of the "Bear Smart" efforts. We may not have the answer at this time. It is hoped that communities would tolerate bears as they pass through human-use areas, but the opportunity to stop and get into trouble with attractants is minimized. It is important not to view this scenario as a failure in the system, but to be aware of this so that false expectations are not created among the public to the extent that they withdraw their support for the Bear Smart Community program.

NOTE: Most of the information in Sections 9.2, 9.3 and 9.4 is summarized from “Bear Shepherding Guidelines: For Safe and Effective Treatment of Human-Bear Conflicts” (Carrie L. Hunt 2003). For more detailed information and instructions to aid in decision-making, investigation and conditioning lessons, please see the above noted document and course for protocols for creating Key Profiles: Site, Bear and Safety and Effectiveness Profiles; Key Indexes: Site Suitability, Bear Aggression, Bear Conflict Level, Predicted Outcome Indexes; and Key Weighting Factors.

9.1 Bear Aversion Protocol

9.1.1 Training

Agencies responsible for wildlife management should develop a certification process for officers carrying out aversion tactics, in which recertification would be required after a certain period of time.

Training is particularly important if physical deterrents are applied as they can cause injury if used improperly. Officers conducting aversion must know the limitations of their projectile loads in order to use them correctly. Advanced training is mandatory for officers working with grizzly bears.

Officers living in areas where both black and grizzly are found may require more information on the two species such as how to distinguish them from one another. This information can be found in Section 3.2.

9.1.2 Plan the action

Before applying aversion techniques, it is essential to analyze the situation and define the goals and objectives of what the desired outcome is in the given situation. The goals of the community, the nature and amount of human activity in the area, the bear's behaviour, people's past behaviour toward the bear and the specific lesson you are trying to teach the bear will determine your actions i.e. the choice of aversion techniques used and the manner in which they are applied. Objectives might include eliminating access to anthropogenic food or garbage, maintaining a certain level of wariness of people, eliminating bear activity in the area during the day, or establishing strict no-go bear zones. A plan is especially useful with different personnel working the same bear.

Plans can be established for long term aversive conditioning programs, i.e. a bear is taught, through several planned lessons, that a school yard is a no-go bear zone. On the other hand, it may be necessary to formulate a quick plan, to address a situation that requires immediate action, e.g. to simply haze a bear that has entered a school yard just before recess.

9.1.3 Take Safety Precautions

During field application, the safety of officers and the public should not be compromised. Members of the public must not crowd the bear or interfere/prevent the bear from leaving. Supporting officers are responsible for protecting and controlling bystanders. Additional officers can also help to block inappropriate avenues of escape to encourage the bear to move in the desired direction. More than one person may work the bear, but a single person or "team leader" should oversee the delivery of aversion tactics to ensure that the bear is not being given confusing messages. The leader, or person overseeing the aversive action, should keep his or her attention focused on the bear during the process.

Bear spray is recommended as the first line of defence for personal protection when conducting negative conditioning with bears. Bear spray minimizes concerns about line of fire, a safe back-drop, and the position of other officers or bystanders. Although common sense might suggest that guns would provide greater personal protection, research and experience are showing the opposite. Research suggests that human-bear encounters involving firearms are more likely to result in injury to humans and bears. Evidence suggests that persons encountering grizzlies and defending themselves with firearms suffer injury about 50% of the time, while persons defending themselves with pepper spray escaped injury most of the time and those that were injured experienced shorter duration attacks and less severe injuries (US Fish and Wildlife Service 2005). Canadian bear biologist Dr. Stephen Herrero reached similar conclusions based on his own research -- a person's chance of incurring serious injury from a charging grizzly doubles when bullets are fired versus when bear spray is used.

In circumstances where it is necessary to have lethal back-up (e.g. when working with a grizzly or a bear of either species that has shown aggressive behaviour), one field personnel member

should be assigned this role and only his or her shotgun should contain lethal slugs. Working with conflicts can be a stressful situation for the bear and the personnel involved. This will avoid confusion.

To avoid an accidental discharge of a lethal round, lethal and non-lethal rounds should never be used in the same shotgun. Furthermore, the rounds should be a different colour (red is suggested for lethal rounds) so that they are easily distinguished from non-lethal cartridges.

We also recommend that a "safety" orange stock shotgun be used with all non-lethal rounds. This identifies the shotgun as a non-lethal tool to the general public, avoiding some explanation to concerned bystanders. It also provides a visual reminder to the officer as to which shotgun contains non-lethal vs. lethal rounds.

9.1.4 A special note about grizzly bears

Much greater care must be taken when working with grizzlies, due to the tendency of this animal to react more aggressively in certain confrontational situations than the black bear. The safety of bystanders and officers delivering deterrents must be assured, particularly when using physical deterrents. Officers should stay in vehicles, unless they can work the bear from a safe distance. However, using trained bear dogs to work grizzlies at a closer distance using Bear Shepherding protocol has proven to be safe and effective (Hunt 2003). A team of three or more members will decrease the risk of a charge by increasing the numbers of opponents facing the bear. Both bear spray and lethal backup are recommended. Again, human dominance techniques (other than yelling from a safe distance) are not recommended for use with grizzlies.

9.1.5 Make sure it doesn't happen again

Once the bear has left the area, the site should be examined to determine why the bear was attracted to the area in the first place and all attractants should be removed immediately (see Section 12 for more information on managing attractants).

9.2 Assessing the Site and Safety Risks

Before employing aversion tactics, the site must be assessed for suitability. The site assessment will help you to address whether the bear has a clear and safe escape route that leads to secure cover including how far the bear has to travel and whether there are any obstacles that might prevent the bear from reaching secure cover. In some cases, these concerns may have to be remedied before proceeding.

The following points should be used to guide the assessment of the site:

9.2.1 General Availability of Attractants:

- Are natural/anthropogenic attractants available at the site and in areas adjacent or near the conflict site? Can they be removed after conditioning to prevent the bear from returning? As mentioned previously, aversion tactics will work with food-conditioned bears if the negative reinforcement outweighs the positive reinforcement of getting food. While it is not possible to stop a bear from eating, it is possible to stop a bear from eating in the presence of people (Hunt 2003). However, if a bear continues to have access to attractants, much greater and more consistent effort may be required to achieve successful results.

9.2.2 Site Suitability for Conditioning:

- To what extent has the site been developed? Is it an isolated site, rural, semi-rural, subdivision/trailer park, or highly developed? The more highly developed the site, the greater the concern for human/bear safety; and the more difficult it might be to move the bear out of the area.
- Are the site and adjacent lands easily accessible for treatment? Are there any topographical obstacles?
- Are there concerns for human safety i.e. can random foot traffic be controlled?
- Are there concerns for bear safety i.e. can vehicular traffic, if any, be controlled?

9.3 Assessing the Suitability of the Bear

To determine whether conditioning is feasible given available resources, the following should be assessed, whenever possible (Hunt 2003):

- What type of conflict is it – sighting; accessing anthropogenic food sources; causing damage to grain fields, fruit orchards or gardens; causing property damage; livestock depredation; entering structures (3-sided vs. 4-sided); approaching people?
- What is the bear's level of aggression prior to treatment? Is the bear exhibiting behaviour that risks officer or public safety? (See Section 6.2) A bear that shows *true* aggression and is a risk to public safety should not be considered for aversion tactics. NOTE: remember, it is important not to confuse ritualized defensive behaviour (like huffing, jaw popping, slapping the ground or lunging) as aggression (see Section 6.2.1.).
- What is the bear's motivation? In National Parks, such as Jasper and Banff in Canada and Glacier in the U.S., a bear that is judged to have acted under <u>normal</u> defensive circumstances (defense of cubs, a carcass or other major food source; or provoked or cornered) is generally not handled or removed, even if the bear injures a person. In the case of a bear feeding in an area, the site may be closed to public assess for a period of

time. It is best to consult with the appropriate local authorities regarding policies and to aid in making this type of decision.

- How strong is the bear's drive to obtain food? Although a bear's drive is strongest during fall hyperphagia, they are always highly motivated to find food. Are there natural foods available away from human-use areas where the bear can be diverted to? If natural foods are in short supply or unavailable, it will be difficult to deter bears from anthropogenic food sources. Perhaps a higher level of tolerance is needed during these periods – i.e. if a bear is feeding on some apples in a landscaped tree a reasonable distance away from a home, it might be considered acceptable, when NO natural foods are available. The level of tolerance will vary from community to community.

- What is the bear's current level of habituation or food conditioning (if known)? Aversion techniques may still be effective on habituated bears. However, depending on the level of food conditioning, the bear's behaviour may not be as easily deterred.

- Does the bear have a previous history of human-bear conflict i.e. is this the first conflict vs. repeated conflict situation? Bears will little or no experience around people and human food will be more easily deterred than bears with a long history of human-bear conflict.

- What is the general health of bear (if notable)? Health can be a difficult factor to assess. Unless the bear is severely emaciated or has sustained an injury that prevents it from feeding, it can usually be treated with <u>non</u>-physical tools.

- Is it a grizzly or black bear? Grizzlies may react more aggressively to aversion tactics and therefore additional safety precautions must be taken (see section 9.1.4).

- What is the sex class (if notable) and estimated age of the bear? Age may not play as big a role as previous history, although a young inexperienced bear may learn quicker than an older bear with established behaviour patterns. Nonetheless, it is important to remember that all bears are individuals with unique personalities and may respond differently in different situations. A sow with young will require additional precautions to ensure the family is not separated during treatment.

- What is the bear's immediate response to conditioning? A bear that exhibits an assertive attitude toward humans during conditioning may require a higher level of negative conditioning techniques. A bear that exhibits aggressive behaviour (and there is a reasonable expectation that the behaviour will lead to physical contact) may be too great a risk to officer/human safety and aversion tactics may not be appropriate.

NOTE: To complete a more in-depth assessment, please refer to "Indexes for Creating Bear Profiles: Aggression and Conflict Level" and identification of additional "Key Weighting Factors" detailed in the manual "Bear Shepherding Guidelines: For Safe and Effective Treatment of Human-Bear Conflicts" (Carrie L. Hunt, Wind River Bear Institute, 2003).

9.4 Methodology

This section introduces various methods for effectively modifying a bear's behaviour using aversion tactics. Below is a summary of Hunt's general rules for conducting conditioning lessons (Hunt 2003):

9.4.1 Make the lesson meaningful:

Take the time to make a safe, effective and meaningful lesson plan. Give careful consideration to what it is you are trying to teach the bear e.g. to avoid a particular site; to move away from pedestrians; or to stop accessing attractants in the presence of people. Ensure the bear can do what you are asking of it e.g. it is difficult to deter a bear from anthropogenic foods if there are no natural foods in the area.

Then ensure the lesson teaches what you want the bear to learn e.g. a "hard" release with treatment of a translocated bear defeats the purpose since you're actually teaching the bear that the new site is inappropriate.

Teach bears to associate their behaviours with resulting consequences. The first few lessons are the most critical. Ensure there is enough manpower to carry out the lesson plan consistently over the first few hours or days.

9.4.2 Inform bystanders:

Although it usually takes your entire attention when dealing with bears, when possible, take the time to talk to the public about what you are trying to accomplish. You can also talk to them about what they can do to help – whether that's leaving the site on cue or assisting with the action in a safe manner, such as blocking inappropriate avenues of escape with their vehicle and honking or yelling. Ensure that you do not place members of the public at risk.

9.4.3 Be consistent:

Since it is more difficult to teach bears to avoid areas inhabited by humans after receiving mixed messages (i.e. sometimes the bear is rewarded for accessing human-use areas with food, other times it has a negative experience and is moved off), it is important to strive for a level of consistency in applying aversion methods. Achieving consistency means being prepared to work the bear as often as possible when it comes into conflict with people. Negative conditioning must outweigh positive food rewards.

Sometimes, bears come to associate the sound of an officer's shotgun or vehicle with a negative experience and will respond quickly to an officer, but not the general public. A consistent approach, including a consistent command like "Get out of here bear" will elicit a consistent response and will help teach the bear that the officer is not the problem, but that the site and people in general are to be avoided.

9.4.4 Think like a bear:

It is very important to work from the bear's perspective: how does it perceive things? A bear's life revolves around (1) finding food (making it difficult to teach a bear to stay away from available attractants); and (2) avoiding injury/death (making it easy to teach a bear to use security cover).

Also keep in mind, that a bear lives in a dominance hierarchy and it is your job to convince the bear that humans are at the top of the hierarchy and have the biggest, meanest ATTITUDE in town; and that approaches into both our personal space and property should be avoided.

Another way to accomplish that is to "stack the odds" against the bear by outnumbering it. Whenever possible use a minimum of 2 officers.

To paraphrase Lt. Col. Cooper, USMC, RET. (firearms expert, author),

"mindset is more important than hardware."

9.4.5 Send the bear a clear message:

Bears are masters at interpreting human body language and vocalizations (Hunt 1984). It is thus essential to ensure the "message" being communicated to the bear is clear. Behaviour that would indicate human submissiveness, such as turning your back on the bear or crouching, laughing, or smiling must be avoided. Untrained dogs or fearful dogs can also send the wrong message resulting in an unwanted response by the bear.

9.4.6 Teach the bear to "choose" to flee and seek cover:

For both roadside/trailside and developed-site bears, use aversion tactics to first teach the bear that it has a choice to leave, then to recognize and avoid human boundaries e.g. the bear has a negative experience while engaging in inappropriate behaviour, but as long as it is leaving, nothing bad happens- all negative stimuli stops- if the bear stops leaving – start using negative stimuli again and repeat.

Then teach it to use cover when people or vehicles approach - stop delivery of the negative stimulus when it goes into full cover. For roadside/trailside bears, it is important not to pursue the bear into cover as you merely want it to learn to hide when vehicles or people approach (cover must remain a secure place for the bear). However, a developed site bear may be worked in the perimeter zone, if this is a location used to "stage" and wait for officers to leave. In this case, you want the bear to move far enough off site that it cannot see or smell attractants and be tempted back into the site.

9.4.7 Ensure that the bear has an appropriate escape route when applying aversion techniques:

Make the "right thing easy and the wrong thing hard"- a horse training philosophy! The theory is to confront the bear in a way that does not elicit aggression but instead, elicits leaving easily. To accomplish this, ensure that inappropriate avenues of escape are blocked, while the route you

have chosen for the bear is clear of obstacles that might make it difficult for the bear to leave e.g. pedestrian or vehicular traffic; or natural/man made objects in the path. If a black bear is inside/outside a building with a stairway, block the route "up" as black bears have a tendency to go up (just as they innately climb trees when threatened).

9.4.8 Go Bear Speed:

Your speed of pursuit should be gauged by the bear's reaction to what you are asking it to do, as well as an assessment of possible worst-case scenarios. This is of particular importance in situations where pedestrian/vehicular traffic is a concern. For example, if you are asking a bear to leave a site where you do not have control of random foot or vehicular traffic and there is plenty of it around (e.g. campgrounds or town sites), either tree the bear immediately and wait for a quieter hour, or if that is not possible, move the bear out at "bear speed". It may not be desirable to "tree" the bear (depending on whether crowd control is possible), unless the goal is to immobilize and remove the bear from the area.

Moving a bear at "bear speed" means allowing the bear to leave at its own pace and not using projectiles (e.g. cracker shells or rubber bullets) or anything that travels faster than the bear itself is moving. In this way, the bear can pick its own way through the crowds and streets as it always has, making good choices and not getting too fearful or aggressive.

Use mostly voice commands, through yelling and/or dog barking, to create a "wall of sound" to push the bears away from the areas you do not want them to go. If the bear is moving off, but not running, you can continue pursuit at the speed the bear is traveling. If the bear stops or pauses and looks back, you can quicken the pace, yell louder and run a few strides towards it (dogs are especially useful here), to ensure the bear understands it must continue on its way. If the bear will not move - make sure it has a clear avenue of escape and it has collected its young before continuing to push. Occasionally, you may have to use a cracker shell in this situation.

9.4.9 Using the appropriate level of force:

We recommend that you use an initially intense level of force with black bears (as noted in Section 7.2.1). Always ensure the action can be carried out safely and the bear has an easy way out. Initially intense punishment should not be at the expense of safety (you may need to go bear speed if people/vehicle traffic are present), hold back on projectiles until the bear has an escape route. You may hold additional tools in reserve as a trump card in case you need them as an exclamation point or for a bear who tries to backslide.

When working with an adult grizzly, use a low level of force the first couple times you work the bear. This teaches the bear that it has the option of leaving, reacting in "flight", not "fight". In subsequent actions with the same bear, the level of force can be increased.

9.4.10 Know your projectiles and make them count:

Be familiar with the technical specifications of all rounds being used. Use the round appropriate for the desired distance. Don't "pepper" the bear with hits from too far away. A single shot that teaches the bear to avoid getting hit again is more effective. The bear should learn that *it's not worth it* to go back and try it again. Also, avoid habituating the bear to noise by overusing auditory deterrents.

9.4.11 Timing is important:

It is crucial that the bear receive clear and consistent communication about what specific aspects of its behaviour are inappropriate, so that it can pair the undesirable behaviour with a negative consequence or the correct behaviour with a more positive event. This makes the timing of reinforcement tremendously important: any delay in delivery of the negative event will make it more difficult for the bear to understand what you want it to do. Timing of reinforcement is one of the most important factors in training any animal; correct timing (within 2 sec. of the unwanted behaviour) will significantly increase the rate of learning.

9.4.12 Never let the bear win:

It is crucial that you do not let the bear "win" by letting it stay in undesirable sites or display behaviour that you cannot stand up to, risking an aggressive response. At no point in the treatment, should you allow the bear's behaviour to deteriorate. It's always a good idea to keep a "trump" card for these situations where you can step up the intensity of negative reinforcement.

A bear that learns it can push you to a certain level by backing you off, will loose its submissiveness rapidly. Don't let the bear test you – move it off before it gets to that point with a lot of yelling and noise (a "wall of sound") and physical pursuit. Let the bear know you're coming well in advance – don't opt for a close encounter and force the bear to react aggressively. This will only teach the bear it can push people around.

If the bear is too aggressive, or has an extremely high conflict level, aversion tactics may not be appropriate. The level of aggressiveness can be determined using Hunt's indexes as noted in Section 9.3 above.

9.4.13 Stop when the bear is exhibiting appropriate behaviour:

It is essential to define where human boundaries end and the bear's safety margin of habitat begins. Once the bear chooses to move to suitable cover and/or ceases inappropriate behaviour, all negative conditioning should cease. The cessation of negative conditioning is the reward the bear receives for appropriate behaviour and communicates to the bear that its location or behaviour is now acceptable. The bear also learns that it has choices, and if it makes the right choice, the situation will instantly improve.

9.4.14 Don't harm the bear:

Physical deterrents must never be used to make the bear "pay" for his actions i.e. using pain deterrents after the animal is no longer exhibiting undesirable behaviour. In addition, never use physical deterrents to cause injury to a bear. Physical deterrents, including thrown rocks must only be fired at the rump of an animal from the proper distance.

Furthermore, improper use of aversion tactics can have a negative effect on bears. For example, if a bear is repeatedly shot with rubber bullets while it's up a tree or hurt by humans while it's in a trap, it learns it can't leave when confronted by people. Remember, the bear should always learn that it has the choice of leaving. We're not trying to teach bears to fear people, but rather to fear choosing to approach people or human-use areas - an important distinction.

9.4.15 Don't be discouraged if the bear relapses:

A bear may be conditioned after a single session, or several sessions before it makes the link between its behaviour and the negative event. Officers may find it necessary to remain at the conflict site for a period of time to monitor for re-entry and application of tools if necessary. Don't get discouraged if the bear's behaviour relapses immediately or days later.

It might take a few lessons before the bear can "generalize" what it is that needs to be avoided. Available resources and community goals should also be considered in deciding how many times a bear receives aversive treatment.

9.5 Defining Undesirable Bear Behaviour within Communities

There is no single definition of "undesirable" bear behaviour. Each community should develop their own definition, taking into account residents' tolerance levels, but also considering ethical concerns and the maintenance of a healthy and sustainable population of bears. All stakeholders should be involved in the development of the definition of undesirable bear behaviour.

One of the underlying goals of this program is to encourage a healthy respect for bears – one that is based on tolerance and coexistence. Bear complaints are often a result of a lack of public understanding of bears and their behaviour. Before taking action, an officer should ensure that the bear is actually exhibiting *undesirable behaviour*. The complainant should be briefly interviewed to determine the circumstances of the encounter and exactly what behaviour the bear was exhibiting. If the bear's behaviour is described as aggressive, probe for more detail. For example, did the bear huff, or pop its jaws, or did it actually stare the person down and come toward them with intent? If possible, it is better if the officer relies on his own observations.

The following examples can assist in identifying and selecting bear behaviour as undesirable:

- behaving assertively toward people in a non-defensive situation
- approaching humans to obtain food
- damaging property to obtain food
- not leaving an area when encountering humans at close distances

- actively searching for or eating food when humans are present

It is appropriate to use bear aversion tactics in the above situations. However, bears that pose an imminent or immediate threat to the safety of humans are candidates for destruction.

9.6 Determining Management Action

The following Bear Management Action Chart and accompanying definitions are presented as a guide to help bear managers make decisions based on officer and public safety with the animal's welfare in mind. Individual bears with known conflict histories may be managed differently depending on officer discretion. It is critical that a program to control attractants (including non-natural and natural foods) is implemented.

		Bear Behaviour/ Level of Conflict				
		Level 1 **Wary of humans (leaves on approach)**	**Level 2** **Human tolerant** **Exhibits defensive posturing e.g. huffing; blowing; slapping; lunging; "bluff" charges** **Causes minor human injury in defensive or surprise situation**	**Level 3** **Causes property damage (including entering vehicles and attacks on livestock)** **Enters occupied building once through open window or door**	**Level 4** **First sign of aggressive behaviour** **Causes more serious human injury in defensive or surprise situation** **Repeatedly causes extensive property damage** **Breaks into occupied building once**	**Level 5** **Pattern of aggressive behaviour** **Predatory or non-defensive attack.** **Enters occupied buildings chronically**
Site/Food Source	**Level A** **Bear is feeding on natural foods in natural area; feeds on outskirts of human-use area; or in green space within human-use area (with immediate escape route)**	No action necessary.	Manage: people (using enforcement options); site.	Manage: people (using enforcement options); site. Mark bear and manage (using non-lethal tactics).	Manage: people (using enforcement options); site. Mark bear and manage (using AC program).	Manage: people (using enforcement options); site. Destroy bear.
	Level B **Bear is occasionally feeding on NON-natural foods in remote area (camps etc).**	Manage: ATTRACTANTS; people (using enforcement options); site.	Manage: ATTRACTANTS; people (using enforcement options); site; bear (using non-lethal tactics).	Manage: ATTRACTANTS; people (using enforcement options); site. Mark bear and manage (using non-lethal tactics).	Manage: ATTRACTANTS; people (using enforcement options); site. Mark bear and manage (using AC program).	Manage: ATTRACTANTS; people (using enforcement options); site. Destroy bear.
	Level C **Bear is frequently feeding on NON-natural foods in or adjacent to human-use area WITH an immediate escape route**	Manage: ATTRACTANTS; people (using enforcement options); site; bear (using non-lethal tactics).	Manage: ATTRACTANTS; people (using enforcement options); site; bear (using non-lethal tactics).	Manage: ATTRACTANTS; people (using enforcement options); site. Mark bear and manage (using non-lethal tactics).	Manage: ATTRACTANTS; people (using enforcement options); site. Mark bear and manage (using *intensive* AC program until behaviour is extinguished) with option to destroy.	Manage: ATTRACTANTS; people (using enforcement options); site. Destroy bear.
	Level D **Bear is frequently feeding on NON-natural foods in confined human-use areas with NO immediate escape route**	Manage: ATTRACTANTS; people (using enforcement options); site; bear (using non-lethal tactics).	Manage: ATTRACTANTS; people (using enforcement options); site; bear (using non-lethal tactics). Immediate option to remove and relocate bear within home range.	Manage: ATTRACTANTS; people (using enforcement options); site. Mark bear and manage (using non-lethal tactics). Immediate option to remove and relocate bear within home range.	Manage: ATTRACTANTS; people (using enforcement options); site. Immediate option to remove and relocate bear within home range. Mark bear and manage (using *intensive* AC program until behaviour is extinguished) with option to destroy.	Manage: ATTRACTANTS; people (using enforcement options); site. Destroy bear.

The chart does not reflect the policies of any agency or organization.

Please refer to the definitions in Section 9.6.1 to fully understand the suggested actions.

9.6.1 Bear Management Action Chart Definitions*

Aggressive/Offensive Behaviour: See detailed discussion in Section 6.2.2.

Aversive Conditioning (AC) Program: A structured program applying deterrents consistently and sustainably over an identified period of time to achieve modification of an animal's behaviour by pairing the undesired behaviour with pain or an unpleasant stimuli. An intensive AC program requires that wildlife managers monitor the bear's behaviour at least during daylight hours (or while people are present) and while the bear is in a human-use area. The most intense level of conditioning should be used (i.e. Bearmagedon) until the bear no longer exhibits the undesirable behaviour and displays sufficient wariness in the presence of people.

Chronic Behaviour – Persistent, repetitive, unwanted behaviour regardless of whether the bear has other alternatives (i.e. plentiful natural food sources), but chooses to get into conflict situations time and time again. The season/time of year should be taken into account e.g. a bear that exhibits persistent unwanted behaviour late in the fall, may be given a period of grace until hibernation as it is not necessarily the case that he will come out of the den and exhibit the same behaviours. Furthermore, a bear that exhibits unwanted behaviour once in a while i.e. seems to get into conflict only once or twice a year; or once one year and then not again for a couple of years would not be considered a chronic offender.

Conditioned Taste Aversion (CTA): CTA occurs when an animal eats a bait with a nausea-causing substance concealed in it, so that in subsequent encounters the animal avoids the bait. [See Section 7.2.4 for details.]

Defensive attack: A bear that makes full physical contact by either swatting or biting and has exhibited defensive posturing/behaviour (see def'n below) prior to contact.

Defensive posturing: Body language and vocalizations used by bears to establish dominance hierarchies; *designed to avoid a physical confrontation*. Bears may also use this behaviour when interacting with people. The behaviour includes direct eye contact, jaw popping, huffing, swatting, lunging and bluff or false charges and is considered ritualized posturing rather than aggressive or offensive. [For more information, see section 6.2.1]

Destroy: Refers to killing a bear involved in a human-bear conflict, normally either by a conservation or police officer, in a humane manner.

Enforcement Options: See Section 13.

Escape Route: A clear route free of obstacles (like traffic, buildings, people, dogs) that leads to bear habitat or a natural area quickly.

Foods: Non-natural: Garbage, human food and other odorous products that have attracted a bear; including landscaped fruit trees/berry bushes, crops, livestock etc. **Natural:** Native or non-native species plants (or their parts i.e. roots, fruit, seeds, nuts) that grow naturally/wild in an area (not landscaped plants); insects; fish and small mammals (wild not domestic).

* also see additional definitions in the manual glossary in Section 1

Hazing: An immediate management response to a conflict situation, by using negative reinforcement, to move an animal out of an area or discourage an unwanted activity. Further application is not implied.

Human Dominance Techniques (HDT): Human dominance techniques try to mimic bear communication. The person becomes the "dominant" or "alpha" animal in a human-bear interaction so that the bear retreats and learns to avoid people and human-use areas. They include: ATTITUDE, Human Presence, Direct Eye Contact; Body Posture, Voice, Pursuit and Bluff Charges [See Section 8.3 for details].

Human Tolerant: Indifferent to the presence of people, pets, vehicles or other machinery.

Human-Use Area: An area of human development, either urban or rural, but could also include a campground or an established remote camp; park; golf course.

Manage Attractants: Ensure that all non-natural foods are removed from the conflict site or stored in a bear-proof manner (such that the bear can not access them). Even more natural foods i.e. carcass or berry bush/fruit trees should be strongly considered for removal.

Manage Bear: Use non-lethal tactics (AC, HDT, bear aversion, bear shepherding) to move the bear away from the conflict site to suitable cover or a more desirable location away from people or busy urban areas, preferably back to a natural area or bear habitat.

Manage People: Ensure that people in the area of conflict are kept a safe distance from the bear; educate people as necessary to ensure the circumstances that lead to the conflict aren't repeated. **<u>Use enforcement options, with zero tolerance, to ensure attractants are removed or bear-proofed</u>.**

Manage Site: This may include stopping traffic or heavy equipment while a bear is being shepherded away from the site; or if conflicts are expected to reoccur a this site, this may require closing the area or trail, with signage and/or barriers; re-routing human use or using passive aversion techniques.

Mark: Use non-toxic paint substance or hair dye to mark bear's side or back; or use coloured ear tag(s) so that he can be identified if he re-offends. A bear may also be radio-collared so that he can be easily found.

Minor Human Injury: A person suffers minor wounds as a result of physical contact by a bear, not requiring overnight hospitalization i.e. they can be treated on an out-patient basis

Non-defensive attack: A bear that attacks exhibiting offensive aggressive behaviour [See Section 6.2.2 for details].

Natural Area: An area that is not landscaped, but where plants grow naturally/wild.

Non-lethal tactics: A term used to describe various bear behaviour modification methods including AC, HDT, bear shepherding, and hazing.

Occupied Building: A four-sided structure in which people live/work.

Predatory attack: A bear that physically attacks a person with predacious interest or intent [See Section 6.2.2.3 for more detailed information].

Property Damage: Refers to damage to building or vehicle, including bird feeders; fruit/nut trees; bee-keeping operation, crops or orchards.

Relocation: Capturing a bear and moving him to an area away from human activity and anthropogenic food sources within his estimated home range. The purpose is to remove the bear from an area/situation where he had no escape route and was unable to leave on his own; as well as to buy time to clean up attractants.

Remote area: Wilderness or backcountry spaces away from residential or urban areas.

Serious Human Injury: A person suffers serious wounds, as a result of physical contact by a bear, requiring overnight hospitalization.

Wary of Humans: Bear leaves when people approach.

10 Situations and Case Studies

Actual situations provide a good forum for learning how to apply bear aversion tactics in different circumstances. The following story illustrates a typical incident of human-bear conflict:

We had a call from one of the local recreation centres that was having a problem with a bear. When we arrived, we found the garbage bin at the back of the centre was not secure and a bear had gotten into it. Further investigation revealed that the bear had dragged garbage down into the thick bush of the stream corridor behind the centre.

It was obvious the bear would be back again and that the garbage needed to be cleaned up. Sure enough, as I was standing at the top of the ravine waiting for the recreation centre employees to return with plastic garbage bags, the bear showed up again for the garbage. Seeing me, the bear hesitated, started to leave, and then returned and started huffing at me. There was a time when this behaviour might have frightened me, but now I understood that he was just trying to move me off so he could get the garbage.

I yelled at him and blasted an air horn I had with me and he took off. When the recreation centre employees returned, I went down into the ravine ahead of them, thrashing the bush with a stick and yelling to make sure the bear would stay away while they cleaned up the garbage. The employees then found a secure place for the garbage bin and that was the last we heard of that bear.

Catherine Sherlock, North Shore Black Bear Network

The following brief story illustrates the effectiveness of using human dominance techniques and how quickly bears respond to body language:

"I once stood with a group of people watching a bear feeding from a bird feeder sixty feet away; people were talking, some had binoculars, and the bear couldn't have cared less. But when I stared directly at him and took one step in his direction, he took off." (Kilham, 2002)

Ben Kilham, Author of Among the Bears

Human-bear conflicts can often be resolved non-lethally, particularly when the situation is cautiously considered and a plan is carefully made:

On Halloween night, Whistler Bylaw Enforcement Officers received a call of a bear picking through a bag of candies behind a Postal kiosk. Most passers-by were completely unaware of the bear. However, there was concern over the numerous children in the area each carrying a bag of goodies that might be tempting to the bear. Two Bylaw officers attended, evaluated the situation and called the Police for additional backup. When the two members arrived, a plan was agreed upon as to how and where to move the bear.

The two Bylaw officers were assigned to crowd control – their job was to inform the bystanders as to what was happening, as well as keep the crowd together and well away; and most importantly to clear the area established as the bear's escape route. One of the Police officers was equipped with lethal backup in the event of a mishap. (Note: we also recommend Bear Spray for personal protection.) The two Police officers worked the bear – using a slow pursuit and a neutral tone of voice; one officer on each side of the bear, but slightly behind, encouraging him down the street and toward cover.

They had to move the bear almost one kilometre through a residential area to reach an undeveloped forested plot where the bear would feel secure and be away from people. They purposely took a slow and deliberate approach, taking care not to frighten the bear up a tree or into a backyard. They used their physical presence in certain locations to block avenues they didn't want the bear to go in. When the bear picked up his pace, the officers slowed theirs down. Once the bear was in secure cover, they stopped and fired a banger, while yelling, to move the bear

deeper into the woods. They did not pursue the bear into the forest – this is the bear's reward – or positive reinforcement that he's now doing the right thing.

The story had a very happy ending and the crowd cheered for the officers. Everyone walked away with a positive spirit. This situation would have had a far different outcome if the lethal option were chosen. The killing of an animal can be an unpleasant experience for a young child – it can be very traumatic even for adults to see an animal die, especially if the first shot doesn't kill.

Sylvia Dolson, Get Bear Smart Society

Let's look at some more typical situations and the recommended courses of action:

10.1 Bear passing through human-use area, no attractants, no bystanders gathered

As long as the bear is only passing through, there is likely no need to take action with regard to the bear. Nonetheless, this could provide a good opportunity to do some public education – ensure the caller/complainant appreciates the need to tolerate the bear's presence and respect the need for a peaceful coexistence. Advise caller/complainant to call back if they see the bear getting into attractants or getting too close to people.

10.2 Treeing

A common response, when working with black bears, is treeing i.e. when a bears climbs a tree to escape a potential threat. This is a submissive act; the bear is communicating that it does not want to be confrontational. A treed black bear is a very low risk to public safety, even after it comes down out of the tree.

If there are no bystanders and the area is generally a low-use human area, the bear can be left in the tree to come down on its own (the bear may wait until it feels secure under cover of darkness). If the area is a busy human-use area, secure any bystanders and allow the bear to descend from the tree. Ensure there is a safe avenue of escape for the bear where it can move into cover. Bangers fired above the bear may accelerate the bear's descent. Officers can also bang a stick against the tree and then move away, allowing the bear to descend. If the bear doesn't come down, officers may have to back further away or leave the area. Nearby residents can be asked to call back for help if the bear comes down later and doesn't leave the area.

On the other hand, it may be necessary to intentionally "tree" a black bear and keep it in the tree until officers from a wildlife agency arrive. In this case, select a suitable tree (big enough for the bear to climb and tall enough to keep some distance between the bear and any bystanders below) and then encourage the bear toward the tree using human pursuit. Additional field personnel can be used to block inappropriate directions and help encourage the bear toward the tree. The bear may "tree" on its own or require additional persuasion. Stomp your feet, lunge toward the bear or take a short run toward the bear. Use direct eye contact and a firm tone of voice.

10.3 Sow and Cubs

Care should be exercised when dealing with a sow and cubs, especially a female grizzly bear as they are known to be significantly more aggressive in defending their cubs. As a threatened species, they are also a conservation concern. Police or other non-agency individuals should not attempt aversion methods (or destruction) with a female grizzly bear that has cubs – instead secure members of the public and call the local wildlife agency for help.

Normally, when a black bear sow feels threatened, she will tree the cubs and wait at the bottom of the tree or she may climb the tree herself. A sow will evaluate the potential threat the person poses. If she feels sufficiently threatened, she may behave defensively by huffing, slapping the ground and even false-charging in an attempt to motivate the person to leave. Do not let a black bear intimidate you into leaving – it may be prudent to back off slightly, though, depending on your goal. Maintain direct eye contact with the sow to ensure you are in a position of strength.

In situations involving a sow and her cubs, officers should only work the mother and let her direct the cubs. NEVER use physical deterrents on cubs or yearlings accompanied by their mother. It is essential to ensure that a sow does not get separated from her cubs. Should this happen, stop and secure the area. If the sow and cubs are not disturbed, they should reunite in a short time. Otherwise, you can attempt to reunite the family by encouraging the cubs toward their mother with human dominance techniques – an appeasing tone of voice is recommended to keep the cubs calm. Move the cubs slowly, but deliberately.

10.4 Bear inside a garbage container

A bear in a garbage bin will likely have to be coaxed out. Take care in approaching the bin, as the bear may quickly pop out and slap the container or you, if you are too close. Let the bear know you are there by using a firm tone of voice, or use a long stick to bang on the container. Bear spray can be very useful in evicting a bear from inside a container, but be careful not to inhale the spray yourself. Make eye contact with the bear as soon as possible to let him know you are in charge. Ensure he has a clear exit route and walk the bear out to a safe area. If possible, ensure the garbage bin is secured, so that garbage is inaccessible to the bear.

10.5 Bear surrounded by bystanders

All officers at the scene should ready their bear spray, should the bear get too close to themselves or bystanders. Secure bystanders and clear an avenue of escape for the bear. Take a moment to evaluate the situation and the potential for further conflict to arise. It may not be necessary to do anything else. If the bear needs to be moved, use a normal or appeasing tone of voice and direct eye contact, and “walk” the bear to an area that provides it with security cover. Supporting officers should keep bystanders under control and attempt to block any openings or avenues of escape you do not want the bear to use. Upgrade the level of force as necessary, but with many bystanders present, slow and easy is the way to go.

Always remove any non-natural attractants that may have lured the bear in. Keep in mind, there is little to no risk of serious injury to a group of bystanders; indeed there are no records of four or more people being attacked and injured by a bear (Herrero 2002). However, there have been minor injuries associated with people feeding and petting bears and thus bystanders should be kept well out of swatting or biting distance of the bear in order to ensure that the bear never feels crowded (Herrero 2002).

10.6 Bear in/near children's play area

This is not a situation that should cause unnecessary alarm! A bear can be moved away from a children's play area in much the same manner as if it were surrounded by bystanders, as described above. The children should be kept as calm and quiet as possible; and asked to move inside or stand together as a large group. Ideally, the kids should be taught in advance how to react to a bear on the school property or elsewhere – the teacher can use role playing to practice what to do.

Although as parents or guardians, we tend to worry the most about our children interacting with a bear, the reality is that the bear will not treat children differently than an adult. For the most part, a bear would evaluate the children's behaviour as non-threatening and ignore them. Children playing in a backyard should be taught to talk to the bear in a calm appeasing tone and let him know they are there. There's no need for kids to behave in a dominant manner toward bears to avoid a negative interaction – that's not their job. Children should be taught to notify an adult (parent or teacher) in the event of a bear encounter.

10.7 Bear on a upper story balcony

We often do not give bears enough credit – if a bear found its way up onto an upper story balcony, it can surely find its way down (honestly!). It would be best to clear the area below the balcony of bystanders. If possible, try to gain entry to the home – from the inside, make your presence known to the bear. Try banging on the window first. You will have to use your judgement here. If you can do so safely, open the door, exit and move toward the bear slowly. Ensure you have readied your pepper spray. The bear will likely have climbed down by now. If not, you can yell to reinforce your message, or physically stamp your feet and take a short run at the bear. Try not to become impatient; there is plenty of time to give the bear a chance to do the right thing.

10.8 Bear under a Building

Evaluate the situation first, and determine whether it is actually necessary to evict the bear from underneath the building. Bears do sometimes sleep under buildings or even den there. If it is necessary to evict the bear, pepper spray can be a very useful tool. Try to control the bear's exit route (by blocking certain paths) and clear an avenue of escape. Follow up with human dominance techniques or bangers to ensure the bear leaves the area. If food attracted it under the building, ensure it is removed. You should also suggest to the owner of the property that access under the building is blocked.

10.9 Bear in a semi-closed parkade (3-sided structure)

The first step is to provide an easy and safe exit route for the bear. It would be best to position an officer outside the parkade exit to ensure bystanders and vehicles will not impede the bear's exit route. Use minimal force in an enclosed area. Do not use pepper spray in enclosed areas. Ideally, you should be able to use direct eye contact and slowly walk the bear out encouraging him in the right direction. Use a normal or slightly appeasing tone of voice. Do not escalate the situation with too much force. Most bears may be very uncomfortable in closed quarters with people. Make it easy for the bear to do the right thing (clearing the appropriate way out) and difficult to do the wrong thing (blocking unsuitable directions). Use good judgement here and increase force slowly as necessary.

10.10 Bear in area of heavy vehicular traffic

Exercise extreme caution in this situation. You do not want to risk an accident that may injure people or the bear; or cause property damage. It may be best just to control traffic and let the bear move away of its own accord. Use minimal force, continually gauging the bear's response. If traffic has been halted, upgrade force as necessary.

10.11 Bear in Vehicle

It is usually not difficult to remove a bear from a vehicle - it will typically exit the same way it got in. Your presence or approach to the vehicle will usually send it on its way. If it doesn't, bang on the side of the car with your fist, on the opposite side from where you want it to exit in order to flush it out. There have been situations where the door has closed behind the bear. In this case, have bear spray in hand as self-defence and open the door while standing behind it. Again, never use bear spray inside a vehicle as it is likely to damage the vehicle permanently.

10.12 Bear in a home or building (4-sided structure)

The first step is to remove the people from the building or secure them in a room and find a way out for the bear – open as many doors and windows as possible. The bear will most likely try to get out the same way it got in. Block all inappropriate routes the bear may choose. In particular, block any stairways that lead up to other levels in the building – as it is natural for a bear to flee by climbing trees, it will almost always choose to go up stairs rather than down.

Encourage the bear to exit using an appeasing tone of voice and slowly closing the distance between yourself and the bear, while moving in the direction of the exit. Ensure the exit is clear of bystanders and obstacles on the outside.

Never use bear spray inside a building as it is likely to cause permanent damage.

Once the bear has left the building, continue to pursue it to safe cover.

11 Measuring Success

Measuring the success of non-lethal bear management is not easy. There are many factors to consider when determining the effectiveness of the fieldwork. Interpreting the results, over the short term, may not reflect what is actually taking place over the long term. Success will vary from site to site and bear to bear. Measurement of success will only become apparent over time as human-bear conflicts and bear mortalities are monitored. Recognizing changes in these is important; however, understanding why those changes occurred is critical. For example, a reduced number of incidents in an area during a particular year may be the result of a successful non-lethal bear management program; or improvements in the waste management system or an abundant berry crop (Hunt 2003). Alternatively, conflict calls may increase as people gain confidence in the program and become more willing to report incidents.

Indications of a successful conditioning program may include: decreased complaints and/or decreased bear mortality, as well as, positively altered behaviour patterns in individual bears. It is important to understand that an absence of bears is not necessarily a measure of "success", that is, the intent is not to completely displace bears from an area. Furthermore, re-treatment does not mean a lack of success, as periodic "booster" work is usually necessary with habituated or food conditioned bears (Hunt 2003).
Over the long term, a successful non-lethal management program should ensure the safety of people and their property by minimizing undesirable bear behaviour. To accomplish this, people must understand the consequences of their actions and take the appropriate remedial action to reduce the potential for conflict situations (Hunt 2003).

Keep bears wild and people safe!

12 Removing Attractants: Making the Job Easier

Removing human sources of food, garbage and other bear attractants is an *essential* part of any bear management program. Conflict bear behaviour is almost always associated with the availability of anthropogenic food sources (Heuer 1993, Howe et al.2003). Securing attractants prevents conflicts before the bear develops unwanted behaviour. In addition, the continued presence of attractants while applying aversion techniques is likely to increase the number of applications needed and potentially reduce long-term success as even a single food reward may recondition a bear (Hunt 1984, Heuer 1993, Herrero 2002, Hunt 2003).

Furthermore, when responding to a human-bear conflict situation, it is useful to be able to diagnose why the bear was attracted to the area. Knowledge of these proactive strategies enables officers to respond to public or media inquiries relating to human-bear conflicts. Often, when this information is communicated to residents and the resident takes action to remove the attractant, there are no more conflicts, reducing public safety risks, bear deaths and future calls.

More information about all attractants can be found at www.bearsmart.com.

12.1 Garbage

One of the main bear attractants is garbage. Much of human garbage contains food, which tends to be attractive to bears because it is often high in calories. However, bears are also attracted to non-food items, such as used disposable baby diapers, petroleum products and scented personal products. Some of the main sources of garbage for bears are private residences, restaurants and landfills. At no time should a bear be allowed to access human food or garbage. When investigating a conflict, the area should be searched for garbage that has been dragged into vegetative cover. Guidelines for handling garbage, particularly in areas heavily used by bears, include the following tips:

- Garbage should be stored in bear-proof containers or within locked storage areas, such as secure garages, outbuildings, etc. (not even on 2nd story balconies or screened porches)
- If an empty garbage can seems to be an attractant, it should be cleaned with ammonia to remove residual odours.
- People should put garbage curbside only on the morning of pick-up to avoid bears gaining access during the night.

12.2 Bird Feeders

Both stored bird seed, hummingbird nectar, suet and bird feeders are primary attractants.

- Ideally, people should not use any type of bird feeder (including hummingbird feeders and suet), unless bears have denned for the winter. Bird seed must be stored securely indoors at all times.

- Another solution is to ensure the feeder is hung well out of reach of bears (using aircraft cable) or on an electrified pole. If your feeder is hung on a cable between two trees, affix

a plastic shower rod cover over the wire (at each end) so that the bear can not grab hold. It is essential in this case that the area below the feeder is kept clean and that bird seed is stored securely indoors at all times.

12.2.7

12.3 Fruit Trees / Gardens / Lawns

Any number of plants in the yard can act as attractants to bears:

- *Ripe fruit on trees or fallen to the ground*: Homeowners should remove fruit-bearing trees completely or harvest fruit as soon as it ripens including fallen fruit, particularly in areas they don't want to find a bear feeding. An electric perimeter fence can be very effective in preventing bears from having access to fruit trees.
- *Berry Bushes:* Artificially planted shrubs that produce berries should be avoided in heavy bear-use areas, such as mountain ash, wild rose, red-osier, kinnikinnick and others. They should be removed or replaced with non-berry producing plants.
- *Garden vegetables*: can also be an attractant with root vegetables being particularly appealing to bears. Vegetables should be harvested as soon as they ripen. A portable electric perimeter fence will be most effective in deterring bears from gardens.
- *Other attractants*: include bone meal, fish fertilizer or deer repellent. Even uncut lawns can be a source of food since grass, dandelions and clover are all natural bear foods.

12.4 Pets and Pet Food

- Pet owners should feed pets inside and store their food indoors. They should not leave bones lying around their yard.
- Most dogs can help deter bears from entering a yard, or at least be effective at warning the resident if a bear is nearby. However, some dogs may escalate potential conflict situations by agitating the bear.
- Caged rabbits and pigeons may be predated upon by bears and should not be left unattended outdoors, unless contained within an electrified or bear-proof enclosure.

12.5 Barbeques

- Barbeques should be cleaned immediately after use. Preferably, barbeques should be stored indoors or in a secure building (without the propane tanks, of course, as that would present a fire hazard). If that is not possible, at least the grease can/drip tray should be stored indoors.
- Remind people to be watchful at barbeques – the smell from cooking can attract bears from long distances. Food and dirty dishes should not be left outside unattended.

12.6 Compost

To reduce the likelihood of compost being a bear attractant:

- Absolutely no meat, fish or dairy should be composted. Even fruit/vegetable waste will attract bears. To reduce odours, people can add equal amounts of dried vegetation to kitchen scraps and bury them near the centre of the pile, as well as maintain a layer of dried brown vegetation – leaves, grass, straw – on top of the pile. Ideally, ONLY lawn clippings and garden trimmings should be composted in areas heavily used by bears.
- Compost should be aerated often, using lime to reduce odour.
- Compost should be located well away from your home's entrance-way, windows and children's play sets.
- If possible, an animal-proof closed bin should be used or it should be placed inside a bear-proof fence system.
- An indoor worm composter may also be used for items not suitable for outdoor composters.
- Use the community compost system where available.

12.7 Freezers, Vehicles and Homes

- Food should not be stored outside even in padlocked refrigerators or freezers as a bear can easily break into or flip over a freezer to access food.
- A bear can easily pry open a vehicle window or door to access garbage, groceries, animal feed, coolers or any odorous item – even an empty drink cup or candy wrapper.

- Food smells (and every home has them) can lure hungry bears inside homes. It is recommended that people keep their accessible doors and windows closed and locked during active bear season.

12.8 Apiaries

- Beehives should be located away from prime bear habitat (like a berry patch or a riparian zone) or bear travel routes.
- Beehives should be protected with electric fencing or placed on a platform with an overhang more than 2 m above the ground. Wire beehives together with metal strapping.
- Beehives should not be setup in early spring when other bear foods are not yet abundant.

12.9 Clover, Grasses, Sedges

Roadsides, trailsides or other areas that have been seeded with clover, grasses and sedges can be a major attractant for bears, particularly when they are just sprouting. Attracting bears to roadsides and trailsides creates a hazard for drivers, cyclists, pedestrians and bears.

12.10 Agricultural Crops

People can often be educated to have a certain tolerance for wildlife and many have learned to plant extra to accommodate for losses to wildlife. In addition, black bears like secure cover and so removing natural forest cover around fields creates a buffer zone that bears avoid. Other options include electric fences and guard dogs.

12.11 Fruit Orchards

Most edible varieties of fruit provide food for bears. The best way to keep bears out of an orchard is to use an electric fence, especially when used in combination with a 2 m high sturdy wire fence.

12.12 Livestock

Livestock predation is rare for black bears, but does occur occasionally and more so in areas where vegetation or other foods are less abundant. The primary domestic animals that fall prey to black bears are rabbits, sheep, goats, calves, pigs, ducks, geese and chickens. Grizzlies are more capable and likely of killing and feeding on livestock than black bears. Deer, elk and bison ranches are also vulnerable.

- Feed should be stored securely indoors or in air-tight, odour-free, bear-proof containers.
- Carcasses must be removed and taken to an electrified landfill; buried at least 2.5 - 3 m (8 -10 ft) deep, or removed by a rendering service.

- Calving grounds can be located away from forested areas and other cover that provides an easy approach route for bears. Livestock must be closely supervised during the calving period.
- Small livestock can be kept indoors at night and electric fencing used around small animal cages.
- Chicken coops and runs can be made bear-proof by installing an electric perimeter fence as well as an electrified grill on henhouse doors.
- Livestock Guardian Animals, like dogs, can be highly effective in deterring predatory wildlife.

13 Enforcement Options

Legislation can provide a means of ensuring that people manage their properties in a manner that does not attract bears and create a conflict situation. Many people will change their behaviour when they understand its consequences. Unfortunately, it only takes ONE person who is mismanaging food and garbage to create a problem that affects the whole area. Enforcement options are useful for the few people who will not comply.

13.1 Municipal Bylaws or Ordinances

More and more municipalities are developing bylaws or ordinances that require the proper storage of garbage so that it does not attract wildlife. Check to see if the communities in your district have bylaws or ordinances that can be enforced and encourage their enforcement. If no bylaw exists, encourage the community to enact a waste management bylaw with the following elements:

- prohibits the supply of food to bears as a result of intent, neglect, or irresponsible management of attractants;
- prohibits the intentional feeding of bears and other wildlife;
- addresses special considerations including the use of birdfeeders, composting restrictions, placing of garbage curbside before a certain hour, and temporary waste containers at special events;
- has a compliance strategy that includes promotion (education, awareness), verifications (inspections, audits) and enforcement (investigations, tickets, prosecution)

Various community bylaws and more information on developing bylaws can be found at www.bearsmart.com/becoming-bear-smart/community/bylaws-and-ordinances.

13.2 Provincial or State Legislation

In some provinces and states, it is an offence for people to feed or attract dangerous wildlife (i.e. bears, cougars, coyotes and wolves) to their premises. Check with the local wildlife agency for legislation applicable in your province or state.

14 Closing Remarks

No matter how bear smart communities become, some human-bear conflicts will always continue to occur. Increasingly, management agencies and police are seeking non-lethal methods that allow humans and bears to coexist. Aversion methodologies provide important tools to address conflict and ensure public safety, manage unwanted bear behaviour and decrease the number of bears killed in our communities.

This manual has provided you with a basic understanding of bears and how to mitigate conflict situations with human safety as a primary concern. As your individual experiences and successes using these techniques build an increasing level of confidence and reassurance, this, in turn, will increase the effectiveness in delivery of the techniques.

In order to standardize aversion methodology and increase its efficacy and safety for both bears and people, it is important to provide accurate documentation of incidents to the local wildlife agency. Results can then be evaluated for effectiveness and the program can be continually improved. As highly intelligent animals, bears will always be looking for new ways to outsmart us. It is imperative that we continue to find new ways to manage their behaviour in order to provide acceptable levels of safety.

Nonetheless, aversion tactics are just one more tool in a more holistic approach to managing human-bear conflicts. Removing attractants remains key to proactively reducing the need for management response. This requires a multi layered approach including enforcement (audits and inspections) and an education program that involves all the stakeholders (all levels of government, police and wildlife agencies, as well as the community and business sectors) in a partnership process. Consistent, effective and accurate messaging is critical – therefore, community groups, police and wildlife agencies should develop mutually agreed upon messaging and a Media Strategy.

Your best defence in bear country is still your brain –

your knowledge and understanding of bears (Herrero 2002).

15 Appendices

15.1 Guidelines for Bear Calls

When a call regarding a bear is received, it should be forward to the wildlife agency in charge. If an officer is not available to deal with the call, the following guidelines will assist in handling the call.

Not all human-bear conflict calls require that action be taken. Many callers just need to be heard because they are unfamiliar with bears and seeing one can be unnerving. When a bear call is received, the switchboard operator can interview the complainant over the telephone to determine the severity of the call and whether any action is necessary:

Is this the first time you have seen the bear?

Is it a grizzly or black bear? (see Section 3.2 for distinguishing features)

Where is the bear and what is it doing?

Bear passing through the neighbourhood: It is normal bear behaviour to wander through neighbourhoods on occasion. Make sure no attractants are available and the bear will keep moving. If the bear is a grizzly, the caller should be asked to remain indoors and children and pets should be brought indoors as well. Neighbours can be notified about the bear and the importance of removing attractants.

Bear up a tree: The bear will come down on its own – likely after dark. However, if the bear is in a tree in a busy urban area or an area where there might be concerns with regard to harassment or a vehicle collision then an officer should be dispatched to evaluate the situation.

Bear Accessing Non-natural Foods: If the bear is into garbage or another attractant, explain that the attractant is the reason the bear is there. It is important to let the bear know it is not welcome. From a SAFE place, such as the second story balcony or just inside a propped open door, a person can yell at the bear saying, “Get out of here bear” and bang pots or make some other kind of loud noise to make the bear feel uncomfortable. Additional safety precautions should be advised if the bear is a grizzly. The caller should be advised to remove any bear attractants from their property after the bear leaves the area. The bear may return to check for more food or garbage but will move on if it does not find anything. Any time the bear is seen, the safest thing that people can do is to let it know it is not welcome in human-use areas.

If the caller is uncomfortable trying to deter the bear or unable to get the bear to leave the area, then an officer should be dispatched to the location.

Other calls requiring attendance by an officer include:

- a bear damaging property,
- a bear breaking into a building

- a bear repeatedly sighted in an area where there is potential risk for human safety (bystanders crowding a bear)
- depredation of unprotected livestock or pets (this is normal bear behaviour and may not warrant the destruction of the bear, however an officer may attend to prevent the depredation from happening at the time and again in the future)
- a bear involved in a vehicular accident or potentially causing an accident
- a bear behaving aggressively (see Section 6.2.2)

If a caller is reporting alleged aggressive behaviour, an officer should be sent out immediately to evaluate the situation – particularly if the caller reports any behaviour suggestive of predacious intent such as stalking, chasing or acting strange towards humans or their pets. In this situation, ask the caller to remain indoors with the doors locked and to alert their neighbours to do the same. Pets or livestock should also be secured, when feasible. If pets, such as cats, cannot easily be brought in, advise the caller not to worry as the cat will likely just hide until the bear leaves.

Attending a Call:

When an officer is dispatched to investigate a complaint, an assessment should be made as to the appropriate action required. An assessment involves:

- interviewing the person or persons who reported the incident and/or any neighbours who have seen the animal;
- locating the bear and applying bear aversion where appropriate;
- searching the area to ensure that any non-natural food sources that attracted the animal are removed. If the food sources have not been removed, recommendations should be made to the property owner and explained in detail. It may also be appropriate to levy a Warning Ticket and/or fine (see below).
- Once the call is complete, officers should complete an Occurrence Report (see Appendix 15.2 for sample form). The report should be faxed to the local wildlife agency responsible and held in a bulk file.

Warning Ticket:

1. As local enforcement options dictate, a written warning should be issued by police to any person who has knowingly or unknowingly attracted wildlife to their property through improper management of attractants. Warning forms can be made up by police in consultation with the local wildlife agency responsible.
2. The warning should include the following information:
    - type of attractant i.e. improperly stored garbage, bird feeder, pet food stored outdoors, compost, fruit trees/berry bushes, beehives, livestock/livestock feed, salt or mineral blocks, food crops
    - solution – i.e. bear-proof garbage containment, removal of attractant, electric fencing

- contact information – local bear aware group, community policing officer
- date issued
- date problem must be resolved by

Fines:

1. Local Municipal Bylaws / Ordinances (if applicable) may be used to enforce:

- improper storage of garbage
- animal-proofing waste containment
- placement of trash for curbside pickup outside of the allowed time period
- feeding or otherwise attracting dangerous wildlife intentionally or unintentionally

2. Provincial or State Legislation – often officers can issue violation tickets with prescribed penalties. Contact the local wildlife agency responsible for a ticket booklet.

15.2 Sample BLACK BEAR OCCURRENCE REPORT

Date (yy/mm/dd): _____ Time Arrived _____ Time Departed _____ **O.R. #** ____

Location: _____ Complainant's Name _____ Phone Number _____

Action Taken:
- ☐ Advice Given
- ☐ Refer to Wildlife Agency
- ☐ Attended
- ☐ Warning or Fine

Note type: _____

Type of Situation (✓ one):	
Human safety concern	
Depredation (pets, livestock)	
Causing property damage	
Accessing non-natural foods Note type: _____	
Sighting: Roadside __ Residential __	
Injured Animal	

Description of Animal:
Sex: ☐ Male ☐ Female ☐ Family ☐ Unknown
Approx. Age: ☐ cub-of-year ☐ yearling ☐ sub-adult ☐ adult
Colour: ☐ blonde ☐ cinnamon brown ☐ dark brown ☐ black ☐ other _____

Markings: e.g. neck/chest blaze, ear tag, scars on face/body, ear tags, paint markings, radio collar
_____
_____

Known bear history/description:
_____
_____

Tools Used/Action Taken	**No. of times**	**No. of hits**	**Distance Shot**	**Order of use**
Observation Only				
Crowd Control				
Presence (human/vehicle)				
Human Dominance - note type: _____				
Screamer				
Banger				
Cracker Shell				
Stones				
Pepper spray				
Bean bag				
Rubber slug				
Lethal				
Other Action_____ _____ _____				

Bear Behaviour: ✓	**On arrival**	**After Treatment**	**circle word(s) that apply**
Gone on Arrival (GOA)			
None			appears not to detect observer
Treed			Sleeping, eating, curious, blowing, jaw popping, slapping tree, climbed higher, came down (slowly, quickly)
Indifferent			resting, feeding, defecating
Curious			standing, sniffing, head-up-down
Defensive or Nervous			Blowing, jaw popping, clacking teeth, urinating, salivating, short lunge(s), slapping ground/object, bluff charge
Immediate Departure			hesitant, walked, ran – distance _____ fled toward/away from officer, for cover, wrong way
Withdrawl but no departure			treed, hid in cover
Eventually Departed			hesitant, walked, ran – distance _____ fled toward/away from officer, for cover, wrong way
Offensive Attack			charge with contact, slapped or bit person/animal

Comments:_____

Officer's Name: _____ Date: (yy/mm/dd) _____

15.3 Backcountry Bear Encounters

Meeting a bear in his backyard is quite different than encountering a bear in a human-use area or your own territory. Behaviorists have long known that the further an animal is from the center of its home-range, the more likely it is to flee rather than fight, and vice versa (Kilham 2002). As Lorenz (1963) noted in his research on territories, as distance from an animal's headquarters increases, the readiness to fight decreases proportionately as the surroundings become stranger and more intimidating to the individual. Tinbergen (1953) noticed similar behavior.

Thus, human dominance techniques are only appropriate for use in human-use areas. If we meet a bear in the woods, we should treat it with respect and follow all the rules for backcountry encounters as noted below.

If you see a bear in the backcountry...

Encounters with bears rarely lead to aggressive behaviour and attacks are even rarer. From 1900-2004, 54 people were killed by black bears and 87 people were killed by grizzly bears in NA. People are more likely to be struck by lightening, killed by a pet dog or in a vehicle accident.

There are no hard and fast rules when it comes to bears, but the following tips may help:

- Remain calm and assess the situation.
- Try to determine whether it is a grizzly or black bear, and whether it is defending cubs or an animal kill, such as an elk or a deer. Bears may "act" defensively (see Section 6.2.1) if startled or if protecting cubs or a food cache.
- If the bear is in the distance, try to make a wide detour or leave the area. Respect the bear's need for space. Never approach a bear, not even for a photo.

If you encounter a bear at close range...

- Ready your deterrent (for example, bear spray) and keep your group together.
- Keep your wits intact and trust them.
- Stand your ground. Identify yourself as human by talking in a calm, appeasing tone. You may back away slowly, preferably moving in the direction you came from. Do not run. In most cases, the bear will flee.
- A bear may "pop" its jaws or swat the ground while blowing or snorting. It may lunge toward you or "bluff" charge in an attempt to motivate you to leave – usually stopping well short of contact. These are defensive behaviours, signaling you are too close. Remain calm and increase your distance from the bear.
- Grizzly mothers may fiercely defend their young, whereas a black bear will usually tree her cubs and try to motivate you to leave by "acting" aggressively while waiting for the threat to pass. Try to appear non-threatening by remaining still and calm. Back away and leave the area.

If a bear persistently follows you or stalks you...

- Stop! Stand your ground and prepare to use your deterrent or any available improvised weapons such as rocks and sticks. If possible, try to reach the security of a vehicle or building. Do not run unless you are certain you can reach safety before the bear could catch you (bears can run up to 15 m/sec or 50 ft/sec).
- Face the bear. Look directly towards it. You might try taking a step or two in the bear's direction to motivate it to back off.
- If the bear continues to follow you, act aggressively toward the bear. Let the bear know you are not easy prey and will fight back if attacked. Shout! Make yourself look as big as possible. Stamp your feet, as you take another step or two toward the bear. Use your deterrent.
- If the bear attacks (physical contact is made), fight for your life. Kick, punch or hit the bear with whatever weapon is available. Concentrate your attack on the face, eyes and nose. Fight any bear that attacks you in a building or tent.

If a mother grizzly actually attacks (physical contact is made) in defence of cubs...

- Use your deterrent and try to back away. Do NOT act aggressively.
- As a last resort, lie face down and play dead with legs apart and your hands covering the back of your neck. This will let the bear know you are not a threat. It is the best strategy to minimize injury at this point.
- Do not move until long after you think the bear has left the area.

If a bear attacks while defending an animal kill...

- Use your deterrent.
- Do not play dead and try not to act aggressively. Back away quickly and get as far away from the food cache as possible.

15.4 References for Additional Information

15.4.1 Books

Understanding, Mitigating and Managing Black Bear Behavior
by Ben Kilham
Unpublished, 20 pages.

A summary of a presentation provided to wildlife and police officers. Available by request via email: info@bearsmart.com.

"Partners-In-Life" Program: Bear Shepherding guidelines for safe and effective treatment of human-bear conflicts.
by Carrie L. Hunt, Wind River Bear Institute
70 pages, 2003

A detailed manual describing bear shepherding techniques, including Indexes for Creating Bear Profiles: Aggression and Conflict Level" and identification of additional "Key Weighting Factors". Wildlife officers working with grizzly bears should review this guide.

Living with Bears: A Practical Guide to Bear Country
by Linda Masterson
Softcover, 256 pages, published by Pixyjack Press, 2006

Insightful, well-researched and witty. This practical guide dispels myths, replaces fear with respect, and lays the foundation for improving human-black bear relations with an inside look at the fascinating world of these highly intelligent, adaptable and resourceful animals. A must-read if you want to co-exist with bears. Also check out www.livingwithbears.com.

Bear Attacks: Their Causes and Avoidance
by Steve Herrero
Paperback, 282 pages, Revised Edition, published in 2002 by The Lyons Press.

Considered one of the leading authorities on bears, Herrero has studied bear attacks across North America in an attempt to gain an understanding of their causes and thus what can be done to avoid them from happening. Although graphic, it is one of the most informative books on bears for anyone who camps, hikes or is interested in bear behaviour. Herrero discusses how to avoid running into bears, how to deal with encounters and what to do in the unlikely event of an attack.

Living with Predators Resource Guides, 2013 Edition:
1. Recreating in Bear, Wolf and Mountain Lion Country
2. Techniques and Refuse Management Options for Residential Areas, Campgrounds, and

Group-Use Facilities
3. Predator Behaviour Modification Tools for Wildlife Professionals
4. Electric Fencing Guide

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15.4.2 Videos

Staying Safe in Bear Country: A Behavioral-based Approach to Reducing Risk. 2001. Produced by Wild Eye Productions, BC. In association with AV Action Yukon Ltd. Presented by the Safety in Bear Country Society in cooperation with the International Association for Bear Research and Management.

"Staying Safe in Bear Country" is a 50-minute video that is a stand-alone educational tool for anyone living, traveling, or working in bear country. It includes the consensus opinion of leading experts on bear behaviour and its relevance to human safety. People who watch the video will develop a better understanding of bear behaviour and how this knowledge can help them prevent bear encounters and attacks.

Living in Bear Country – Practical Advice on Living Responsibly in Bear Country. 2005 Produced by Wild Eye Productions, BC. Presented by the Safety in Bear Country Society in cooperation with the International Association for Bear Research and Management.

“Living in Bear Country” provides practical advice on ways to minimize problems with bears in places where people live. This 20 minute program shows how making a few simple adjustments to our daily routine can reduce property damage and increase human safety. By living responsibly in bear country both individuals and communities can help prevent conflict with bears; making things safer for themselves and the bears.

To obtain copies of either video/DVD, contact Distribution Access toll free at 1-888-440-4640 or sales@distributionaccess.com.

15.4.3 Websites

www.bearsmart.com maintained by the Get Bear Smart Society

BearSmart.com has become a well established resource for individuals, Bear Aware/Wise/Smart groups, bear managers and municipal governments working to mitigate human-bear conflicts. The site contains information about bears, becoming bear smart at home, in the backcountry, and on the job. There is also a section designed specifically to help with Managing Communities and Managing Bears. As the largest resource on bears online, the site contains over 100 pages, dozens of links and downloads.

15.5 Literature Cited

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