Document submission from the Northern Bear Awareness Society:

- 1. Bear Smart Community Program Province of British Columbia (Website)
- 2. Bear Smart Northern Bear Awareness Society
- 3. Bear Hazard Assessment for Prince George
- 4. Human-Bear Conflict Prevention Management Plan for Prince George
- 5. Bear Occurrence Reports and Mortalities for Prince George



Bear Smart Community Program

🔶 Last updated on July 3, 2024

Every year, hundreds and sometimes thousands of bears are destroyed as a result of conflicts between people and bears.

In rare instances, people are injured or killed as a result of these conflicts.

Most of these problems begin when people give bears access to non-natural food, such as garbage.

The program

The Bear Smart Community Program has been designed by the Ministry of Environment and Climate Change Strategy in partnership with the British Columbia Conservation Foundation and the Union of British Columbia Municipalities.

It's a voluntary, preventative conservation measure that encourages communities, businesses and individuals to work together.

The goal is to address the root causes of human-bear conflicts, thereby reducing the risks to human safety and private property, as well as the number of bears that have to be destroyed each year.

This program is based on a series of criteria that communities must achieve in order (recognized as 'bear smart.'

The responsibility to manage human-bear conflicts rests with everyone.

The Bear Smart Community Program requires participation from the B.C. government, municipal governments and local citizens to be successful.

Resources and publications

A brochure outlining the program and a technical background report are available:

- Be 'Bear Smart' Community Brochure (PDF, 7MB)
- Bear Smart Community Program: Background Report (PDF, 527KB)

The background report is intended for communities interested in pursuing this initiative and provides detailed information on each of the criteria, including examples of their successful application.

Learn the differences and similarities between black bears and grizzly bears:

• Who's Who: Know Your Bears Brochure (PDF, 359KB)

Bear Smart Community Program



Congratulations to the 12 B.C. communities who have successfully attained 'bear smart' status:

- <u>Castlegar</u>
- <u>Coquitlam</u>
- <u>Kamloops</u>
- Lions Bay
- <u>Naramata</u>
- <u>New Denver</u>
- <u>Port Alberni</u>

- Port Hardy
- Port Moody
- <u>Squamish</u>
- <u>Tofino</u>
- <u>Whistler</u>

Contact information

Contact the <u>Conservation Officer Service</u> if you have any questions:

• conservation.officer.service@gov.bc.ca

Did you find what you were looking for?

No

Yes

The B.C. Public Service acknowledges the territories of First Nations around B.C. and is grateful to carry out our work on these lands. We acknowledge the rights, interests, priorities, and concerns of all Indigenous Peoples - First Nations, Métis, and Inuit - respecting and acknowledging their distinct cultures, histories, rights, laws, and governments.



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Bear Smart Communities

BRITISH COLUMBIA CONSERVATION OFFICER SERVICE

WHY IS THE BEAR SMART COMMUNITY PROGRAM IMPORTANT?

Every year, B.C.'s Conservation Officers respond to thousands of complaints regarding bears. Most of these conflicts begin when people allow bears to access non-natural food sources. Unfortunately, because there are few alternative control methods once bears have learned to access human food, Conservation Officers have no choice but to euthanize those bears.

10-Year Average of Bear Conflicts in British Columbia



ACCESS TO HUMAN FOOD

People teach bears bad habits. If bears are allowed to access human food and garbage, they quickly learn to associate it with people and become what is called food-conditioned. These bears also become habituated to people as they lose their fear of humans.

Habituated and food-conditioned bears learn to expect human food and are more likely to approach people, increasing risks to public safety, and are more difficult to drive away than wild bears.

WHAT IS THE BEAR SMART COMMUNITY PROGRAM?

The Bear Smart Community Program is a proactive conservation initiative that encourages efforts by communities, businesses and individuals to reduce human-bear conflicts.

It is a co-operative venture that recognizes the responsibility to manage bear-human conflicts rests with everyone and will require participation from the provincial government, municipal governments and local citizens to be effective.

It is community led, entirely voluntary on the part of the community, and acknowledges that each community will be unique in the conflicts that occur and the opportunities that exist to reduce those conflicts.

THE BEAR SMART VISION

- Focus efforts on addressing the root causes of bearhuman conflicts.
- Reduce the overall number of conflicts.
- Reduce the number of bears that have to be destroyed due to conflicts.



THE BENEFITS OF BEING "BEAR SMART"

The primary goal of the Bear Smart Community Program is to diminish the rate and intensity of human bear conflicts and thereby:

- **>>** Improve public safety.
- **»** *Reduce property damage.*
- >> Have fewer bears killed due to conflict.

THE BEAR SMART COMMUNITY PROGRAM IS BASED ON A SERIES OF ESTABLISHED CRITERIA:

1. Prepare a bear hazard assessment.

Review the history and pattern of bear conflicts in the community and identify highuse bear habitat, human-use areas (school yards, playgrounds, etc.) and non-natural attractants such as accessible garbage, fruit trees, bird feeders, compost, etc.

2. Prepare a bear/human conflict management plan.

Develop strategies to resolve the hazards identified and reduce the potential for human-bear conflicts.

3. Revise planning and decision making documents.

Ensure the community's commitment to the Bear Smart Community Program by incorporating Bear Smart practices into official community documents such as the Official Community Plan and/or Solid Waste Management Plans.

4. Implement a continuing education program.

Education is a key component of human-bear conflict reduction and the community must have an ongoing education program that is directed at all sectors of the community and consistent with the WildSafeBC/Ministry standard.

5. Develop and maintain a bear proof waste management system.

Ensure that all components of municipal waste management including waste, recycling and composting are managed appropriately and made inaccessible to bears. This may be done through bylaws, the use of bear-resistant containers and/or electric fencing.

6. Implement Bear Smart by-laws.

Implement "Bear Smart" bylaws prohibiting the provision of food to bears as a result of intent, neglect, or irresponsible management of attractants. Implement a compliance strategy for these bylaws to ensure that there is full compliance with them.

BEAR SMART SUCCESSES

We have seen a steady decrease in the number of bears killed annually in response to conflict with people.

Average Number of Bears Killed Due to Conflict





R.A.P.P. Report All Poachers and Polluters

Conservation Officer 24 Hour Hotline 1-877-952-RAPP (7227) Cellular Dial: #7277



More than 20 communities in B.C. are actively pursuing Bear Smart status.

Congratulations to eight communities that have successfully attained official Bear Smart status: Kamloops; Squamish; Lions Bay; Whistler; Port Alberni; Naramata; New Denver; and Coquitlam .



The Conservation Officer Service and the Province recognize there are challenges to the implementation of the Bear Smart Community Program and are committed to supporting and assisting with community efforts.

For more information regarding Bear Smart please visit us online or contact the Wildlife Conflict Manager.

Mike Badry, Wildlife Conflict Manager Conservation Officer Service Branch Phone: (778) 698-4276 Email: mike.badry@gov.bc.ca

Bear Smart Community Program: http://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/wildlife/ human-wildlife-conflict/staying-safe-around-wildlife/bears/bear-smart

"Bear Smart" Community Program: Background Report

Prepared for: BC Ministry of Water, Land and Air Protection Victoria, BC

March 2002

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Executive Summary

Conflicts between humans and bears within British Columbia communities have occurred frequently in the past. Management of human-bear conflicts was largely reactive: problems were managed after they had developed. This usually involved the destruction of the bears involved. However, this reactive management approach is very expensive and ineffective at decreasing both the frequency and intensity of future conflicts. This deficiency, in combination with shifts in the public's attitudes towards the destruction of wildlife, has resulted in changes to the ways in which human-bear conflicts are managed.

This document details the steps and procedures by which communities can reduce the frequency and intensity of human-bear conflicts. The process involves a shift from the reactive management of "problem" bears to the proactive management of the attractants that draw bears into the communities. The Province of British Columbia has chosen to facilitate this change by accrediting communities with "Bear Smart" status, which will be granted to those communities that reach a benchmark level of proactive management of humanbear conflicts.

It is recommended that achieving "Bear Smart" status should be a two-stage process. In Phase I, the sources of potential human-bear conflicts within the community are identified. This typically involves identifying non-natural and natural attractants. In Phase II, a human-bear management plan is developed and implemented. This management plan includes components on monitoring human-bear conflicts, education, managing waste, implementing and enforcing bylaws, managing green space, and community planning. The "Bear Smart" process is designed to be adaptive, so that new management options or improvements can be incorporated into each phase. Criteria for each step in the process are provided so that communities have clearly defined and achievable targets.

Acknowledgements

Without hesitation, we would like to give much of the credit for the material and ideas in this report to many highly dedicated and motivated individuals in Canada and the U.S.A. who have been working to minimize human-bear conflicts and increase awareness and understanding of bears. These people all freely shared their expertise and time to assist us. Most of these people we acknowledge have been involved in the initiation and evolution of the "Bear Smart" Community Program (in various aspects, stages and under various program names) for numerous years. We are merely the people contracted to pull together the ideas and experience of others in a report with the "Bear Smart" Community Program name. We would like to give special thanks to the following British Columbians:

- bear education coordinators and supervisors: Sylvia Dolson, Debra Haas, Blair Hammond, Darcey Lutz, Fancis Maltby, Debby Robinson, and Carla Wainwright,
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- BC Ministry of Water, Land and Air Protection staff: Matt Austin, Mike Badry, Tony Hamilton, Beverly Taylor, and Frazer McKenzie.
- others with expertise used in this report: Brian Barnett, Andreas Comeau, Arthur De Jong, Mia Gardner, Reinhart Troutmann, Ben Hendrickson, Reg Kienast, Jeff Marley, Adrian McCluskey.

Human-bear conflict is not only a problem in British Columbian communities but also in communities in Alberta, the southern U.S.A. and Alaska. We would like to extend thanks and appreciation across borders to bear specialists, bear educators, and/or human-bear conflict managers: Steve Herrero, Jon Jorgenson, and Glen Peers in Alberta; Alasdair Veitch in the Northwest Territories; Mike Madel and Tim Manley in Montana; and John Hechtel, Boyd Porter, Dick Shideler, Rick Sinnott, and Tom Smith in Alaska; and Chris Morgan in Washington State.

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The proactive citizens of many communities deserve appreciation and recognition. Furthermore, the dedicated efforts of the citizens of Canmore, Revelstoke, and Whistler should serve as an inspiration to other communities.

In closing, we hope that all of your efforts to reduce human-bear conflicts are generously rewarded with success. Our communications with others while researching this report has been a major reaffirmation that many people have chosen to work for bears because they care....a lot!

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Mission Statement

"To accept personal and community responsibility for reducing human-bear conflict in and around our communities"

1 Program Introduction

With the expansion of human development, an extensive history of conflict between humans and bears (*Ursus* spp.) has developed. A primary contributing factor to this conflict is that many of the habitats that bears prefer are also desirable to humans. For example, communities are occasionally situated near abundant food sources for bears, such as salmon spawning streams, or in valley bottoms that also serve as major travel corridors for bears.

Conflict ensues when this overlap of habitats is combined with people providing bears with easy access to non-natural food and garbage. Once bears learn they can obtain food from humans, they become persistent in their attempts to access this resource. This tenacity often escalates in frequency and intensity and can pose a threat to human life and property. As a result, these bears are frequently destroyed.

The effects of human settlement on bears are then twofold: bears are displaced from their natural habitats by community expansion and development, and they are also drawn into communities by attractants. Since it is not feasible to relocate towns and communities, we can reduce the source of this conflict by managing attractants within the communities of British Columbia.

In the past, human-bear conflict was widely perceived to be the result of "problem" bears. However, these conflicts typically arose because bears were simply looking for food. Many people were not aware that their own behaviour contributed greatly to the creation of these conflicts. The natural ecology of the bear plays only a small role in the development of these problems.

Because of this perception, management of human-bear conflicts in British Columbia has been primarily reactive: that is, "problem" bears were translocated (moved to another area) or destroyed. In British Columbia, the Conservation Officer Service receives an average of 9000 complaints per year and destroys over 1000 bears per year. The cost of having the Conservation Officer Service respond to human-bear conflicts in this manner is estimated at more than one million dollars annually.

Ultimately, people need to understand that poor management of attractants within communities often results in the destruction of bears. Unfortunately, this

reactive approach to human-bear conflicts is ineffective, as it focuses on managing the bears, not managing the problem. In many cases the bear that is removed from a non-natural food source is soon replaced by a new bear that, if allowed access to the attractant, will also become a "problem" bear and will be removed from the system. Treating the symptom and not the cause perpetuates the cycle.

In recent years, several communities have taken proactive steps towards reducing human-bear conflicts in their communities. By using proactive measures, including education and eliminating sources of non-natural foods, many of these communities have been able to decrease the number of bears destroyed each year in their communities. The BC Ministry of Water, Land and Air Protection (MWLAP) is now taking further action to reduce the number of bears that are destroyed in British Columbia each year. By spearheading the delivery of the "Bear Smart" Community Program, the province is encouraging individuals and communities to take responsibility for reducing human-bear conflicts within their community.

The primary goal of the program is to diminish the rate and intensity of humanbear conflicts, which will thereby increase public safety and reduce the number of bears that are killed. Using proactive management, communities can reduce conflicts between humans and bears by identifying and eliminating the root causes of the conflicts. The "Bear Smart" Community Program provides communities with options for addressing their own unique situation and helps them reach the objectives of the program.

It is recommended that "Bear Smart" status be achieved through a two-stage process. In Phase I, the sources of potential human-bear conflicts within the community are identified. This typically involves identifying non-natural and natural attractants. In Phase II, a human-bear management plan is developed and implemented. This management plan includes components on monitoring human-bear conflicts, education, managing waste, implementing and enforcing bylaws, managing green space, and community planning. The "Bear Smart" process is designed to be adaptive, so that new management options or improvements can be incorporated into each phase.

This document is designed to guide communities through the process of becoming "Bear Smart." It focuses on proactive changes that can be made within the community and is limited to those changes that are within the community's jurisdiction. Criteria for each step in the process are provided so that communities have clearly defined and achievable targets. This document does not address activities such as hunting or backcountry recreation or reactive techniques such as aversive conditioning¹.

This report follows a report released in 1997: "Reducing human-bear conflicts: solutions through better management of non-natural foods" (Ciarniello 1997).

¹Various aversive conditioning techniques and translocations are available but should be used *only* after non-natural attractants are eliminated and *only* if bears have little or no history of food conditioning and/or human habituation.

2 Understanding Natural Bear Behaviour

To fully understand the development of "problem" bears, it is necessary to examine the biological requirements of bears and the process by which they learn specific behaviours. The following sections outline how bears behave in natural settings without non-natural foods and attractants. Using this as a framework in which we can predict how bears function, we are better able to manage conflicts with bears based on their biology. Although grizzly bears (*U. arctos*) and black bears (*U. americanus*) share many similarities, they are different species that have learned to exploit different niches. These differences need to be understood and applied properly for management decisions to be effective.

2.1 General Biology

Although classified as carnivores, grizzly and black bears are opportunistic omnivores that mainly feed on graminoids (i.e., grasses and sedges), emergent forbs (e.g., the leaves or stems of herbaceous plants), roots, and berries) but prefer richer, fatty foods when available (e.g., fish, ungulates). Bears will switch foods according to their digestibility, distribution, and abundance. Unlike ungulates, bears lack digestive organs such as a caecum and a rumen that are specialised for digesting vegetative materials; therefore they pass food quickly through their digestible components of the food are utilized. As a result, bears must obtain vegetation when it is in a tender and easily digestible stage and will select habitats that contain plant foods high in soluble nutrients and relatively low in fibre (Bunnell and Hamilton 1983, Hamer and Herrero 1987, Pritchard and Robbins 1990).

Bears need to accumulate a large reserve of fat to survive up to six months of winter hibernation. Their physiological imperative is to consume enormous amounts of food, so dramatic that biologists label the process "hyperphagia," literally "excessive eating," They are attracted to nutrient rich foods that are easily digested and absorbed. For example, bears gorge themselves when eating fat-rich salmon during their hyperphagic period; they have been recorded to consume over 10 to 15 salmon per hour or approximately 100,000 calories per day (Olson 1993, B.K. Gilbert, Utah State University, personal communication).

2.1.1 Reproduction

A special reproductive characteristic of grizzly bears and black bears is delayed implantation. Mating occurs from mid-May to early July, but implantation of the embryo will not occur until November or December while the bear is hibernating (Barber and Lindzey 1986). Successful implantation of the embryo is dependent upon the female's fat reserves; the embryo will implant if she has enough reserves to successfully sustain herself and her offspring (Samson and Huot 1995).

2.1.2 Home Range, Movements and Dispersal

The home range of a grizzly bear is generally larger than the home range of a black bear. Home range sizes are affected by sex, age, population density, and habitat quality. In both black and grizzly bears, adult males have the largest home ranges, which usually overlap other male ranges and often contain part or all of a number of adult female home ranges. Adult females have more restricted and well-defined home ranges than males. Females accompanied by cubs of the year (COY) generally have the smallest home ranges. The home range of a family group increases as the cubs mature. Females may allow partial use of their home range by their female offspring (Rogers 1987). However, subadult males are usually forced to disperse and establish a new home range.

The forced dispersal of subadult males by their mothers, the need to find and establish their own home range in areas dominated by larger, more aggressive males, and their curious nature are keys to understanding why this cohort dominates wildlife complaint records. Subadults are more likely to accept risk and feed in closer proximity to humans when natural food is limited, or when bears perceive the benefits to be greater than the costs. Less dominant bears, including subadults, females with cubs, and black bears, may use humans to avoid more dominant bears (Mattson 1990). In general, females with cubs of the year will avoid both adult males and humans.

Home range size depends on the distribution, abundance, and quality of food available within an area. Study areas with high densities of bears normally report smaller home ranges and a richer food base than those with low population densities of bears (Gilbert and Lanner 1995). The major determinants of habitat quality are the relative and average abundance of bear foods (i.e., quantity, productivity, and distribution). In areas with poor habitat quality, bears must search more widely for food, thus increasing the size of their home ranges. For example, bears habituated to humans and conditioned to human foods will alter their natural movements between habitat types to utilize areas with lax garbage management (Ciarniello 1996). This affects bear density in the area and places bears and humans in closer proximity than would otherwise be the case. Furthermore, concentrations of non-natural foods provide a highquality food source, which has the potential to increase the bear population artificially beyond that which is possible in the natural environment (e.g., British Columbia's South Okanagan, Tony Hamilton, MWLAP, personal communication).

2.2 Grizzly Bears

The grizzly bear is wide-ranging and generally secretive in nature. The grizzly bear is listed as a vulnerable species by the Committee on the Status of Endangered Wildlife in Canada (McLellan and Banci 1999), as a blue-listed species (species at risk) in British Columbia (BC Conservation Data Centre), and as a threatened species in the United States (listed in 1975 by the U.S. Fish and Wildlife Service).

Grizzly bears are extinct from approximately 24% of their original range in Canada, and some local populations in British Columbia are known or are believed to be declining. The BC Ministry of Water, Land and Air Protection estimates the population of grizzly bears in the province to be 13,800 individuals (M. Austin, MWLAP, personal communication). The "Bear Smart" program is less applicable to grizzly bears in specific locations in south and central British Columbia because grizzly bears have largely been extirpated in these areas (e.g., Kamloops, William's Lake, Kelowna; Tony Hamilton, MWLAP, personal communication).

2.2.1 Reproduction

Female grizzly bears average between five and seven years of age before they reach reproductive maturity in the wild (Russell et al. 1979, Nagy et al. 1989). Cubs are born every two to five years, with one to two cubs per litter being most common. As mentioned, implantation of the embryo is correlated with nutrient availability; larger females tend to be more successful in producing more offspring and reducing the intervals between breeding events (Eiler et al. 1989). Because reproduction begins at a late age, is dependent upon nutrient availability, and occurs at lengthy intervals, the majority of females reproduce only a few times during their life. For example, in an optimum scenario, if a female grizzly bear begins successful reproduction at the age of five, reproduces at every minimum interval (two years), averages two cubs per litter, and reproduces until age 20, she will produce 12 cubs during her life time. Because cub mortality ranges from 15% to 44% (McLellan 1994), seven to ten of these cubs will survive, of which half will have the chance of being female and thus able to contribute to the future population. This scenario does not factor in mortality from "problem" bear management; hunting; poaching; vehicles; habitat loss, alienation, alteration, and fragmentation; and those years in which the female is unable to obtain a weight sufficient for reproduction. The low reproductive rate of grizzly bears makes them sensitive to overharvest (Dueck 1990).

2.2.2 Habitat Use

In interior mountainous areas, from early May to late June, grizzly bears tend to follow the receding snow-line, using higher-elevation habitats as they become available (Hamer and Herrero 1987, Ciarniello and Paczkowski 2001). Grizzly

bear movements tend to be characterized by shifts from avalanche slopes and low-elevation riparian habitats (e.g., stream valleys, wet meadows) in the spring to high-elevation forests and alpine zones in the summer, and back to low elevations in autumn (Mundy and Flook 1973). In coastal British Columbia, grizzly bears tend to use forested and non-forested habitats on lower slopes and valley bottoms through all seasons (MacHutchon et al. 1993). In both coastal and interior areas, grizzly bears prefer habitats with high ecosystem productivity, such as avalanche slopes and riparian and seepage areas, especially in spring when vegetation is protein-rich and easily digestible. Adult males often occupy the habitats with the greatest productivity.

2.3 Black Bears

Black bears are more adaptable to humans and human settlement than grizzly bears and continue to occupy 85% of their historic range. As a result, the black bear is not listed by COSEWIC and is not a species at risk (yellow-listed) in British Columbia (BC Conservation Data Centre). Black bears have been extirpated in areas of heavy human settlement but remain in all of British Columbia's major forested areas, including those adjacent to towns and cities. Throughout British Columbia, black bears have been known to enter towns or development sites in search of human food and garbage. The population of black bears in British Columbia is estimated to range between 120,000 and 160,000 individuals (M. Badry, MWLAP, personal communication).

2.3.1 Reproduction

In British Columbia, black bears normally become sexually mature between four and five years of age. Adult female black bears are able to breed every other year and produce an average of two cubs per litter. However, this level of breeding will occur only if the food supply is adequate. In environments with limited food, black bears may average three to four years between successful litters (Samson and Huot 1995). Although black bears are able to breed at shorter intervals than grizzly bears, they are still considered to have low reproductive rates; a severe reduction in their local population may seriously affect population viability.

2.3.2 Habitat Use

The most important factor affecting the use of habitats by black bears is the distribution, availability, and abundance of preferred foods (Hatler 1967, MacHutchon 1989), combined with security cover (Kansas et al. 1989, Ciarniello 1996). Avoidance of grizzly bears also affects the black bear's selection of habitat. Females, and especially those with cubs, may avoid areas occupied by adult male black bears and grizzly bears (Chi and Gilbert 1999). Because of these factors, black bears display distinct seasonal variations in their habitat use.

In general, black bears prefer moderate to heavily forested areas with a dense shrub understory and high availability of foods (graminoids, forbs, and berries), often in small openings. These vegetation characteristics are typical of unlogged valley bottoms. Since transportation corridors and communities are also commonly developed in valley bottoms, human settlement often conflicts with the preferred habitat of black bears. Black bears will utilize clearcuts and the subalpine when it does not compromise their safety (i.e., no grizzly bears or other threats present). Females with cubs usually avoid such openings. Black bears normally use trees for cover or climbing when they feel threatened (Davis and Harestad 1996).

A reduction of forest cover, or insufficient food supply, may cause black bears to retreat into less preferred habitats. In Banff National Park, Kansas et al. (1989:5.70) found that "in some instances cover was the overriding factor determining black bear ecosite importance."

2.4 Learning and Development

Understanding how bears learn is critical to the implementation of effective strategies to reduce human-bear conflicts. Thorpe (1963:56) comments on the processes of learning in the following manner:

Many workers have considered that the more or less frequent repetition of a stimulus or of a changed situation is necessary for learning; but, while it is true that most learning comes about as a result of repeated application of a stimulus or combination of stimuli, such repetition can be no necessary part of the concept because we all know that learning can, on occasion, result from one experience only.

An initial learning environment imprints heavily on the future behaviours displayed by cubs. Grizzly and black bear cubs learn skills fundamental for their survival from their mother in the one to three years they remain with her, and once weaned, they must fend for themselves. For example, if a mother spends her time foraging at a landfill, the cubs will learn this behaviour. As a result, these bears will likely become highly reliant on the landfill as a food source and in some cases may not be able to survive in the natural environment.

Throughout their life, bears remain curious and continue to learn through trial and error. Curiosity is an adaptive characteristic that helps bears discover the most productive and nutritious foods, which are fundamental to their survival (Graf et al. 1992, Herrero 1985, Heuer 1993). Bears also possess the ability to learn through observing other bears; they may even be able to follow information communicated by the marking behaviours of other bears (Tony Hamilton, MWLAP, personal communication). Because bears are very effective learners, any high-energy food that they feed on may be included in their search image. Bears have an excellent sense of smell (Graf et al. 1992) and are able to associate smells with food types. In the spring, bears may travel long distances to locate carrion. Garbage, fruit tree windfall, and carcasses of animals are all extremely pungent attractants that have the ability to draw bears in from long distances.

3 Creating "Problem" Bears

This section focuses on those aspects of the learning process of bears that contribute to the creation of "problem" bear behaviour. The intent is to gain a better understanding of the connection between human-bear conflicts and the biological requirements of bears so that people recognize the pressures that bears face in relation to humans and their activities. The reader should keep in mind that THE CREATION OF "PROBLEM" BEHAVIOUR DISCUSSED IN THIS DOCUMENT IS THE RESULT OF THE AVAILABILITY OF NON-NATURAL ATTRACTANTS; THE AVAILABILITY OF NON-NATURAL ATTRACTANTS IS THE DIRECT RESULT OF HUMAN ACTIONS AND MISMANAGEMENT.

3.1 Causes of Bears' Attraction to Human Food

Many factors affect bears' attraction to human food. Each of these factors operates on bears in a fairly predictable manner. Understanding how these factors affect the frequency and intensity of human-bear conflicts is crucial to the implementation of a proactive management strategy.

3.1.1 Community Development and Habitat Loss

Many cities and towns in British Columbia are situated in areas of good to excellent bear habitat (Fuhr and Demarchi 1990). When humans move into areas inhabited by bears, they often introduce new feeding opportunities that the bears are quick to discover and exploit. In addition, an expanding human population requires developments that decrease the suitability of the natural landscape to sustain bear populations.

British Columbia's rapidly expanding human population continues to encroach upon the natural habitat of grizzly and black bears. As a result, habitat loss, alteration, alienation, and fragmentation can disrupt bears' use of natural habitat and ultimately result in negative impacts to individual bears and bear populations through displacement or mortality.

Grizzly bears and black bears that are wary of humans will be displaced to other, generally less productive, habitat. Displaced bears may then have to compete with bears already established in the area. Displaced bears may experience stress associated with adapting to the new habitat, and there is an increased chance of mortality inflicted by more dominant bears in their quest for, or defence of, habitat. Black bears appear to have a wider variety of habitat selection patterns, making them more resilient to human change, whereas grizzly bears may have a narrower pattern, which accounts for their lack of resiliency when landfills are closed. Given that existing towns in British Columbia cannot be moved or closed means we must make them as bear resistant and bear friendly (e.g., accommodation of movement corridors) as possible. In addition, most communities are

expanding, and this expansion should also be done in a bear-friendly way. Currently, the majority of bears that adapt to living adjacent to communities are drawn into the community by the availability of non-natural attractants.

3.1.2 Natural Food Shortages

Bears in North America commonly experience food shortages. The failure of critical natural food crops, such as salmon and berries, and the resultant increase in competition among bears, forces them to search for alternate foods (Tompa 1987, Mattson et al. 1992, Ciarniello and Paczkowski 2001). As opportunistic feeders, bears are naturally attracted to scents that suggest food. During years of natural food scarcity, the hunger of some bears may lead them to overcome their fear of humans in order to acquire accessible foods. The effects of natural food shortages and an increase in negative human-bear interactions have been well documented (Hatler 1967, Knight et al. 1988).

Natural food shortages can be local or sub-regional in extent, both affect "problem" bear generation: in years of low food availability, bears move more and encounter human situations more (local shortages). When food shortages are on the sub-regional scale, it can be catastrophic to bear populations. In British Columbia we get both kinds of failures. Failure of food crops tend to have more consequence in areas with limited food choices or availability (e.g.., interior habitats tend to have lower diversity in berry species than coastal habitats), making any failure that much more disastrous.

3.1.3 Concentration of Food Resources

The poor digestive ability of bears and their constant struggle to attain the thickest layer of fat possible (to survive winter denning and increase reproductive success), are keys to understanding their attraction to non-natural foods. Probably the greatest reason that bears are attracted to communities is the concentration of food resources that are found there. Landfills and other non-natural foods that humans create are attractive to bears because they contain highly concentrated sources of calorie-rich foods that require little energy expenditure to acquire (Graf et al. 1992, Herrero 1989). The amount of nutrition attained influences reproductive success and social status, and is vital to survival. Clearly, bears are simply maximizing their energetic balance sheet when they select these concentrated food sources.

Another element affecting bears' attraction to non-natural foods is their use of habitats. Natural bear foods vary widely in their abundance, quality, and distribution. Thus, bears must move widely in response to this variable supply of foods. Doing so increases their chances of finding non-natural foods in their travels. Unlike seasonal fluctuations of natural food sources, landfills are not seasonal, and when bears find them, they do not have to use energy to search for new food sources.

3.2 Habituation of Bears to Humans

Another issue that contributes to the development of human-bear conflict is habituation of bears to humans. Thorpe (1963:60-61) provided the following definition of habituation:

Used in its widest sense, habituation is a simple learning not to respond to stimuli which tend to be without significance in the life of the animal Habituation can, therefore, be defined as the relatively permanent waning of a response as a result of repeated stimulation which is not followed by any kind of reinforcement. It is specific to the stimulus.

Human-habituated bears are those that tolerate human presence, reducing their fleeing response in the presence of humans (McCullough 1982, Herrero 1985, Gilbert 1989, Aumiller and Matt 1994). An example of habituation by bears to humans (without food conditioning) is best illustrated at McNeil River Falls in Alaska. At this site, grizzly bears have become habituated to the presence of people, whose activities are strictly monitored to ensure no food or garbage is accessible (Aumiller and Matt 1994).

Food-conditioning and human habituation are considered separate behaviours because a food reward is not a necessary condition for human habituation (Herrero 1985, Gilbert 1989, Aumiller and Matt 1994,). Thus, used in a behavioural sense, the term "garbage-habituated" is incorrect because bears are not known to "respond" to garbage. and garbage provides reinforcement of bear behaviour through reward.

3.3 Effects of Non-Natural Attractants

The availability of non-natural attractants within a community can have several profound effects on bears that pass nearby the community. Each of these effects directly influences the likelihood of human-bear conflicts.

By providing artificial foods we may accelerate the natural reproductive cycle of the bear. Bears may respond with a decreased interval between breeding, larger litter size and earlier reproduction (Rogers 1983). However, non-natural mortality rates of bears that feed on unnatural food sources are greater than those of wild bears (Cole 1974, Rogers 1983, Ciarniello 1996). Bears that feed on garbage at landfills often suffer from burns, cuts from broken glass and can starve from having containers stuck on their tongues/mouths (Smith and Lindsey 1989) or heads (Huber 1998).

3.3.1 Human Food Conditioning or Garbage Conditioning

Operant conditioning is the form of learning most often related to the process of bears feeding on garbage (Herrero 1989). Bears that are attracted to human food

and are subsequently rewarded develop behaviour patterns that enable them to exploit their conditioning. For example, if a bear is attracted to the smell of garbage in a can, it may push the can over, exposing the contents for consumption. The animal's action of pushing over the can was instrumental in obtaining a reward (i.e., food). Bears have the ability to learn from a single experience, and this process may be all that is necessary for the animal to become conditioned to pushing over garbage cans to obtain food. As a result of learning, whenever the animal encounters garbage cans in the future, with or without any food odours, it will likely investigate them (i.e., associative learning). In addition to this conditioning, the association between the smell and a reward has also been made. In this situation, the bear would likely be attracted to smells similar to the can (e.g., garbage on a porch).

Generally, bears attracted to non-natural foods other than garbage (e.g., fruit trees, grains) will behave differently towards humans than "garbage" bears. Regardless of the type of attractant, once bears have been successful in obtaining human foods, they begin to develop behaviour patterns and continue to seek food at sites used by humans (i.e., they become human-food conditioned). The bear then repeatedly returns to the source of the conditioning (Ciarniello 1996).

Bears are very effective learners. Cubs remain with their mother for one to three years and in that time learn the requirements necessary for survival. If the mother is a "garbage" bear, then the cubs will learn to forage on garbage. Similarly, if the mother does not display an avoidance of humans and/or if the cubs acquire food from humans, then they may learn a lack of fear of humans and an association between humans and food.

3.3.2 Habituation in Combination with Human Food Conditioning

The majority of "problem" bears display a combination of human food conditioning and human habituation. Herrero (1989:12) comments on the relationship between food conditioning and human habituation in grizzly bears in the following manner:

...when human-related foods are first sensed by a grizzly bear, an approach-avoidance conflict exists. A bear is attracted by the odour of food or garbage, and repelled by human presence or even the odour of people. Such food-seeking behaviour has thus far only been mildly rewarded by food odour (a secondary, not a primary reinforcer). At first the perceived risk may be too great for a bear to approach the food source. However, upon repeated exposure to similar situations, and if no harassment or harm occurs, then habituation develops. The bear comes to accept the smell of, or even the presence of, people nearby, and finally it feeds on the food or garbage. It is then foodconditioned ...It has learned to accept the risks associated with eating human-related foods. It has also become habituated to some extent... to the presence of people. It is less likely to flee from people, more likely to approach them.

Ciarniello (1996:26) identified two behavioural traits displayed by bears that were human habituated and garbage conditioned:

- 1. The bear loiters around humans and appears tame; or
- 2. The bear searches out human food and garbage with little or no fear of humans.

With both of these behavioural traits, bears have made the association between humans and food. In the first case, the bear appears tame to humans, who in turn try to approach the bear. These bears may beg and will accept handouts from humans (Mundy and Flook 1973, Herrero 1985, Ciarniello 1996). This type of behaviour increases the risk of injury to humans from bears.

Bears displaying the second trait pose the greatest threat to human safety by boldly approaching people (Herrero 1985, Ciarniello 1996). Kunelius and Browne (1990: 1) cite the availability of unnatural food sources as a "major cause of bear management problems and related public safety hazards" in Banff National Park. Holroyd and Van Tighem (1983:338) state that "the first documented human death due to a bear attack was caused by a black bear which had become habituated [sic; conditioned] to handouts in Jasper." The combination of human habituation and garbage conditioning poses a threat to human safety and is the most difficult trait to discourage (Herrero 1985).

The level of habituation to humans varies with individual bears and their past experiences with people (Herrero 1985). Generally, food-conditioned and human-habituated bears have a higher probability of being involved in a negative human-bear encounter than wild bears because their attraction to human foods brings them into more frequent contact with people (Ciarniello 1996).

4 Moving Towards Becoming "Bear Smart"

4.1 Overview of "Bear Smart"

The goal of the "Bear Smart" Communities Background Report is to assist communities in understanding and achieving "Bear Smart" status. The information in this report is based on a thorough literature review of humanbear conflict management. In many ways, the "Bear Smart" Community Program applies the same strategies that have been implemented in many national and provincial parks in Canada and the U.S. The report is also based on interviews with government personnel and biologists in British Columbia, Alberta, Yukon, Northwest Territories, Alaska, Washington, and Montana that have been involved in various aspects of the management strategies that make up the "Bear Smart" Community Program.

This report presents the criteria that must be met to achieve "Bear Smart" status and strategies for fulfilling them. Firstly, the criteria by which communities will be assessed are outlined, and the logic behind each criterion is provided. Secondly, several methodologies are provided by which communities can fulfil the criteria. Because each community is unique, the methods that should be used will likely be community-dependent, so options have been developed, as necessary, for the fulfilment of criteria. Thirdly, quantitative measures are provided by which external reviewers can assess the success of a community's attempt to become a "Bear Smart" Community. Finally, the report concludes with a number of case histories as examples of the process of becoming "Bear Smart." An overview of the process of preparing for, implementing, and monitoring the program is provided in Figure 1. The background report is divided into several sections, with a rationale provided for each step in the process.



Figure 1. Flow chart of recommended steps in the process of becoming a "Bear Smart" Community. Highlighted boxes are required criteria.

4.1.1 Changing Attitudes

In the early 1900s, the attitudes of the public and management agencies towards bear management throughout North America was generally reactive, in that "problem" bears were simply removed from the system. These attitudes have been well documented in Canadian National Parks (Ralf 1995) and U.S. National Parks (Gniadek and Kendall 1998). During this period of reactive management, injuries inflicted on humans by bears and the subsequent destruction of bears became common and eventually were considered a serious management issue. In more recent years, many parks have managed to reduce human-bear conflicts through proactive management. However, in community settings the process of change towards proactive management has only just begun.

In 1960, the U.S. National Park Service implemented a bear management program that aimed to reduce property damage and injuries to humans and also enable bears that used National Parks to return to their natural behaviours. The following management strategies were identified to achieve these objectives:

- educate the public about bears, bear behaviour, and methods for reducing human-bear conflict,
- control garbage to reduce the dependence of bears on garbage,
- enforce regulations restricting the feeding of bears,
- develop bear-proof garbage cans,
- remove potentially dangerous food-conditioned bears.

In 1968, Glacier National Park in Montana wrote its first bear management plan. Gniadek and Kendall (1998) concluded that this park management plan reduced the amount of property damage done by bears, the number of injuries to humans by black bears, and the number of bears removed from the park system (either through culling or translocation).

Similarly, Denali National Park in Alaska implemented a human-bear conflict management plan in 1982 in response to a dramatic increase in the number of visitors and problems with grizzly and black bears during the 1970s. Denali's human-bear conflict plan focussed on visitor education, food-storage regulations, backcountry closures, and experimental aversive conditioning (Schirokauer and Boyd 1998). Evidence indicates that Denali's program also effectively reduced human-bear conflicts, even as visitation levels rose (Schirokauer and Boyd 1998).

In Yellowstone National Park in Wyoming, injuries to humans from bears also decreased because of increases in public education and removal of foodconditioned bears following the implementation of a bear management plan in 1970. As a result of this plan, bears' access to human foods was almost entirely eliminated by 1979; bears conditioned to human food inflicted the most injuries prior to 1980. Data from elsewhere strongly suggests that food-conditioned bears that had access to human food and garbage were the primary cause of injuries inflicted by bears on humans in developed areas. In Canada, bear removals in Jasper National Park also declined as a result of garbage becoming inaccessible to bears because of bear-proofing during the 1970s and 1980s (Ralf 1995).

4.1.2 Adaptive Management

Adaptive management is a formal process for continually improving management polices and practices by learning from their outcomes (BC Ministry of Forests). The "Bear Smart" Community Program should be flexible enough to allow for new research and professional expertise to further develop the program. This will enhance the efficacy of proactive management in reducing human-bear conflicts within the community. The development of new, cost-effective methods under the guidance of a biologist experienced in the ecology and behaviour of bears, as well as human-bear conflicts, is strongly encouraged.

5 Initiating the "Bear Smart" Community Program

5.1 Formation of a Bear Stewardship Committee

The most effective way to implement the "Bear Smart" Program is to create a Bear Stewardship Committee. Decisions on the process, delivery, and implementation of the "Bear Smart" Community Program must come from a community that takes ownership of the program. Several communities currently have a committee for addressing human-bear conflict issues (Black Bear Task Team 1998, Maltby 2000, Stroh 1999, Nahornoff 2000). Community ownership implies that the community values the lives of bears. It also suggests that these communities have a desire to reduce preventable destruction of bears and foster an attitude that will ensure the health of bear populations over the long term.

Communities need to decide if and how they will co-exist with bears. Without public and community support for proactive management, human-bear conflicts will continue to increase, and bears will continue to pay the price. Change in public attitudes and commitment can change decades of reactive management into a co-operative effort of which a community can be proud. Several communities provide evidence of this change. With time and measured success from communities at the forefront, other communities are sure to follow.

5.1.1 Objectives of Bear Stewardship Committee

The primary objectives of the Bear Stewardship Committee are to:

- Initiate and support the development of the "Bear Smart" Community Program.
- Review management strategies and options for attaining "Bear Smart" Community status.
- Initiate and review the Problem Analysis.
- Establish a Human-Bear Conflict Management Plan that will implement the recommendations from the Problem Analysis.
- Monitor the progress of the program.
- Provide annual reports that identify the progress of the program, evaluate the success or failure of management strategies, and provide direction for the program for the following year.

5.1.2 Recommended Composition of "Bear Smart" Stewardship Committee

The Bear Stewardship Committee will need a strong leader that is committed and prepared to spend the time necessary to develop and direct the implementation of "Bear Smart" criteria. Ideally this position would be a paid part-time or full-time position for as long as is required to implement the program successfully. In many communities, the person that takes the lead in the "Bear Smart" Community Program may also coordinate the education program. The rest of the committee should have members that represent:

- the community, including:
 - o local governments (regional district and/or city, municipality),
 - First Nations governments,
 - waste management contractor,
 - local RCMP,
 - community stakeholders (e.g., ranchers, orchardists, beekeepers),
 - university or college representative if wildlife management or other relevant subjects are part of the curriculum,
 - other community interest groups (e.g., naturalist club, rod and gun club), and
 - o local tourism representatives (local tourist booths).
- Regional MWLAP, including staff from:
 - Conservation Officer Service
 - Wildlife Sciences and Allocation
 - o Environmental Management

The committee also needs a committed public relations person and fund-raiser.

5.1.3 Importance of the Bear Stewardship Committee

The objectives of the "Bear Smart" Community Program will be achieved through the guidance of a Bear Stewardship Committee. This committee should meet on a regular basis to follow the process from program initiation through to completion. The committee should begin the process by establishing a meeting schedule and process that suits the particular needs of the community. When "Bear Smart" status has been achieved, the committee could then downsize to a core group that will be focused primarily on maintaining and monitoring "Bear Smart" status for the community.

6 Phase I: Problem Analysis

The Problem Analysis has the broad goal of identifying the current and potential agents of human-bear conflict that occur within the community. There are several components to the Problem Analysis, each of which will need to be implemented in a step-wise fashion.

6.1 Preliminary Hazard Assessment

The first step of the Problem Analysis is to conduct a Preliminary Hazard Assessment. The basic objective of the Preliminary Hazard Assessment is to establish a general but community-specific overview of human-bear conflict in and adjacent to the community. It will include the identification of communityspecific natural or non-natural features or practices that increase the potential for conflict. The hazard assessment will provide the initial direction for the community to become "Bear Smart." The Preliminary Hazard Assessment may also identify areas that will need more Detailed Hazard Assessments (section 7.0).

Hazard assessments of varying levels of detail have been conducted to qualitatively and/or quantitatively identify existing and potential hazards in and around communities (Simpson and Jaward 1997, Diggon 1999, Maltby 2000, Wellwood 2001a). The purpose of these assessments is to identify existing and potential hazards and provide recommendations for reducing human-bear conflicts that may arise from these hazards.

The results and recommendations from the Preliminary Hazard Assessment will be used by the Bear Stewardship Committee to establish community-specific priorities and direction for implementing the "Bear Smart" Community Program. Results are to be presented in the Human-Bear Conflict Management Plan.

6.1.1 Objectives

The specific objectives of the Preliminary Hazard Assessment are to: 1) identify sites, areas, trails, and practices that have historic, existing, and potential humanbear conflict, 2) identify gaps in the existing knowledge of bear use and humanbear conflict in the area and provide recommendations for further investigation and additional hazard assessment phases, and 3) produce management recommendations to reduce existing and potential conflict within the community.

The Preliminary Hazard Assessment is the first step in an in-depth process that will be required to reduce human-bear conflicts. The Preliminary Hazard Assessment should distinguish the major and most readily identifiable issues that influence existing or potential human-bear conflict. Generally, these will be issues that are related to the availability of non-natural foods within the community. However, natural features that influence the existing or potential conflicts should
also be identified where appropriate. The assessment should identify areas in the community where bear proofing is needed (based on existing or potential humanbear conflict) and should be implemented. The Preliminary Hazard Assessment report should be used as a reference tool to set priorities for the implementation of bear-proofing measures within the community.

6.1.2 Recommended Components and Steps

Preliminary hazard assessments will be comprised of several key components and should be approved by a Registered Professional Biologist with expertise in bear ecology and behaviour and human-bear conflicts. The assessment should include the following:

- 1. A review of patterns of historic human-bear conflicts based on Problem Wildlife Occurrence Reports for bears and/or Conservation Officer experience.
- 2. Interviews with personnel from the Conservation Officer Service, local wildlife biologists and other biologists that have worked in the area, the Bear Stewardship Steering Committee, and other agencies responsible for the community to identify:
 - sites, areas, and trails that are considered high risk for human-bear conflict, and
 - practices that are considered high risk for human-bear conflict.
- 3. Identification of non-natural foods and attractants that are available within the community and surrounding area. This process should assess the following issues:
 - residential and commercial garbage containment,
 - garbage transfer and disposal at landfills and transfer stations,
 - park and highway pull-out litter barrels, and
 - orchards, honeybee colonies, and ranching and agricultural attractants.
- 4. Identification of major non-natural features that may influence the travel patterns of bears, including major roads, edges of the community, and security cover/green space within the community.
- 5. Identification of general bear habitat suitability within and adjacent to the community, potential natural movement patterns of bears in the area (including travel corridors), and visibility and other sensory issues (see below).
- 6. Identification of human-use areas that have high risk for conflict with bears, such as schools, playgrounds, community campgrounds, and residential areas located adjacent to bear habitat, and walking/hiking/bike trails that pass through higher-quality bear habitats, including berry patches, etc.
- 7. Identification of regional, inter-provincial and/or international issues in areas outside the community that may affect the effectiveness of the "Bear Smart" Community Program. For example, non-natural foods that are outside the community but within the home range of a bear that uses the

community can increase the potential for food-conditioned bears within the community. Bears do not adhere to or respect political boundaries (see Canmore Case History section 12.2).

8. Identification of potential data limitations.

An example of a Preliminary Hazard Assessment outline is provided in Appendix D.

6.1.3 Assessment Approaches

Three major factors affect the methodology that should be used for the Preliminary Hazard Assessment. Each of these factors play an important role in determining the strategies that will be implemented and identifying available techniques that may be used to achieve "Bear Smart" status.

Natural and non-natural features influence the potential for human-bear conflict, and these features differ among communities. Therefore, communities will vary in the time and effort required to complete comparable hazard assessments. For example, a community that is adjacent to high-quality bear habitats and is confined by terrain features that concentrate the movements of bears into the community may need to commit considerable effort to identifying and mitigating problems. Communities that have a higher overall rating for potential humanbear conflict may be required to conduct a Detailed Hazard Assessment, whereas other communities that are rated lower may need to do very little in addition to the Preliminary Hazard Assessment.

Hazard assessments are largely based on informed, but subjective, professional opinions of biologists. It is important to identify the limitations of the data that can be collected in a community. The process of completing hazard assessments should remain adaptive until a standardized methodology has been established and the methodology has been tested. This will allow new and more effective methodologies to be implemented as they become available.

Finally, the amount of work required should not discourage communities from beginning to pursue "Bear Smart" Community status. Therefore, the process of conducting a Preliminary Hazard Assessment and additional Detailed Hazard Assessments should proceed by stages so that communities can receive some acknowledgement for their progress even though they are aware that additional work is required.

6.1.4 Potential Data Sources

The process of completing the Preliminary Hazard Assessment should use several sources of data to examine risks to the community. Communities need to identify the habitat's potential for attracting bears with natural food sources as well as

habitat features that affect the likelihood of conflicts, evidence of past bear activity, and sources of non-natural food or attractants within the community. Potential sources of data regarding human-bear conflict include Conservation Officers, RCMP, and provincial or national parks records. Other sources of information include terrain maps, ecosystem maps, vegetation maps, bearsuitability maps, and drainage system maps.

6.1.5 Qualitative Assessments

Qualitative assessments can be conducted through brief investigations of specific hazards and representative habitat types while walking through and/or driving around the community. Time constraints may not allow entire sites, areas, or trails to be assessed. Therefore, effort should be focused on investigating features identified as high risk during interviews or on obtaining information from the number of reports in areas over the years and investigating other potentially high-risk features as they are encountered. Photographs should be taken of sites, areas, trails, and other hazards. Record all sites, areas, and trails on air photos, on 1:50,000 National Topographic System (NTS) map sheets, and/or on a detailed map of the community.

To assess the potential for bear-human conflicts at sites, areas, and trails, investigators need to evaluate habitat potential, travel issues, and visibility and other sensory issues. Record bear sign as it is encountered. Document the availability of security cover and non-natural foods. Describe and/or rate the following conditions during assessments and/or interviews.

Habitat Potential

Understanding the natural habitat potential of an area is important to understanding the likelihood of a bear using an area once non-natural attractants have been eliminated from the community. A community that has abundant highquality habitats in close proximity to the town is more likely to have bears nearby. High-quality bear habitat adjacent to the community will continue to influence the potential for conflict even after access to non-natural foods has been eliminated. If a detailed inventory of vegetation habitats and a study of bear food habits have been conducted for areas adjacent to the community, this information should be used to evaluate habitat potential at sites, areas, or trails.

Many communities will not have detailed habitat inventories or information on the specific food habits of bears in their area. In these cases, it would be beneficial to begin by referring to the food habits of bears that have been documented by researchers in ecologically similar areas. Understanding the habitat potential of an area will enable a community to relocate or restrict human activity or development from high-quality habitats. Assumptions about habitat potential can be supported by opportunistically recording vegetation descriptions, as well as by having investigators record their observations of bears when they are consuming natural foods and their observations of the contents of scats.

Travel Issues

Travel issues are geographic features such as creek and river corridors and steep mountains that influence the likelihood of bears travelling through specific sites or along trails. In some communities, travel issues may have a major influence on the potential for a human-bear conflict but less so in another community. For example, travel routes may contribute to the likelihood of human-bear conflicts on the edge of a community that is located in a narrow, steep-sided valley bottom, but not for a community that is located in a wide, gently sloped valley. The location and proximity of wildlife trails and/or potential travel routes should also be documented and included in this category.

Visibility and Other Sensory Issues

Sensory issues are environmental features that reduce the ability of bears and humans to detect each other. Visibility issues occur because of features such as vegetation and topography that limit visibility and thus increase the potential for surprise encounters. Other sensory issues result from the noise made by creeks or from persistent, strong valley winds that affect the ability of bears and humans to hear each other.

Bear Sign

Bear sign such as trails, mark trees, beds, and scats should be opportunistically recorded when encountered.

Security Cover Issues

Security cover issues arise when vegetation provides cover for bears, thus lowering the likelihood of detection by humans. Investigators will need to identify high hazard areas for security cover.

Non-natural Food Issues

Document sources of non-natural food and practices that enabled bears to access non-natural food. These include, but are not limited to, landfills, residential and commercial garbage, fruit trees, composts, and apiaries. The assessment should provide an overview of the types and spatial distribution of major non-natural food issues that is detailed enough for the Bear Stewardship Committee to establish preliminary direction in tackling non-natural food issues as well as direction for ongoing data collection to identify additional non-natural food issues.

Identify Hazards for Human-Bear Conflict

Following ground investigations, an overall rating of the potential for bearhuman conflict should be estimated based on habitat potential, travel issues, visibility and other sensory issues, security cover issues, and non-natural food issues. Generally at this stage, ratings will be based on overall potential for conflict. However, any preliminary information that can be gathered and discussed on the seasonal habitat potential and the seasonal potential for conflict will be valuable to the program. Sites, areas, and trails that are assessed as higher risk should be identified and management recommendations provided. Locations that do not appear to be higher risk should not be given a rating until more detailed investigations can be conducted because preliminary investigations may have missed potential hazards.

Provide Recommendations for Reducing the Potential for Conflict

Recommendations for reducing the potential for human-bear conflict within the community should be identified for the Bear Stewardship Committee. This section should include general management recommendations that are specific to the community, but that also go beyond site-specific hazards:

- Observations and recommendations with respect to ensuring that bears do not have access to non-natural foods, including background on observed handling of residential, commercial and industrial garbage, garbage transfer, and landfill disposal. The assessment should identify any observed weak links in the waste management system and provide recommendations for addressing these problems.
- Recommendations for brushing specific sites, areas, or trails where potential for conflict was observed.
- Recommendations for establishing a Human-Bear Conflict Monitoring System.
- Recommendations for interagency exchange of bear incident reports
- Recommendations for improving the management of "problem" bears and "problem" people.
- Identify gaps in knowledge and provide general recommendations for subsequent phases of a Detailed Hazard Assessment.
- Identify other issues that were observed but not addressed in the results and discussion.

6.2 Education Program

The Phase I: Problem Analysis should identify what, if any, education programs exist within the community and whether multiple agencies are delivering such programs (e.g., MWLAP, BCCF, BC Parks, commercial businesses). The Problem Analysis should then be followed up with a coordinated and thorough education program implemented under the Human-Bear Management Plan. Several communities are already taking action to reduce the number of bears that are destroyed by delivering a Bear Aware Education Program. In 1995, Whistler began a bear-awareness education program. The BC Conservation Foundation (BCCF), a non-profit society and registered charity, has delivered similar Bear Aware programs in many communities in British Columbia, including Castlegar, Kamloops, Nelson, Rossland, Revelstoke, Trail, and the Alberni Clayoquot Regional District (Bennett 1996, Stroh 1999, Haas 2000, Paquet 2000, Maltby 2000, Robinson 1997, 1998, 2000; Quarterman 2000). Interest groups in other communities such as Prince George (Narhornoff 2000), Kitimat and Terrace (Wellwood 2001b), and Kimberly have also delivered the education program with partial or joint support from BCCF.

6.3 Bear-Proof Waste Management System

To achieve "Bear Smart" status, a community must develop and maintain an entirely bear-proof municipal solid waste management system, from generation to disposal. Bear-proofing the waste disposal within a community and implementing an education program are the first steps in bear-proofing a community. It is absolutely critical that these steps be taken *before* landfill closure. While the initial capital costs of implementing a waste management system that is bear-proof may seem large, in the longer term it is often more cost-effective to have a bear-proof collection system (Philipp 2000) and landfill (R. Trouttmann, Central Kootenay Regional District, personal communication).

There are also additional benefits to bear-proofing waste management within a community. Bear-proof waste management systems often reduce human-bear conflicts, but garbage is also no longer available to other animals. For example, Norman Wells, NWT, has been bear-proof since 1991, and because of the bear-proof dumpsters, birds or dogs no longer scatter garbage. As a result, the community is cleaner as a whole (A. Veitch, Wildlife Management Supervisor, Government of the NWT, personal communication).

The handling of residential waste needs to be bear-proof from "cradle to grave" to ensure the success of the system as a whole. The responsibility for each of these steps falls on several different parties. The first step is for residents to ensure that garbage is stored in a bear-proof manner at each residence. Garbage cans must be kept in a bear-proof location at all times except during the day of pick-up or transfer to a disposal container/site. This can be achieved by keeping garbage inside, in the basement or in a bear-proof out-building. The second step in this process is bear-proofing the transfer of garbage to the municipally operated system. If curb-side garbage collection is retained, garbage should not be placed on the streets before a specified hour on the morning of pick-up. After transfer to the municipal system, the responsibility for bear-proofing shifts to the municipality. The transfer of garbage, temporary storage, transfer stations, and end disposal must all be bear-proof.

There must be high rates of compliance with the following waste management recommendations in order to produce any appreciable reduction in human-bear conflicts within a community. In most instances, bylaws must be in place and enforced to ensure compliance.

6.3.1 Recommended Actions

- Ensure that all municipally owned and operated components of putrescent waste management system collection, transfer, disposal, recycling, and composting are bear-proof in areas that are accessible to or are frequented by bears.
- Implement bylaws to ensure that the same is true of all private sector components of putrescent MSW collection, transfer, disposal, recycling, and composting.
- Implement a compliance strategy for the municipal solid waste management bylaws.

6.3.2 Recommended Techniques

The Bear Stewardship Committee will have to examine the extent of the problems with the community's current waste disposal system (in Phase I: Problem Analysis) and judge which are the best options for bear-proofing the disposal system. Differences in community layout and environment can greatly affect the feasibility of each of the different options for dealing with residential and commercial garbage.

Here are some examples of "how to" approaches for bear-proofing MSW systems.

Handling Residential Garbage

There are several basic options for acceptable residential waste management systems in a "Bear Smart" community:

1. <u>RESIDENTIAL DUMPSTERS</u> (see Canmore Case History, section 12.2). In this option, bear-proof dumpsters are located throughout residential areas (one per 20-35 homes). Residents take their household garbage to their nearest bear-proof container. To reduce odours, containers are emptied regularly and taken to a bear-proof landfill. There are significant savings in using this system over curb-side pick-up, even after factoring in the capital costs of purchasing and implementing new containers (Philipp 2000). Replacing curb-side collection with dumpsters that are emptied with a self-loading truck (a one-operator system) is the main cost saving in switching to a bear-proof container system (Philipp 2000; A. Veitch, Wildlife Management

Supervisor, Government of the NWT, personal communication). This system takes away the potential problem of residents storing garbage on their property.

- 2. <u>LARGE COMMUNITY DUMPSTERS</u> (see Whistler Case History section 12.1). With this system, the entire community uses several large bear-proof compactors. The compactors are emptied regularly, and the contents are taken to a bear-proof landfill. Similar, but not as effective, is the use of transfer stations. There are often problems with lids being left open at transfer stations. In this instance, there has to be a plan in place to ensure that bins are not allowed to overflow and that the lids are kept closed. Education on the proper use of transfer stations is essential: "This container is only bear-proof if the lid is closed" stickers seem to work well. It may be necessary to put an electric fence around transfer stations.
- 3. <u>CURBSIDE COLLECTION</u>. If curb-side collection is to continue in a "Bear Smart" community, garbage cans must be kept in a bear-proof location at all times except on the day of pick-up. Garbage cans may not be placed on the streets before a specified hour on the morning of pick-up. Both of these requirements will likely need to be reinforced with bylaws and their enforcement. This option may work in areas with relatively few humanbear conflicts, but it is not likely to work in areas with chronic problems.
- 4. <u>DISPOSAL DIRECTLY AT THE LANDFILL</u>. Disposal directly at an electrified landfill is an option for smaller communities. Problems that can occur with this method include leaving the electrified gates open, which can be remedied by having a staffed landfill. Additionally, people occasionally dump garbage at the gates of the landfill when it is closed. This problem may be reduced by having a bear-proof dumpster at the gates to the landfill, although this solution has many problems of its own. "Bear Smart" status will not be granted to communities with a landfill that is continuously open to the public unless it is staffed continuously as well.

Selecting a Residential Garbage Handling Option - Considerations

Although single-family dwellings may not have difficulty storing garbage away from bears, smaller dwellings such as mobile homes and condominiums often have space constraints that restrict the ability to store garbage effectively. The odour from stored garbage may also be offensive to many homeowners. Solutions to this problem include freezing odourous refuse until garbage pick-up day or the use of communal bear-proof garbage dumpsters in locations with these problems (e.g., mobile home parks, condominium complexes, apartment buildings).

Communities that experience heavy snowfalls may have greater difficulty with some waste management systems. The placement of bear-proof containers needs to consider access during the winter months, as well as their effect on snow removal activities. Additionally, any waste that is left on the streets may be plowed into snow banks in winter months and end up being revealed in the spring. Adequate spring clean-up should be addressed in communities that have experienced these problems.

It is also important that maintenance of waste receptacles occurs on a regular basis and that all waste that may have fallen out is collected. This will reduce odours and the risk of bears investigating and possibly damaging garbage containers and dumpsters.

Handling Commercial Garbage

Several aspects of commercial garbage storage and collection need to be considered and addressed in a "Bear Smart" community.

- Bear-proof garbage containers need to be implemented at:
 - downtown streets that bears may be attracted to,
 - all municipal park facilities (campsites, ball parks, soccer fields, etc.), and
 - school grounds.

These may be phased in, starting with high-risk areas identified in the Preliminary Hazard Assessment and followed by lower risk areas.

- Commercial/industrial collection routes should use bear-proof dumpsters. Dumpsters should be emptied often enough to prevent waste from overflowing or waste being placed next to dumpsters. If dumpsters are not bear-proof, then dumpsters must be housed within a bear-proof building (i.e., on a concrete slab and with four solid walls and a roof). A phase-in process for existing businesses is appropriate, but all new business should be required to be bear-proof upon opening.
- Any attractants, especially grease barrels, must be housed in a bearproof building.
- Construction sites must have either 1) a bear-proof garbage receptacle for items that may be attractive to wildlife, 2) a receptacle that is kept within a bear-proof building outside of working hours, or 3) removal of food wastes to a bear-proof location at the end of every working day.

Disposal of End Waste (Landfills)

Once garbage has been collected from commercial and residential locations, the disposal of this end waste may be completed in the following bear-proof ways.

- 1. Residential and commercial garbage may be taken to a bear-proof transfer station that ships the refuse to a bear-proof disposal facility.
- 2. Complete-combustion incineration may be a possibility for smaller communities or remote camps. The incinerator must be appropriately sized for the amount of waste produced by the community.
- 3. Disposal in a landfill located inside a properly designed, constructed, and operated electric fence (see Appendix B). Aggressive maintenance must be undertaken to ensure that the fence is operating at full capacity and is not

breachable. Note that the community needs to be bear-proof before the landfill is fenced. Bear-proofing of landfills should *not* be done in years with shortages of natural bear foods. This will substantially exacerbate human-bear conflicts. Bear-proofing dates may have to be modified to help reduce potential human-bear conflicts.

In addition, a bear-proof landfill must be covered with fill or heavy duty tarps after every day that it receives refuse to reduce odours, insect and rodent problems, and the amount of refuse scattered by wind and birds. Tarps may be used once a landfill is bear-proof, otherwise bears will rip them, but once in use, tarps can significantly reduce the costs of buying, trucking, and covering landfills with fill. Use of tarps also significantly extends the life of a landfill by decreasing the amount of non-refuse fill (R. Troutmann, Central Kootenay Regional District, personal communication). There are also sprayable biodegradable foams that serve the same purpose.

6.4 Bylaws

Bylaws to ensure compliance with the goals of the "Bear Smart" program may need to be implemented. "Bear Smart" bylaws should be implemented to prohibit the supply of food to bears as a result of intent, neglect, or irresponsible management of attractants. A compliance strategy needs to be created to ensure compliance with these bylaws.

Recent changes to the *Wildlife Act* can help supplement bylaws and thereby reduce the likelihood of human-bear conflicts and provide public safety. Under the new amendments to the *Wildlife Act*, it is an offence for people in British Columbia to feed dangerous wildlife (i.e., bears, cougars, coyotes, and wolves) or to disobey orders to remove and clean up food, food waste, or other substances that can attract dangerous wildlife to their premises. Conservation Officers may issue a written dangerous wildlife protection order, which requires "the removal or containment of compost, food, food waste or domestic garbage." If people fail to comply with the order, they could face a heavy court-ordered penalty of up to \$50,000 and/or six months in jail. However, this new legislation is only applicable to residences, not farms or apiaries, commercial establishments, or landfills, all of which are strong attractants for bears.

The Phase I: Problem Analysis should identify whether any bylaws currently exist for the community and determine whether any will be necessary given the bearproof waste management system that is selected and the problems that were identified in the Preliminary Hazard Assessment.

6.5 Green Space Management

Green space within and adjacent to a community can provide security cover for bears to access non-natural foods within and adjacent to the community. Green space can also provide natural feeding habitats and travel corridors for bears and other wildlife to by-pass the community. Green space includes vacant properties that are over-grown with vegetation, parks and alleyways, trail networks, and undeveloped areas adjacent to the community. Other species using green spaces should be documented and the potential impacts on these species assessed if brushing occurs. Mitigation measures to reduce the impacts to other species should be taken. In some cases there will be a trade off between the benefits of clearing or modifying green space in terms of increasing human safety versus the cost of eliminating natural bear or other wildlife habitats. The risk of human-bear conflict relative to the cost to other species and the priorities of the community should be evaluated when establishing plans to remove vegetation.

6.5.1 Green Space Objectives

In some communities, bears may use vegetation cover within and adjacent to the community for security cover while feeding on garbage and other non-natural attractants. As long as bears have access to non-natural foods, removing brush that provides security cover for bears may reduce the likelihood that some bears will travel through the community. However, eliminating access to non-natural foods in the community will likely have a greater influence on decreasing the probability that bears will use the inner areas of the community. If non-natural foods are no longer available to bears, brushing can then be focused on achieving the following objectives:

- reduce the habitat potential in natural feeding areas that are commonly used by humans by removing natural bear foods, and
- increase visibility where people are most likely to surprise bears, such as along trails, and in areas with user groups that may be at higher risk such as schools, playgrounds, and campgrounds, particularly those in areas that are on the outer edges of the community.

6.5.2 Recommended Actions

- 1. Formally identify and map problem areas that will require continual removal of brush, such as parks, schools, playgrounds, and campgrounds as well as alleys that bears are using for cover.
- 2. Direct the removal or modification of green space by brushing vegetation to reduce security cover and habitat potential in areas of high human use (e.g., removing brush around portions of parks, schools, playgrounds, golf courses, and campsites and in areas adjacent to residences in high-risk attraction areas).
- 3. Develop a community landscaping plan that avoids the use of fruit trees and other plants the may act as attractants to bears. Adjustments to the

landscape plan may include removing existing fruit trees that have been identified as sources of human-bear conflict.

6.5.3 Recommended Techniques

- 1. Consult recommendations provided in the Preliminary Hazard Assessment for removing or modifying brush to increase visibility or reduce habitat potential and security cover at specific sites, areas, or trails.
- 2. Regularly review the human-bear conflict monitoring system to assess whether brushing or modifying green space may alleviate some of the human-bear conflict in specific problem areas.
- 3. Consult with Conservation Officers annually to determine whether additional sites, areas, or trails should be added to the list of locations identified for brushing.
- 4. Consult with the appropriate agencies to ensure that clearing is permitted. For example, the Department of Fisheries and Oceans restricts the clearing of vegetation within varying distances of fish-bearing streams.
- 5. Consult with the public and other agencies to evaluate the cost of brush removal to other species and the aesthetic qualities of the community versus the potential for reducing human-bear conflict. Consult with a biologist with experience in bear ecology and behaviour and human-bear conflicts to determine an effective strategy for removing vegetation (i.e., how, where, and what to remove) to reduce potential human-bear conflict while protecting habitat for other species where appropriate/possible. This may also require consulting an additional biologist with broader wildlife expertise, particularly regarding Red-listed (endangered or threatened) and Blue-listed (vulnerable) species. Conservation Officers should also be consulted to determine areas that are high priority for brushing.
- 6. Formally inventory all of the brush removal as it is conducted. Ideally the documentation would be in a digital format as a layer in the Human-Bear Conflicts Monitoring System Database (see section 9.0). However, in the short term, it may be feasible for small communities to document the information on a plasticized paper map. Complete a new map for brushing conducted each year. This information will be useful for documenting annual progress and will assist new employees or council members with directing the continuation of brushing.
- 7. Ensure that green space is inspected annually in order to schedule removal efforts. Note that some vegetation that grows quickly will likely have to be removed each year to be effective. Removing bear foods before the major season of use is strongly recommended. In addition, removing vegetation, particularly tall shrubs and trees, opens up the canopy and will increase berry production for many berry-producing plant species. If brushing is

started, there must be a commitment to removing all the brush and to continuing to remove it in subsequent years as necessary.

8. Consult with Conservation Officers annually to determine whether additional areas require brushing and to assess the general effectiveness of brushing.

6.6 Community Planning Documents

It may be appropriate in some communities to have a higher-level plan, such as an Official Community Plan (OCP) and/or Regional Growth Strategy (RGS) that is consistent with the Human-Bear Conflict Management Plan. As a minimum, the Regional Solid Waste Management Plan should be modified to be compatible. The Province of British Columbia addresses land use planning, mostly of Crown Lands, through Land and Resource Management Plans (LRMP) while municipalities and regional districts prepare Official Community Plans and Regional Growth Strategies, which focus mainly on private land.

A Regional Growth Strategy is a strategic plan that enables regional districts and municipalities to plan for economically and environmentally healthy human settlements, and for efficient use of public facilities, services, land and other resources. The RGS is initiated and adopted by a regional district and referred to all affected local governments for acceptance. An Official Community Plan establishes policies and objectives for the form and character of land use and servicing and is implemented by zoning, subdivision, and servicing by-laws. The effectiveness of land use planning and management improves if local and provincial plans are compatible ("Links" brochure, BC Ministry of Municipal Affairs).

Whether it is necessary to change these plans to reflect the Management Plan depends on the community. Changes to the OCP and RGS would be useful in terms of long-term planning and ensuring that the goals of the Management Plan are carried out indefinitely, regardless of changes in local government.

As part of Phase I: Problem Analysis, the Bear Stewardship Committee should identify the schedule for updating the OCP or RGS to determine how quickly their input may be needed on such changes. The primary objective of this process is to ensure that the community planning process recognizes that some community developments may increase the potential for human-bear conflict and/or the displacement of bears from important habitats (e.g., feeding habitats and travel corridors). Thus, the community planning process needs to address the effect of the presence and locations of new facilities on the rate of human-bear conflict. For example, new landfills, campgrounds, or schools should be situated in areas of low-quality bear habitat and away from travel corridors. It is up to the Bear Stewardship Committee to decide if changing these plans is appropriate, and possible, for their community.

7 Detailed Human-Bear Conflict Hazard Assessments

Detailed Hazard Assessments may be conducted to focus more specifically on identifying, assessing, and mitigating the potential for conflict as a result of natural issues (e.g., high-quality bear habitats with high human presence). Detailed Hazard Assessments may also be conducted to reduce the potential for displacement of bears from important habitats (e.g., well-used travel corridors, feeding areas). Detailed Hazard Assessments may be conducted at sites that received a Preliminary Hazard Assessment to provide more detailed information and further investigate the potential for additional mitigation measures. They may also be conducted at locations that are recommended for Detailed Hazard Assessments by the Bear Stewardship Committee or the Regional MWLAP office but were not specifically identified for further assessment during the Preliminary Hazard Assessment.

Detailed Hazard Assessments have been conducted in numerous provincial and national parks (Herrero et al. 1986, McCrory and Mallam 1990, MacDougall et al. 1999, Wellwood and MacHutchon 1999). These assessments include detailed quantitative and/or qualitative assessments of natural features that influence the potential for human-bear conflicts, as well as assessments of other issues such as bears' access to non-natural foods.

To date, no communities in British Columbia have conducted a hazard assessment of specific hazards within and immediately adjacent to the community such as those completed in some provincial and national parks. In general, the primary objectives of many national and provincial parks are to reduce impacts to bears and increase the safety of humans by reducing the potential for human-bear conflicts (McCrory and Mallam 1990, Katmai National Park and Preserve 1990, Environment Canada 1992, BC Parks 1995). Communities will also have to decide what their primary objectives are with respect to stewardship of bear populations and their habitat and human-bear conflict and how to achieve a balance between these objectives.

In some areas where use by humans is concentrated, it may be beneficial or necessary to initiate research to determine the cumulative effects of human activity, including road access, urban development, logging, and mining, on the ecology and viability of bears in and adjacent to the community.

The Detailed Hazard Assessment should expand upon the information gathered in the Preliminary Hazard Assessment. Detailed Hazard Assessments should be conducted in the growing season so that bear food plant quantity and quality can be rated. The assessment should include hazard ratings (i.e., low, moderate, and high) and maps of known and potential bear hazards. The methods that are used for additional hazard assessments will depend on the information available from bear studies in the area or other ecologically similar areas and the priorities of the community with respect to reducing human-bear conflict. If detailed information on the food habits, habitat use, and movements of bears using the area is not available, investigators may need to conduct studies in addition to the Detailed Hazard Assessments. These studies should focus on the following objectives.

- 1. Identify preferred wildlife movement corridors around the community and recommend restoration of natural corridors that may have been interrupted by human activity/development (this may require moving existing facilities to other, less intrusive areas).
- 2. Conduct a study to determine the seasonal food habits of bears near the community. Use detailed information about food habits and plant phenology to identify seasonal use and better understand the bears' spatial and temporal movements.
- 3. Identify the vegetation cover of the area in and adjacent to the community, using research conducted in the area or other areas that are as ecologically similar as possible. Ideally the area covered would incorporate the home ranges of most bears using the area.
- 4. Identify and rate seasonally important bear habitats. As a minimum, green spaces within and immediately adjacent to the community should be classified, rated, and mapped for bear habitat quality, including identification of well-used travel corridors and other areas of concentrated use.
- 5. Conduct more detailed investigations to identify, verify, and assess the potential movements of bears, including major travel corridors.
- 6. Where applicable, document and monitor the timing and abundance of salmon runs. For example, a bear activity monitoring system that is conducted by fisheries personnel may assist in anticipating activity by bears related to salmon spawning.
- 7. Identify denning areas.

7.1 Detailed Hazard Assessment Techniques

Additional sites, areas, and practices that result in human-bear conflicts should be identified so that issues at these locations can be addressed. If necessary, these issues may need to be further assessed in subsequent phases of the hazard assessment. The Preliminary Hazard Assessment, data collected by the Bear-Human Conflict Monitoring System, and annual interviews with Conservation Officers will be beneficial for identifying other hazard locations that may require a Detailed Hazard Assessment. Methodology should be approved by a Registered Professional Biologist with expertise in the assessment of bear habitat. Specific methodology will depend on the information and time available, specific characteristics of the community, and the priority the community, region and/or province has assigned to obtaining more detailed information regarding human-bear conflicts.

8 Phase II: Human-Bear Conflict Management Plan

Proponents will need to prepare a Human-Bear Conflict Management Plan that is designed to address the human-bear conflict issues identified in the Phase I: Problem Analysis.

The goals of the Human-Bear Conflict Management Plan are to:

- provide a general summary of the human-bear conflict issues in the community based on the Phase I: Problem Analysis,
- identify the community's level of commitment to the program,
- identify the level of tolerance of the community towards maintaining or restoring natural bear habitats (e.g., travel corridors and feeding areas) adjacent to the community,
- clearly establish goalposts for the success of the program,
- identify the agencies, groups, or individuals responsible for addressing problems,
- determine what is necessary to address each problem successfully,
- set priorities for specific actions to be taken,
- develop a timetable for addressing each problem, and
- conduct a cost estimate of proposed management actions and provide a budget break-down for each of the criteria in the program.

Preparation for the management plan should include a brainstorming stage for generating ideas and concepts for developing the plan. The contents of the management plan should be developed using a consensus-based approach for identifying and assessing preferred solutions.

8.1 Education Program

8.1.1 Objectives

A mission statement that succinctly summarizes the message of the program can be a powerful tool for delivering the program.

Example Mission Statement

"To help people reduce human-bear conflict through education, innovation and cooperation (BCCF draft)."

The primary objectives of the education program are to:

1. develop a greater understanding of bear ecology and behaviour,

- 2. facilitate support from local residents for bear-proofing the community. This can include identifying methods and options for eliminating bears' access to non-natural foods and attractants.
- 3. develop guidelines for human activities in bear habitat to reduce the likelihood of human-bear conflict,
- 4. recommend actions to take during a bear encounter, and
- 5. encourage tolerance towards the presence and natural behaviours of bears in reasonable numbers in or near the community.

8.1.2 Recommended Actions

Program Structure

The education program should be implemented in three stages: 1) a program development stage, 2) a program delivery stage, and 3) annual progress reports.

Program Development

Ideally, the development of the Bear Aware Education Program will be completed between January and April of the year it is to be delivered. The goals of the development stage are to:

- secure financial, logistical, and volunteer support for the delivery of the education program,
- establish a Bear Stewardship Committee, and
- establish working relationships with local media to help raise the profile of the program.

Program Delivery

Delivery of the program should be initiated at least two weeks prior to the anticipated arrival of bears in and around the community. The program should continue to be delivered until bears have left the area for the season. The goals of the delivery phase are to:

- help individuals/communities reduce the frequency of human-bear conflict within and around their communities,
- eliminate the bears' access to sources of non-natural foods by providing support, solutions, and encouragement for individual/community bear-proofing, and
- increase individual/community awareness and understanding of bears and human-bear conflict.

Annual Progress Report

A program progress report should be completed at the end of each year. The goals of the progress report are to:

• document the success or failure of various components of the program,

- provide a program history for new coordinators and other parties that enter the program at later stages of the process, and
- facilitate the sharing of information among communities on the success or failure of the various methodologies used to deliver the program so that other communities can learn from and utilize the experience of others.

See Appendix D for an example of an outline for progress reports.

8.1.3 Recommended Techniques

Program Development

Proponents will need to hire a Bear Education Program coordinator for each community. In the past, considerable controversy has been created over bears and human-bear conflict. Therefore, the coordinator must be capable of promoting and conveying program information that is based on defendable scientific research and expert opinion. It is imperative that the coordinator does not have a personal bias or agenda that undermines the goals of the program. The coordinator must have strong interpersonal skills: this is considered critical to the success of the program. To minimize misinformation, the program should be developed with the support of experts (e.g., bear biologists, Conservation Officers). Expertise may be provided to community coordinators by a regional coordinator with expertise in bear ecology and behaviour and human-bear conflicts. Ideally, community coordinators should live in the community and be respected members of the community.

Suggested Skills for Program Coordinators

The community coordinator and regional coordinator should have strong interpersonal skills, including:

- oral communications skills for conducting presentations to groups of various sizes, age groups, backgrounds, and interests,
- conflict resolution skills, including the ability to motivate individuals to modify their behaviours to reduce human-bear conflict. The Stewardship Continuum, as identified by the Nature Conservancy and adapted by BCCF, identifies three stages that the public and individuals go through as the "Bear Aware" program is delivered: an initial stage of denial/ignorance that the problem exists, a gradual transition to admission, and finally motivation to change (BCCF draft).
- ability to communicate well with individuals of various ages and interest groups,
- ability and willingness to learn from and openly share with other community coordinators, and
- considerable patience, needed to accept progress through the stages identified in the Stewardship Continuum.

At least one person involved in the program should have the following professional skills:

- experience related to bear ecology and behaviour,
- an understanding of the process of habituation and food-conditioning,
- an understanding of human-bear conflict,
- air photo and map interpretation (beneficial to ongoing data collection using the Human-Bear Conflict Monitoring System),
- vegetation and habitat classification (beneficial to ongoing data collection using the Human-Bear Conflict Monitoring System),
- data collection, summary, and analysis skills, and
- report-writing ability.

The coordinator will be responsible for:

- 1. becoming familiar with education programs being conducted in other communities.
- 2. writing a work plan and time schedule for completion of the delivery phase of the program.
- 3. developing an education program prospectus for delivery to potential volunteers, funding groups, and local media. The goal of the prospectus is to introduce the program and delivery team in a professional manner that will maximize the potential for attracting contributors. BCCF has developed a brochure and slide show prospectus for introducing their education program (Wellwood 2001b). The prospectus could include the following:
 - a mission statement for the program,
 - an introduction to the program,
 - program development goals,
 - program delivery goals,
 - education program deliverables and expected benefits of the program,
 - description of the individual/community/agency support that the education program is asking for, and
 - brief introduction to the project coordinator(s) and the skills that they will bring to the program.
- 4. encouraging, supporting, and participating in the Bear Stewardship Committee.
- 5. reviewing and selecting existing bear information and education resource materials for relevance and usefulness to the community.
- 6. developing and producing bear information and education resource materials specific to the community. Schirokauer and Boyd (1998) suggest "it is important to provide multiple sources and formats of information" to reach the audience.
- 7. working with the media to profile the education program.

- 8. developing a delivery plan for disseminating the education program throughout the community, including schools, residents, businesses, industrial and resource companies, tourists, and agencies.
- 9. developing a delivery plan for providing neighbourhoods and businesses with support and strategies for "bear-proofing" their communities.
- 10. preparing contact and event lists, including the following:
 - individuals, agencies, and stakeholders that might be willing to supply financial, logistical, or volunteer support for program delivery,
 - committee members who might be willing to become involved in a Bear Stewardship Steering Committee, and
 - public events and community groups that might be willing to host the Education Program.

11. initiating the following:

- a campaign to establish financial, logistical, and volunteer support for program delivery,
- formation of a Bear Stewardship Steering Committee for the community.
- meetings with local media to establish a plan for conveying the education program messages,
- development of a plan (including a budget and timetable) for the delivery of the program.

Many of the following components of the education program have been successfully delivered to British Columbia communities and are available for adaptation for other community education programs (Bennett 1996, Black Bear Task Team 1998, Stroh 1999, Haas 2000, Paquet 2000, Maltby 2000, Robinson 1997, 1998, 2000; Narhornoff 2000, Quarterman 2000). The delivery plan should include the following:

- a door-to-door education campaign such as the "We are bear aware" window sticker campaign conducted by BCCF,
- education efforts targeted to reducing human-bear conflicts that result from site-, area-, or practice-specific activities. For example, moving a summer concert away from areas where bears are known to be attracted to a natural food source (e.g., berries or salmon). Local conservation officers and others knowledgeable in bear use of the area should be consulted when developing timetables of seasonally affected human activities so that potential problems can be anticipated and efforts can be focused on specific sites, areas, or practices,
- events and groups that will receive the education program through slide presentations or public displays,
- fruit tree management campaign,
- school education program presentations,
- surveys to determine the success of the education program, and
- delivery of the final annual report.

Depending on the priorities of the community, the timetable will document the timing of some or all of the following:

- program start and anticipated end date,
- staff and volunteer training dates,
- bear stewardship steering committee meetings,
- visits to private campground operators and local businesses,
- presentations to industrial and resource companies,
- presentations to tourist information and food-related businesses,
- presentations to community groups,
- contests such as BCCF's colouring contest for children,
- compost workshops, and
- schedule for media updates.

Program Delivery

Delivery of the program should be initiated at least two weeks before the end of the hibernation period, regardless of when bear problems are evident in the community. Begin with newspaper ads stating that "Spring is in the air and it will soon be time for bears to wake up. This means you need to put your garbage away." The message should provide a general overview of major human-bear conflict issues. In association with general messages, special messages should target specific human-bear conflict-related activities that are season specific. For example, concentrate on information about dealing with fruit in fruit-bearing season or salmon in the spawning season. The program will be ongoing throughout all active seasons for bears and should continue to be delivered until bears have denned for the winter. The start and end dates for the program can be identified by consulting the Conservation Officer Problem Wildlife Occurrence Reports for bears. These dates should be modified, if necessary, in subsequent years based on data from Conservation Officers and education program experience.

The delivery stage should focus on the following:

- working with the Bear Stewardship Committee to identify options for eliminating sources of non-natural foods to bears.
- educating the public about options for eliminating sources of non-natural foods for bears (section 8.3). This can include educating residents about the management of garbage, fruit trees, compost, and other attractants (e.g., bird seed, pet food, and barbecues). Options should be reasonable with respect to cost and ease of implementation. If reasonable options are not available, the steering committee is strongly encouraged to work with the BC Union of Municipalities and local, regional, and provincial governments to find solutions for problematic bear-proofing issues.
- assisting Conservation Officers in educating residents as problem sites, areas, or practices arise.

- increasing awareness of the program's activities in local and regional governments so that they can help support the delivery of the program.
- working with the media on a regular basis to convey the messages of the program.
- increasing public understanding and tolerance of bears in general. This can best be achieved by illustrating to people the actions that they can take to reduce human-bear conflicts. This does not mean tolerating specific bears that are considered a threat to human safety.
- continuing to collect data for the Problem Analysis. This can include mapping attractants such as fruit trees, agricultural attractants (i.e., beehives, livestock, and crops), and non-bear-proof commercial and residential dumpsters.
- considering establishing a method for communicating current bear activity to residents and visitors. For example, Whistler has proposed a "Bear Activity" rating sign (like a fire index sign), with high/medium/low bear activity (S. Dolson, JJWBF, personal communication).

Recommended Educational Messages

The program messages are an important component of the education strategy. The education program should deliver to residents the strategies that have been developed to eliminate specific non-natural food and attractant problems. Within acceptable limits, the program should also foster awareness, understanding, appreciation, respect, and tolerance for bears. Specific messages that should be delivered in the program include a history of human-bear conflict and solutions to eliminate sources of conflict.

History of Human-Bear Conflict

When displayed visually, the history of human-bear conflict within and around the community will be effective for illustrating to residents where troublesome areas have been in the past. Educators may wish to use a map of documented Problem Wildlife Occurrence Reports for bears for several years to provide a powerful message for the public. The map can be produced as part of the Human-Bear Monitoring Program (section 9.0).

Delivery of Program Messages

To maximize the effectiveness of the education program, messages should be delivered using multiple methods (Schirokauer and Boyd 1998). In-person delivery of the program by a person knowledgeable in human-bear conflict, is considered an highly effective method of communication (M. Madel, Montana Department of Fish, Wildlife and Parks, personal communication; H. Davis personal observation; D. Wellwood, personal observation). While in-person (e.g., door-to-door, event displays, public presentations) delivery of the education component of the program is critical to the success of the program, educational materials are also an important method for delivering the program. "If urban homeowners are educated by use of a bear brochure on why urban bear problems occur, and how to prevent them, a substantial number will change their behavior" (A. L. LeCount, bear biologist Hocking College, personal communication). They can serve as a reminder and as reference material for review at a later date. The following is a list of materials that have been produced and typical distribution locations.

<u>Signs</u>

A variety of permanent signs can be developed to provide general, communityspecific, residential, and tourist information and to identify seasonally high-use areas. Temporary signs can also be used to identify hot spots for bear activity. Signs can be posted at rest stops, bus stops, and/or tourist information booths.

Brochures

Different brochures can be developed to provide general, community-specific, residential, and tourist information. These can be distributed at mailboxes, hotels, and offices of the BC Ministry of Water, Land and Air Protection, as well as through Conservation Officers and BC Parks offices, tourist information booths, campgrounds, and public events.

Window Stickers

These can be similar to the "We are Bear Aware" stickers currently used in several communities to identify "Bear Aware" households and businesses.

Other Stickers

Other stickers can be used to promote the program or as a reminder of a specific program message. Display locations include store windows, car bumpers, garbage cans, and dumpsters.

Annual Progress Report for the Education Program

An annual progress report for the education program should be completed at the end of each year and included in the education program section of the "Bear Smart" Community Program Progress Report. Annual reports from education programs have been an invaluable reference tool for other communities to develop their own program. Details such as delivery budget, level of success of various methods, and recommendations for future delivery of the program are not only valuable to the community but to many others as well. Sharing of information is critical to maximizing the efforts of all involved. See Appendix D for an example of an annual progress report outline.

8.2 Bear-proof Waste Management System

Once the Bear Stewardship Committee has reviewed the options for bearproofing its waste management system, it should begin to implement the chosen techniques. A program to phase in new systems and containers may be inappropriate due to the high implementation costs and the program's dependence on the fiscal calendar. For instance, if new garbage trucks are necessary to empty a new container system, but a new truck has been purchased recently, it may be more appropriate to develop a temporary system of restrictions until new capital purchases can be afforded.

If the community has a landfill, it must ensure that the electric fence around the landfill is appropriately constructed and maintained. The town or municipality must regularly monitor maintenance if an independent contractor operates the landfill. The Pollution Prevention Branch should inspect landfills for compliance at least yearly, preferably in the spring before bears become a problem and in late August or early September before the fall season of increased bear activity at landfills. If landfills do not comply with regulations, there should be immediate action, with escalating enforcement until problems are resolved. The town or municipality should ensure that its landfill, or landfill maintenance contractor, complies with provincial regulations.

If the local landfill is to be closed because of the community's conversion to a waste transfer system, then the proper closure of the landfill is important. Landfills need to be capped by a minimum of 60 cm of fill, preferably 1 m, although this may not guarantee that persistent bears will not attempt to access buried wastes. Because of this, it should be a requirement of the closure contract that the contractor must do whatever maintenance is necessary to repair any failures of the capping (e.g., damage by digging). If there is an existing electric fence, it should remain functional until the capped landfill no longer appears to be attracting bears.

8.3 Control of Attractants within the Community

The Preliminary Hazard Assessment will identify many non-natural attractants within the community. Many of these attractants are the responsibility of individual residents and companies. Thus, the onus for controlling these attractants to reduce human-bear conflict lies with these parties. The most effective method of facilitating proper storage and management of these attractants will likely be through education programs.

Bird Feeders

The public must be made aware that bird feeders need to be inaccessible to bears during the non-denning period. To make them inaccessible, feeders must be suspended from a cable or other device. Bringing feeders indoors at night may be another option in summer months. The area below the feeder should be kept free of accumulations of seed. Feeders should not be overfilled. Bylaws may be necessary for restricting the use of bird feeders to structures that are inaccessible to bears in summer months, or restricting feeding to winter months only (see section 12.2 Canmore Case History).

Honeybee Colonies

Honeybee colonies are a non-natural attractant that are commonly targeted by bears. Two options are available for making apiaries bear-proof:

- 1. the preferred option is to surround colonies with a properly constructed bear-proof electric fence (see Appendix B: usually only four strands are necessary).
- 2. placing colonies on raised platforms (at least 2 m) supported with posts that bears can't climb.

Electric fencing has been used effectively to keep bears out of honeybee colonies. For example, in Revelstoke, one bee-keeper had 100+ hives but no bear problems because all colonies were electric fenced (Bennett 1996). Under the British Columbia *Bee Act*, the location of permanent bee colonies must be approved and registered by the BC Ministry of Agriculture, Fisheries and Food. Names of local bee-keepers can be requested from the Ministry in order to target education efforts.

Fruit trees

In some locations, fruit trees can be a significant attractant to bears. Landowners should pick fruit daily before it is ripe and also pick up any windfalls. Mapping fruit trees was completed in Revelstoke (Bennett 1996), and it proved effective at targeting trees for removal by volunteers and harvesting by neighbours. There are two ways community volunteers can help manage this particular attractant:

1. by picking fruit and donating it to local food banks if the landowner doesn't want it. Establishing a Fruit Tree Registry (as per Revelstoke, Robinson 2000) can help pair up owners of unwanted fruit trees with people who want the fruit and are willing to pick it. Neglected fruit trees do not always produce attractive fruit, but the fruit is still acceptable for use in processing (canning, jams etc.), or it can be given to agricultural operations to feed livestock. The best model for fruit sharing is the "Earth Matters" program in Nelson, BC. Earth Matters is a community-based organization that establishes links between social and environmental issues, including community food security. Nelson residents with fruit trees can call the program and volunteers will come and pick fruit and clean the area beneath the trees in exchange for a portion of the fruit harvested. One-third of the fruit goes to the pickers, one-third to the

property owner, and one-third to various non-profit community organizations such as Meals on Wheels (Haas 2000). For information on the Earth Matters program, call (250) 352-2140 or e-mail at: info@earthmatters.ca.

2. by cutting down unwanted trees for landowners (and if possible, replacing them with non-fruit-bearing native varieties).

It should be noted that removing non-cared-for fruit trees or removing blossoms will remove attractants from bears, but it may also meet the requirements of the Sterile Insect Release (SIR) program in the interior of British Columbia. In the Similkameen, South Okanagan, and Creston valleys (Zone 1 of the SIR program), Central Okanagan Valley (Zone 2), and North Okanagan and Shuswap valleys (Zone 3), homeowners must maintain their trees free of codling moth to comply with SIR policies (Okanagan-Kootenay Sterile Insect Release Program brochure, 2000). Host trees for codling moth include apples, pears, crabapples and quince. There are other methods of controlling codling moth, but stripping the fruit or removing trees removes attractants for bears. SIR offers incentives to anyone in the three zones who strips or removes host trees (contact SIR program for more information, 1-800-363-6684).

Commercial orchards

Commercial orchards should consider putting electric fencing around the perimeter of the orchard, which would also lessen damage by ungulates. In addition, the use of specially trained dogs could be considered as an additional deterrent.

Composting

If composting is conducted properly (i.e., covering with soil or lime, frequent aerating), it should not be an attractant to bears. However, if bears are attracted by other sources of food in the area, compost can become a problem. Meats, fish, oils, and milk products should never be composted. Sweet smelling attractants, such as rotting fruit, should also be avoided.

The following rules regarding composting may need to be implemented.

- Backyard composting may need to be restricted in residential areas adjacent to high-use bear habitat or otherwise required by bylaw to be conducted in a bear-proof manner (e.g., use of electric fencing in backyards). Community composting of putrescent matter shall be conducted inside an electric fence.
- Composting of lawn clippings and leaves may continue in backyards. However, the composting of organic kitchen material may have to be restricted to indoor worm composters (see section 12.2 Canmore Case History).

<u>Barbeques</u>

The odours on barbeque grills are very attractive to bears. Grills should be burned at a high temperature following use to burn off residues and should be cleaned regularly. Barbeques should be stored in a bear-proof location such as a garage. If they must be left outside, barbecues should be covered to reduce odours.

Hanging carcasses and smokehouses

Structures for these types of activities should be located away from forest and shrub cover or natural movement corridors. Commercial coolers may be utilized in some communities for hanging carcasses during the hunting season (e.g., coolers used by forestry companies for keeping seedlings cool). These areas should be kept as clean as possible to reduce odours. Community planning may need to consider the central placement of structures for smoking fish, away from the periphery of town. Motion sensitive lights may help scare away bears investigating these attractant for their first time. Electric fencing around buildings used for these activities could be attempted. If problems occur, it is best not to conduct these activities when bears are active.

Pet Food

Pet foods must be kept indoors or in other bear-proof locations. If fed outside, animals should be fed only enough so that they can finish the entire meal, and bowls should be stored inside.

Livestock operations

Bears are attracted to livestock feed, carcasses, and birthing areas. Removing cover and locating attractants (such as grain) away from natural cover and movement corridors can be helpful. Electric fencing can be used to deter bears from birthing areas (e.g., calving, lambing) or chicken coops. Use of lights hooked up to motion sensors, or scare guns, can be attempted.

Grain and other feed should be housed in a bear-proof structure or container. Seed mixes containing low-quality bear foods should be used for areas being seeded for ground cover.

Dead livestock should be disposed of in one of three ways: 1) carcasses should be sent to a rendering (by-products) plant (see Appendix C for local companies); 2) carcass piles should be electric fenced; or 3) if only black bears are present in the area, carcasses should be buried deeply (this approach should not be used in areas with grizzly bears).

<u>Campgrounds</u>

All campgrounds must be bear-proof. Therefore, the education program must also focus on reaching tourists. Bear-proof lockers for food storage should be provided. Campgrounds should use bear-proof receptacles and bear-proof dumpsters for garbage disposal.

8.4 "Bear Smart" Bylaw Implementation and Enforcement

Bylaws in a "Bear Smart" community may include the following prohibitions:

• No person shall leave garbage of any kind accessible, either intentionally or unintentionally, to wildlife or domestic animals. This includes, but is not limited to, household garbage, compost, fruit, livestock feed, apiaries, barbeques, and the hanging of carcasses.

This bylaw wording covers all aspects of non-natural attractants. However, it may be easier to target specific activities through other bylaws:

- Make it an offence for commercial establishments to discard edible waste in a non-bear-proof manner.
- If curb-side collection is retained: garbage may be placed curb-side only on the morning of pick-up (not before 6 am), and the garbage container must be returned a bear-proof location by 7 pm. The bylaw should also require that attractants be stored in a bear-proof container and/or location (i.e., house or garage, not garden shed, carport or wooden box). A number of communities in British Columbia have enacted bylaws to restrict curb-side placement of garbage between certain hours. Kamloops has experimented with the use of restriction in one small area (R. Olsen, District Conservation Officer, personal communication). Kimberly prohibits placement of garbage before 5 a.m., and requires removal of the container within eight hours of pick-up. This strategy must be accompanied by a strict commitment by the public works employees or contractor employees to be expeditious in picking up and removing the refuse put out for collection. Lengthy or lackadaisical pick up contributes to the non-natural attractants being available. See Canmore and Revelstoke Case Histories (sections 12.2 and 12.3) for bylaws with respect to garbage collection.
- Include community composting requirements in high-risk areas of the community or prohibit composting of organic kitchen refuse. See Canmore Case History (section 12.2),
- Bird feeders may be allowed with certain restrictions during the nondenning period: feeders must be suspended from a cable or other device so that they are inaccessible to bears. The area below the feeder should be kept free of accumulations of seed. There are no restrictions during winter months (when bears are denned). See Canmore Case History (section 12.2), and
- Garbage at special community events (festivals, ball tournaments, concerts, etc.) must be removed at the end of each day's activities. See Whistler Case History (section 12.1).

Enforcing by-laws must be the responsibility of an agreed-upon service, such as a by-law enforcement officer, the C.O.S., or police. Money generated from bylaw enforcement should go towards a special fund set aside to address human-bear conflicts, such as the purchase of additional bear-proof waste containers. Alternately, people who violate bylaws could do community service work on a human-bear conflict issue in the municipality, such as garbage clean-up in areas with problems.

8.5 Community Planning Documents

The Bear Stewardship Committee should work closely with local government and other agencies to ensure that planning and decision-making processes are both consistent with and compatible with the objectives of the Human-Bear Conflict Management Plan. This will reduce the potential for new community developments or practices to increase the risk of human-bear conflict and/or potential displacement of bears. Possible changes to community planning documents include the following:

- 1. Revise components of the Regional Solid Waste Management Plan (which Regional Districts are mandated to prepare) pertaining to the community (in cooperation with the regional district) to make them consistent with the Human-Bear Conflict Management Plan.
- 2. If the "Bear Smart" program is implemented at the regional district level, the Regional Growth Strategy may need to reflect the program, which will then be reflected within each Official Community Plan (OCPs have to be revised to make them consistent with RGSs).
- 3. Include consideration of important bear habitat and travel corridors in all documents related to land-use decisions. Avoid development in areas with prime bear habitat in order to minimize the potential for human-bear conflicts.
- 4. Revise land zoning consistent with any revisions of the Official Community Plan.
- 5. Landowners may implement restrictive covenants that are consistent with the revised Official Community Plan.

Most communities in British Columbia that have moved towards becoming "Bear Smart" (such as Whistler and Revelstoke) have not changed their OCP or RGS to be consistent with their bear management plans. In the future, changing these plans may prove to be helpful for providing the impetus to keep the programs running. However, in the case of land-use planning, "higher-level plans" can be very important for reducing the long-term impact of developments on surrounding bear habitats and movement corridors.

9 Monitoring Human-Bear Conflict

Several data sources are available for monitoring the level of human-bear conflict within a community. The Conservation Officer Service currently collects data on human-bear conflict complaints and actions that were taken by its members. The Northern Region Bear Aware Program, with support from the University of Northern British Columbia, created a GIS database to map human-bear conflicts between 1994 and 1999 (Nahornoff 2000). This map provides a powerful visual method for monitoring human-bear conflict complaints so that problem areas can be investigated and management strategies can be focused where they are needed most. A human-bear conflict map will also be a valuable visual aid for showing the public the spatial aspects of the problem and the changes over time. Data collection and subsequent mapping of other information would also be useful for monitoring and analysing issues that influence human-bear conflict (e.g., nonbear-proof dumpster locations, fruit trees, and green space used by bears).

Input from the community will be crucial to the successful collection of data on human-bear conflicts. Thus, it will be necessary to sustain enthusiasm for the project as time proceeds. The general public can help by continuing to identify, document, and address all sources of non-natural foods and green spaces that provide security cover in areas of high human use until the problems associated non-natural foods and green space are effectively eliminated.

Data regarding non-natural food and other issues should be collected, reviewed, and summarized annually. Continuing to add to the information obtained during the Preliminary Hazard Assessment will be important for increasing knowledge of human-bear conflicts and the way bears and humans use a community. The Human-Bear Conflict Monitoring System will be the primary tool the community will use to continue to collect information that can help reduce the potential for human-bear conflict. The Bear Stewardship Committee, or annual reports, should recommend one or more Detailed Hazard Assessments as problem areas are identified (see Section 7.0), using the data collected by the Human-Bear Conflict Monitoring System.

9.1 Objectives

The objective of the Human-Bear Conflict Monitoring System is to establish and maintain a data collection system, including all Problem Wildlife Occurrence Reports for bears on an annual basis, that can be used to identify and map sites that continue to have human-bear conflict. This will focus future effort on eliminating sources of non-natural foods. Additionally, more detailed assessments can be conducted to determine the source of the human-bear conflicts.

9.2 Recommended Actions

The ongoing identification of hazards for the Human-Bear Conflicts Monitoring System could be carried out by the bear education program coordinator with the guidance of local Conservation Officers and a Registered Professional Biologist with experience in bear ecology and behaviour and human-bear conflicts. A map display of the ongoing data collection on Human-Bear Conflicts should be a major component of the system. A year-end report summarizing progress and work required should be completed annually.

9.3 Recommended Techniques

A spatial database is an integral component of the successful implementation of the "Bear Smart" community program. GIS databases will provide the most valuable tool for documenting human-bear conflicts and progress made by the community. Some communities are already digitally mapped. In some cases, small communities that do not have a digital map base and compatible software may need to start by recording information on a large hard-copy map of the community. At least one community has used GIS students at a local college or university to develop the GIS database (Narhornoff 2000). If production of a GIS database is feasible through the joint efforts of the school and the community, the database provides a valuable learning process for the students and a valuable product for the community.

The following spatial information should be included in the ongoing data collection for the Human-Bear Conflict Monitoring System and entered as layers in the GIS database or hard-copy maps.

- 1. Document and map sources of non-natural foods so that management efforts to eliminate non-natural foods can be focused on problem areas.
- 2. Document and map green space that provides security cover and/or foods in areas of high human use so that management efforts can be focused on clearing, brushing, or modifying green spaces to reduce the potential for conflict.
- 3. Document and map human-bear conflict reports so that the temporal and spatial patterns of human-bear conflict can be investigated and problem areas and practices can be identified and investigated.
- 4. Document natural factors that appear to increase the potential for conflict, including habitat potential, terrain features, visibility and security cover issues, and other sensory issues, and conduct a Detailed Hazard Assessment of specific sites or areas where human-bear conflicts are occurring.

The spatial database will also be a valuable tool for new participants in the program (e.g., new bear education coordinators).

10 Annual Progress Reports

Annual progress reports are necessary for monitoring the success and failures of the "Bear Smart" Community Program. They are also important for establishing direction for the upcoming year. These reports are a vital tool to help other communities just starting the program decide which strategies or options may be most successful in their own community. As a result, details such as delivery budget, level of success of various methods, and recommendations for future delivery of the program are not only valuable to the community in question but to many others as well. Sharing of information is critical to maximizing the efforts of all involved. See Appendix D for a recommended outline.

11 Measures of Success

The ultimate measure of success of the "Bear Smart" program is to its ability to reduce or eliminate the instances of "problem" bears being killed in communities and injuries to humans or their property from encounters with garbageconditioned or habituated bears. Despite major efforts on the part of the community to reduce human-bear conflicts, incidents are still likely to occur, although they should occur at a much lower frequency. Evidence from Denali National Park indicates that some level of reactive management will continue to be required in response to bear incidents (Schirokauer and Boyd 1998).

Success will be gauged by:

- a trend toward a decrease in the presence of non-natural foods available to bears,
- a decrease in the number of human-bear conflicts reported to the C.O.S.,
- a decrease in the number of bears destroyed by the C.O.S., RCMP, and individuals,
- a decrease in the number of bears translocated,
- a decrease in property damage, and
- a decrease in resources expended in dealing with human-bear conflicts.

12 Case Histories

While massive positive changes have been occurring in public attitudes and actions towards responsible community-based stewardship of bears, at the time of this report, no community in British Columbia has yet qualified for "Bear Smart" status. However, two communities, Whistler and Revelstoke, stand out as exemplary, and these two communities are in the unique position of leading the world by example in applying responsible-based stewardship of bears.

We have identified four case histories that serve as examples of bear-proofing communities. Each of the communities has used a slightly different approach, with varying degrees of success. None of these communities implemented the "Bear Smart" Communities Program *per se*, but each community attempted to develop bear-proofing systems to reduce the number and extent of human-bear conflicts within their jurisdictions.

The following case histories examine three communities in British Columbia and one in Alberta that have implemented programs to reduce the occurrence of "problem" bear behaviour. The three British Columbia communities were originally profiled in Ciarniello (1997). Each of the towns profiled in the case histories had slightly different human-bear conflict issues to deal with because different bear species used their landfills and towns. Whistler had problems with black bears, Mackenzie had mainly grizzly bear problems, Revelstoke experienced both black bear and grizzly bear problems. These case studies were chosen based on their applicability to management problems experienced in other areas of the province. Canmore was included as an example of how human-bear conflicts have been addressed in other jurisdictions. The first step that each community took was to install an electric fence around their respective landfills. The successes and failures of these communities in their efforts to reduce humanbear conflicts can serve as examples for other communities that are working towards becoming "Bear Smart."

The data regarding the number of reported human-bear conflicts does not necessarily reflect upon the effectiveness of a particular strategy that a community has implemented. The number of bear problems varies a great deal from year to year because of climate changes from year to year, which in turn affect the food supply for bears. In years when the berry crop fails, the number of "problem" bears increases substantially because they must search farther for potential food sources. If many bears are destroyed in these years, the number of complaints will decrease in the following year, usually regardless of the food supply, because the bears killed the year before have not all been replaced yet. Therefore, the numbers tend to be high in certain years, management actions are
taken, and the next year the numbers go down, not necessarily due to an improvement in management of attractants, but because the population has been negatively impacted.

12.1 Whistler

The Resort Municipality of Whistler, BC is located within the Coastal Mountain Ranges and is adjacent to Garibaldi Provincial Park. Being situated in a valley bottom in the Coast Mountain Ranges, Whistler is surrounded by quality bear habitat. Black bears are the only bear species of concern in the municipality because grizzly bears do not tend to frequent the community (Black Bear Task Team 1998).

Whistler has faced many challenges in its quest to reduce human-bear conflicts. There is a high density of black bears in the Whistler area. Prime bear habitat surrounds the resort community, due in part to the development of ski runs that help promote an abundance of natural foods. In addition, the availability of nonnatural food within the resort community has attracted bears to developed areas in Whistler for several years. Finally, the large number of seasonal workers and tourists makes education and awareness a difficult challenge.

Whistler has been one of the most progressive and active communities in British Columbia in becoming bear-proof. A Black Bear Task Team involving key community stakeholders was established in 1997. The Task Team reviewed the entire waste management system, from collection of garbage to disposal at the landfill. The Task Team recommended a number of changes to the solid wastehandling program, including mandatory bear-proofing of waste containers throughout the municipality. Completely bear-proofing the system took a number of years and was completed in 1999/2000. In addition, an aversive conditioning program was implemented in 1999, and a comprehensive education program was launched to target residents, employees, and visitors.

Because of the short time that the community has been bear-proof, Whistler's efforts are just starting to yield positive results. However, despite this short time period, the number of bears killed by the Conservation Office Service decreased substantially in 2000 and 2001 when compared to previous years (Fig. 2).



Figure 2. Number of black bears destroyed in Whistler, BC 1992-2001. Note: graph shows bears destroyed for the entire Whistler area, not just the town site of Whistler.

Moving Towards Becoming "Bear Smart"

Bear Stewardship Committee

In 1997, the Black Bear Task Team was created to establish and implement a Black Bear Management Plan (Black Bear Task Team 1998). The team consists of key stakeholders from the community, including members from the Jennifer Jones Whistler Bear Foundation (JJWBF), the Resort Municipality of Whistler staff, the local waste management company (Carney's Waste System), the Conservation Officer Service, Blackcomb-Whistler mountain staff, and the Association of Whistler Area Residents for the Environment (AWARE).

Phase I: Problem Analysis

Whistler has the most extensive Black Bear Management Plan of any community in British Columbia. The plan was "developed to minimize human-bear conflicts through effective waste management practices, extensive public education, a rigorous bylaw enforcement program, and non-lethal bear management practices" (S. Dolson, JJWBF, personal communication). Copies of the Black Bear Management Plan can be obtained from Brian Barnett, General Manager of Engineering and Public Works (phone: [604] 935-8191). Although Whistler has not completed a full Problem Analysis, the Black Bear Task Team has essentially addressed all the important issues in the Black Bear Management Plan. As part of the plan, important bear habitats and travel corridors were identified within the Whistler area. The plan includes a good summary of local bear ecology, including how habitat use by bears changes by season and how this may affect potential human-bear conflicts.

Education

Whistler is the most urban of the case studies and has a large transient human population that poses challenges to the implementation of an effective education campaign. The seasonal nature of the work force and the large number of visiting tourists makes Whistler's situation unique when compared to many other communities. Many visitors are in Whistler for only very brief periods, so getting the Bear Aware message across effectively is extremely difficult. Many workers are employed on a seasonal basis and often come from foreign countries, and for these reasons, they have no previous experience with bears.

A number of agencies in Whistler have undertaken education programs aimed at informing the public about bears within and around the community.

Whistler has a community-based non-profit registered organization called the Jennifer Jones Whistler Bear Foundation (JJWBF). The organization was founded in 1995 and focuses on community awareness of bear issues and negative conditioning of bears. The ultimate goal of the JJWBF is to reduce the need for translocation and destruction of bears. The mandate of the foundation is "to protect the well-being and lives of bears by establishing a healthier coexistence between people and bears; to reduce the number of nuisance bears destroyed by increasing public understanding and appreciation of bears; educating people on dealing with bears in their communities; and promoting non-lethal bear management practices among wildlife managers" (Dolson 2000).

Many educational programs have been conducted in Whistler by the JJWBF. Programs include the Neighbourhood Bear Watch program and the Bear-Friendly Business sticker program. The JJWBF has also distributed pamphlets and information sheets, manned booths at local events, conducted seminars and workshops for residents, and erected signs throughout the town.

In addition, Whistler-Blackcomb (parent company: Intrawest) has a comprehensive bear ecology and bear-awareness education program (exclusive of the community). This program includes interpretive displays, educational signs, and a wildlife centre for children. Whistler-Blackcomb has tried to enhance forage production for bears on the ski hills by planting fruit-bearing shrubs. Whistler-Blackcomb has also thinned forests by helicopter logging rather than through conventional logging techniques. This approach allows more light to penetrate the undisturbed understory and enhances berry production (A. De Jong, Whistler-Blackcomb, personal communication).

Also, Owen Carney, of Carney's Waste System (the local garbage contractor) has done extensive work on bear awareness.

The Municipality has taken a lead role in the education program within the community. It has developed brochures, erected signs at municipal parks and trailheads, placed annual radio and newspaper advertisements in the local media, and hand-delivered letters to businesses in the autumn to remind managers to dispose of garbage properly.

The efforts in Whistler have been widely reported in newspaper and magazine articles and on various TV news programs. The JJWBF and municipal staff have given presentations and advice to other communities interested in becoming bearproof (S. Dolson, JJWBF, personal communication). Educational kits are available from the JJWBF (604-905-4209). A wealth of information can be obtained on the JJWBF website: www.bearsmart.com.

Bear-proofing and Attractant Management

Whistler does not have a household garbage collection system because of concerns about bears and other considerations specific to the resort community.

Instead, Whistler's household garbage collection system is comprised of two bearproof compactor sites. These compactors are located at the north and south ends of town, just off the main highway, which makes them convenient places to stop as people leave town. The compactor sites are cleaned on a daily basis as part of Whistler's bear-proofing measures as well as for aesthetic reasons.

Carney's Waste Systems is the local waste hauler and is responsible for operating the compactor sites, commercial bins, and the landfill. Owen Carney has been instrumental in Whistler's bear-proofing measures, including designing a new commercial bin to satisfy the Black Bear Task Team's desire for a better bear-proof container.

The municipality passed a bylaw requiring all exterior garbage containers to be bear-proof. The conversion to the new bins was a major undertaking and was completed in 2000. Commercial bins are now bear-proof, or are housed within a bear-proof building. Thanks to the efforts of the Resort Municipality of Whistler, JJWBF, private businesses, and donations, all waste containers along pedestrian walkways are now bear-proof (S. Dolson, JJWBF, personal communication).

Landfill

The Whistler landfill was established in 1979. It is located 10 km from Whistler Village, 6 km from a main urban area, and 1 km from the nearest residence. The landfill was only used by black bears. In 1994, the use of the landfill by black bears increased substantially. Concurrent with this increase, the number of complaints about bears rose substantially within the community.

The landfill area was originally divided into two waste disposal sites, a municipal sanitary waste (MSW) site and a construction waste site. An electric fence was installed around the MSW site in 1995. An increase in bears within the town after the installation of the electric fence was not reported. Over the few years following the installation of the electric fence, the bears showed a remarkable determination to enter the landfill. They would dig holes under the fence, jump inside the enclosure from an adjacent tree or rock pile, climb up wooden fence posts, or enter through the gate when it was left open or not charged. Occasionally, despite the electric shock, bears would charge right through the fence. In response, the municipality installed concrete barriers around the electric fence to prevent bears from digging under it, spikes were nailed into the wooden posts, and the gate was replaced with one that had plastic hand holds so that the power to the gate could be maintained at all times (C. Jennings, Municipality of Whistler, personal communication). In addition, trees inside the electric fence were removed to make the landfill as unappealing as possible to the bears (bears were known to take refuge in the treed areas).

After the MSW landfill site was electrified, the bears focused their scavenging efforts on the construction waste site. In 1999, the electric fence was expanded to include all waste disposal areas at the landfill. An apron of chain link fencing was buried at the base of the new electric fence to prevent bears from digging underneath it. Both the chain link apron and the cement barriers appear to have worked well in stopping bears from digging under the electric fence (B. Barnett, Resort Municipality of Whistler, personal communication). Automatic gates were installed. The success rate of bears entering the landfill is now close to zero. The bear-proofing measures seem to have been successful: bears have now all but abandoned their efforts to feed at the landfill and have returned to the abundant source of natural foods in the surrounding area.

Bylaws

Whistler's garbage disposal bylaw has stringent requirements for bear-proof waste management – perhaps the most extensive requirements in British Columbia. As of August 2000, the Whistler Garbage Disposal Bylaw No. 1445 states:

- no domestic garbage and no food waste or other edible waste that could attract dangerous wildlife shall be stored outdoors, including on any patio, balcony or deck. "Dangerous wildlife" means a bear, cougar, coyote or wolf,
- every outdoor container or receptacle used for depositing or storing food waste or other edible waste that could attract dangerous wildlife shall be a wildlife resistant container,
- every commercial, industrial, institutional, and tourist accommodation building, and every multiple family residential development having three or more dwelling units, shall be provided with a garbage storage site located inside a building or within a wildlife resistant enclosure,
- garbage containers for special events are exempt from requirements as long as they are emptied by 10 pm,
- feeding dangerous wildlife and depositing or storing any domestic garbage, food waste, or other edible waste that could attract dangerous wildlife is prohibited, and
- bird feeders are required to be inaccessible by dangerous wildlife.

The municipal bylaw is strictly enforced and is part of the municipality's comprehensive bear management plan. Enforcement of bylaws increased compliance within the community (S. Jacobi, Conservation Officer, personal communication).

Discussion

Whistler has met many of the criteria set out in the "Bear Smart" program. With the inclusion of bear-proof garbage receptacles for pedestrians, fencing of the entire landfill, and changing gate systems, Whistler has met the objectives of bearproofing their waste management system. Whistler also has ongoing education programs. With continued enforcement of existing bylaws (especially with respect to housing of commercial dumpsters) and maintenance of the electric fence at the landfill, the municipality appears to have met most of the criteria for "Bear Smart" status. The Regional MWLAP office will have to review the situation and determine whether to grant the municipality "Bear Smart" status. The community should continue to monitor human-bear conflicts in the future to determine if the number of nuisance wildlife complaints and bears destroyed decreases over the next few years.

The area of Whistler provides some interesting insights into bear and human conflicts due to its valley location and high density of people. The transient tourist population creates problems with waste management on the ski hill and surrounding cabins. The small number of waste disposal units available for the use of local residents creates problems because people dispose of their garbage in ways that attract bears. Despite all of these potential problems, the Municipality of Whistler has met many of its goals for reducing human-bear conflicts. Unfortunately, keeping a community bear-proof is an ongoing struggle of vigilant maintenance and education.

Recommendations

While Whistler has made enormous strides in its management of bear attractants, several issues still need to be resolved before it can be considered "Bear Smart." The following is a list of necessary actions.

- 1. Conduct a brief hazard assessment using the Preliminary Hazard Assessment guidelines. Because so much groundwork has been accomplished, this should require relatively little effort and may be more of a reassessment in which details not addressed to date can be identified and addressed.
- 2. Conduct a committee review of the management strategies: in particular, green space management and community planning strategies.
- 3. Add an addendum to the Black Bear Management Plan to identify strategies and actions that may be taken to address the recommended criteria.
- 4. Conduct detailed hazard assessments if deemed necessary by the Conservation Officer Service, Black Bear Task Team, or Regional MWLAP office.
- 5. Produce annual reports as recommended in this report. Annual reports will be helpful to other communities by documenting the process Whistler has been through and the failures and successes of specific management actions.
- 6. Continue monitoring human-bear conflicts and investigate and address conflict issues.

12.2 Canmore, Alberta

Details from Andreas Comeau, Town of Canmore.

The Town of Canmore, Alberta has changed the manner in which it handles its waste and is a superlative example of a community's determination to become bear-proof. While this accomplishment is remarkable, the Town's approach of gradual implementation and consultation with residents make it an even more excellent example for other communities.

History

The Town of Canmore is situated in the Bow Valley at the gateway to the Canadian Rockies. Canmore, straddling the Trans-Canada highway, is 100 km from Calgary and 2 km from the gates of Banff National Park in Alberta.

Throughout the 1990s, as Canmore was experiencing steady growth, the Town was pressured to implement programs that would minimize the impact on the environment and wildlife populations in the area. In the Solid Waste Services department, this translated to the establishment of recycling programs, toxic round-ups, and implementation of an animal-proof waste handling system.

In the fall of 1996, responding to increasing concerns from the public and environmental groups about bears being attracted to waste, Council requested the Waste Management Committee to investigate options for animal-proofing the Town's waste handling system. Up until 1997, the Town of Canmore provided its residents with a traditional curb-side waste collection program. The committee recommended that the Town eliminate curb-side collection and implement a communal "bear bin" collection system. Despite this recommendation, Council voted in favour of a dual system that included both curb-side collection and neighbourhood animal-proof waste containers. There was the perception at the Council level that residents were opposed to the complete elimination of curbside collection. This hybrid system gave residents the option of continuing to place waste out for curb-side pick up on their collection day or to use the bearproof containers at any time.

Communal Waste Container Locations

The first hurdle in implementing the dual system was the selection of sites for 60 bear-proof containers in neighbourhoods and multi-residential areas. Placement of the 60 waste containers proved to be a difficult exercise because of the following perceptions:

- aesthetics: some residents viewed the containers as an eyesore, and some were also concerned about their effect on the real estate value of homes,
- space constraints multi-family complexes have limited common space for containers,
- the containers may actually attract animals,
- contents of the containers may smell,
- soil contamination effluent from containers entering storm sewer or groundwater,
- there may be loud noise from people banging lids,
- difficult to use doors are difficult to operate for disabled and elder members of the community, and
- increased automobile traffic neighbours will drive to the containers.

A review was completed of the entire community to find 60 suitable locations. The process started with the administration sending a letter and map to all the visually affected homeowners in all the proposed locations. The public was given two weeks to reply with comments and/or concerns. The majority of the public was receptive to the introduction of the waste containers because they were aware of the wildlife concern and community obligations. Surprisingly, despite the concerns listed above, some residents wanted the containers *closer* to their house!

After several months, the community began to appreciate the benefits of the containers and their convenience and they became very popular. People appeared to appreciate the convenience of disposing of waste at any time, day or night. The containers were quickly becoming the preferred means of disposal for many of Canmore's residents.

The downside to this dual approach of curb-side collection and communal containers was that the program was becoming very costly to operate. This was because the town continued to pay for a complete curb-side program for all residents, many of whom were now opting for the bear-proof system.

During the summer months of 1997, members of the Waste Management Committee completed a curb-side monitoring program. The committee members rode on the waste collection trucks during the curb-side collection days and recorded the number of homes that did not have waste at the curb-side. It was assumed that if no waste was placed out for collection, then the household was using the animal-proof waste containers for waste disposal.

The monitoring results indicated an average of 55% of households used the bearproof waste containers. In some neighbourhoods, it was also noted that up to 77% of households used the animal-proof waste containers. This information was presented to Council, who indicated they would consider eliminating curb-side collection if the total number of households using the bear-proof waste containers reached 66%.

In the summer of 1998, due in part to a poor berry crop, the number of bear sightings grew in town, and the number of incidents related to bears being attracted to waste increased substantially. Local Fish and Wild officers pleaded with the Town via the local newspaper to discontinue curb-side collection and provide a complete animal-proof waste handling system. In addition, members of the public were becoming involved, sending letters to the newspaper editor requesting the Town to eliminate curb-side collection. The summer season continued, and the number of problems increased to such a level that the Mayor sent a letter to all residents urging them to use only the animal-proof waste containers until the bears went into hibernation. When the summer season ended, over 300 bear sightings had been recorded within the town, nine bears had been relocated, and four bears had been destroyed.

Once again, the Waste Management Committee conducted a curb-side monitoring program from March to August of 1998. The total utilization of the

animal-proof waste containers was 62% of residents - only 38% continued to use the curb-side program. In September of 1998, the Waste Management Committee undertook another audit and found that only 23% of households were using the curb-side collection program. Despite this fact, the Town was paying the waste collection contractor a fee based on 100% of households receiving curb-side collection. The costs associated with running the dual collection system continued to rise. Subsequently, Council unanimously accepted the recommendation to eliminate curb-side collection.

The Site Selection Process for Additional Waste Containers

The Town administration and the Waste Management Committee were now faced with the task of selecting sites for an additional 60 animal-proof waste containers to service the entire community. Providing adequate volume for weekends and holidays when Canmore triples in population was imperative. The following criteria were developed:

- 3.0 m³ waste container for every 20 homes,
- 4.5 m³ waste container for every 30 homes,
- waste containers would be located a maximum of one block from every home,
- waste containers would be located on municipal reserve (i.e., public land),
- waste containers would be doubled-up only when necessary, and
- waste containers would not be combined with other services whenever possible (i.e., beside a Canada Post mail kiosk).

The process of selecting potential locations for the containers was similar to the first site-selection process. In the end, the administration and the Waste Management Committee successfully located all but one of the 120 proposed animal-proof waste containers.

The commercial sector was required to implement animal-proof waste handling systems as well. Existing businesses were allowed one year from the Waste Control Bylaw's enactment to replace their waste container with an acceptable animal-proof container. New businesses were required to conform to the new Waste Control Bylaw immediately.

Moving Towards Becoming "Bear Smart"

Bear Stewardship Committee

To assist with program implementation, the Town took advantage of a grass roots movement and established a Waste Management Committee (WMC) made up of interested and concerned residents. The WMC was used extensively during the implementation of the animal-proof waste handling system and proved to be a tremendous asset.

Phase I: Problem Analysis

No formal bear Problem Analysis of the community was completed.

Education

The town of Canmore has not implemented a comprehensive education program like the Bear Aware program in various British Columbia communities (e.g., Revelstoke, BC).

The Town of Canmore provided a "Bears & Your Garbage" brochure to all residents and businesses at the start of its dual collection system in 1997. Since the change to a complete animal-proof waste handling system in 1999, a one-page flyer was mailed out. In 2001, the "Bears & Your Garbage" brochure was updated to reflect the most recent changes in the collection system. Residents also have the opportunity to call the Town if they have any questions.

Bear-proofing and Attractant Management

Birdfeeders were identified as potential attractants within the town after bearproofing took place. Several cases of damaged birdfeeders or sightings of bears up birdfeeder poles had been documented. Because of these problems, birdfeeders and other animal attractants (such as pet food and suet balls) were included in a new Waste Control Bylaw in 2001. This banned the use of birdfeed from April 1until October 31 while bears are active.

In 2000, composting was also identified as another animal attractant. Some residents actively compost both leaf and yard waste, but some also include kitchen organic material, which is an obvious animal attractant if not composted properly. Therefore, the changes in the 2001 bylaw banned outdoor composting of kitchen organic waste. Residents are encouraged to compost leaf and yard waste outside and compost kitchen organic material indoors with a vermi-composter.

Landfill

The town of Canmore does not have a Class II or wet waste landfill site. Waste is collected, sorted at a transfer station, and shipped to a landfill in the Calgary area.

Bylaws

Coinciding with the start of the dual system in April 1997, strict new standards for storage and placement of waste were incorporated into the Town's Waste Control Bylaw. These bylaws no longer apply due to the conversion to bear-proof containers. However, they serve as a model for communities with continued curbside collection.

The bylaws included the following provisions:

- waste must be stored in an animal-proof location between pick-up days (i.e., house or garage, not a garden shed or wooden box),
- waste placed for collection must be in a can with secure lid (i.e., no boxes or waste bags),
- waste cannot be placed out for collection earlier than 6 a.m. on collection day (i.e., not the night before).

Penalties for breaking bylaws are a minimum of \$100, \$200, and \$500 for the first, second, and third offences respectively. Canmore's current bylaws (and fines) apply to all aspects of the animal-proof waste collection system. They require that:

"Occupants of Residential Dwelling Units shall ensure Waste is stored in an Approved Storage Location at all times other than when the Waste is being transferred to an Animal Proof Waste Container."

Cost

Many communities may feel that Canmore's route to "Bear Smart" is not an affordable option. However, Haul-all, the company that supplied the system, conducted a cost-benefit analysis on introducing the new bear-proof waste management system. By using a waste container system that is emptied by one person using a side-loading vehicle, the town has saved money in operating costs that will eventually cover the capital costs of installing the new system. Canmore's 1996 fiscal budget shows that the cost of curb-side collection and transfer was \$187,000. Operating the same system in 2001 was estimated to cost \$361,000 (due to inflation and population growth). The most recent estimate of the cost of operating the bear-proof system was \$201,000, an approximate saving of \$160,000 or 44% (Philipp 2000). While the initial costs are high, the operating costs are lower - the new system saves the town money (A. Comeau, Town of Canmore, personal communication). If the new system meant bear-proofing a landfill that was able to then use tarps instead of fill, the long-term savings would be even greater.

Discussion

When the program began, several bear-waste related altercations occurred in the town each year. The change to the new system saw a slight decrease in conflicts; however, the number of bear-waste altercations did not drop as substantially as anticipated. Despite the stiff fines under the Waste Control Bylaw for improperly storing waste, some residents continued to keep waste in sheds or storage boxes that were not animal-proof. Therefore, the bears continued to have access to garbage as an easy food source.

In May of 1999 the curb-side collection system was eliminated and the residents of Canmore could only use the communal waste containers. Throughout the summer, the success of the complete animal-proof waste handling system became evident. Although there were several sightings of bears in and around the Canmore town site, there were no reported incidents involving bears and waste. Success continues; there were no "problem" bears killed in 2000, and only one black bear was killed in 2001.

The community to the east of Canmore (Exshaw) was not as lucky. During 1999, the community still provided a curb-side collection program and were inundated with bears intent on consuming human food. This community introduced an animal-proof waste handling system in March 2000 with much success and minimal public opposition, due in part to the extensive media attention Canmore received.

Recommendations

The town of Canmore has done an excellent job in terms of creating and implementing bylaws and bear-proofing its waste management system. It should stand as an example of effective change. Although Canmore is not eligible for the "Bear Smart" program because it is in Alberta, the following actions would be needed to attain "Bear Smart" status.

- 1. Conduct a brief hazard assessment using the Preliminary Hazard Assessment guidelines.
- 2. Develop a more comprehensive education program to help educate residents on the continuing need to keep non-natural foods away from bears.
- 3. Complete a Human-Bear Conflict Management Plan to identify strategies and actions that may be taken to address the recommended criteria.
- 4. Conduct detailed hazard assessments if deemed necessary by the Conservation Officer Service, bear committee, or Regional MWLAP office.
- 5. Produce annual reports as recommended in this report. Annual reports would be helpful to other communities by documenting the bear-proofing process and the failures or successes of specific management actions.
- 6. Continue monitoring human-bear conflict and investigate and address conflict issues.

12.3 Revelstoke

The town of Revelstoke has been working toward becoming bear-proof since 1994 when its landfill was electric fenced. Revelstoke has been very successful in becoming more "Bear Smart" by implementing an intensive education program and by managing attractants within the community. Through these efforts, Revelstoke has experienced a significant decline in the need for management actions (Fig. 3), reducing the number of bears destroyed or removed from 62 (33 destroyed, 29 relocated) in 1994 to just two in 2000 and 2001 (Couturier 2002).



Figure 3. Number of bears destroyed in the community of Revelstoke, 1992-2001.

History

Revelstoke is located in the Selkirk Mountain Range in the Columbia River Valley. High-quality bear habitat surrounds the town. Between 1986 and 1995, over 100 grizzly bears were translocated and 17 were destroyed in the Revelstoke area (Proctor and Neumeier 1996). Garbage-related encounters were the main reason cited for grizzly bear translocations (77 of 107 translocations, 72%), followed by property damage (18%), and predation on livestock (6%). The main reason cited for destroying grizzly bears (information available on 13 grizzly bears between 1986-1995) was livestock depredation (including chickens and honeybee colonies) (5 of 13), followed by property damage (4 of 13) and "nuisance" (2 of 13). During this same period, over 50 black bears were translocated and 250 destroyed. Between 1989 and 1995 alone, 129 black bears were destroyed because of "nuisance" complaints (29%), because they were consuming fruit (26%), and because of garbage-related encounters (24%).

Prior to 1992, bears were not regularly tagged when translocated in Revelstoke. After 1992 bears were tagged and some were radio-collared. Proctor and Neumeier (1996) reported that a minimum of 12 (26%) grizzly bears that were translocated between 1986 and 1995 returned to non-natural attractants either in Revelstoke (n=2) or other communities (n=10).

Moving Towards Becoming "Bear Smart"

Bear Stewardship Committee

A Bear Management Committee formed in 1996 continues to exist. The committee pulled together agencies that were directly involved in dealing with the problem of increasing bear problems that occurred after the landfill was electric fenced. Over time, the committee has consisted of representatives from the Columbia Shuswap Regional District, City of Revelstoke, Ministry of Environment, Ministry of Forests, Parks Canada, BC Hydro, Friends of Mount Revelstoke and Glacier National Parks, RCMP, Revelstoke Rod and Gun Club, and Save the Bears Committee (Robinson 2000).

Problem Analysis

The Revelstoke Bear Awareness program has worked on the development of an "urban bear habitat map" (Maltby 2000). This mapping has been used to set priorities for management actions and educational efforts and as a "tool for explaining risk factors associated with urban developments and recreational activities" (Maltby 2000).

Education

An intensive education campaign has been underway in Revelstoke since 1996 (Bennett 1996; Robinson 1997, 1998, 2000; Maltby 2000, Couturier 2002). The program educates residents about management of non-natural attractants in the community. Now called the "Revelstoke Bear Awareness Program," it operates under the guidance of a Bear Awareness Coordinator through the BC Conservation Foundation.

In 1996, a contractor was hired for six months to deliver a site-specific education program targeted at various groups within the community (Bennett 1996). Owners of vacant lots with fruit trees were contacted and permission was requested to allow volunteers to remove the trees. Furthermore, the contractor contacted bee-keepers in the area, questioned them about the extent of bear problems in their operations, and discussed possible solutions. Restaurants and food stores were also visited. The contractor also visited managers of restaurants and food stores to discuss options for making garbage receptacles bear-resistant. However, on subsequent checks, only two establishments had attempted to rectify their garbage management situation (Bennett 1996).

From 1996 through 2000, a variety of media campaigns were undertaken. The Ministry of Forests "Bear Aware" video was shown on the public cable network,

columns were printed in local magazines and newspapers, and announcements were broadcast on the local cable channel and radio. Bear Aware displays at farmer's markets and other local events were effective venues for getting out information on the Bear Aware program (Robinson 1998). In addition, the use of the Welcome Wagon to distribute Bear Aware brochures helped bring newcomers up to date with bear issues in the community (Robinson 1998), an approach that has also been useful in Nelson (Haas 2000). Many presentations were given to school classes over the years, focusing on proper management of non-natural attractants such as appropriate garbage storage. The Bear Aware program has a very high profile in the community: surveys indicate that 90% of the residents are aware of the program (Robinson 2000).

The Bear Management Committee and the Bear Awareness Coordinator have a good working relationship with the Conservation Officer Service, and the coordinator works closely with the C.O.S. as well as the bear biologists from Parks Canada to ensure correct information gets to the public and situations are dealt with quickly and properly.

Bear-Proofing and Attractant Management

Under the Bear Aware program, talks on bears and garbage were given to a number of community organizations, such as the Rotary Club and the Revelstoke Chamber of Commerce. A number of groups were contacted regarding donations towards the purchase of bear-resistant garbage receptacles for the community. School districts were also approached regarding their garbage bins, and one school began a fundraising campaign to purchase receptacles. Two bear-proof receptacles were purchased by Arrow Heights School due to the efforts of the Parent Advisory Council at the school (Robinson 1997). Two more bear-proof receptacles were purchased by City Council for two local parks in 1999.

An ongoing problem in Revelstoke is the improper use of commercial dumpsters by businesses. Dumpsters with locking lids are rarely secured, and bears can easily access the contents. Grease barrels are also kept outside and may attract bears (Maltby 2000, Couturier 2002).

Door-to-door campaigns have been used extensively in Revelstoke to educate residents about potential attractants near their homes (Robinson 1997, 1998, 2000; Maltby 2000, Couturier 2002). Residents who live within identified problem areas were visited and proper non-natural attractant procedures were discussed. Furthermore, residents living in areas in which the C.O.S. received bear complaints were contacted. "We are Bear Aware" window stickers were used to encourage participation by residents and businesses and a "Bear Aware Checklist" was distributed. The coordinators also attempted to help educate Revelstoke's visitors about bear attractants by ensuring that campgrounds had an adequate supply of pamphlets and encouraging campgrounds to earn "We are Bear Aware" window stickers.

Volunteers helped remove fruit trees in which the fruit was not being picked. A fruit tree registry was established, but support in its first year (Robinson 1999, 2000) was low.

Landfill

The landfill was electric-fenced in September 1994 in an effort to eliminate nonnatural food sources. The landfill primarily attracted grizzly bears and was operational for over 20 years. Prior to closure, some black bears were destroyed and 19 grizzly bears were translocated immediately after the installation of the fence (Proctor and Neumeier 1996).

The electric fencing appeared to be effective at eliminating bears from the landfill. After the installation of the electric fence, grizzly bears wore a path around the fence perimeter but none penetrated the fence. Fence performance was regularly monitored by a contractor (J. Marley, Margo Supplies, personal communication). Excluding bears from the landfill and a year with a poor crop of berries in mid-tolow elevations resulted in a number of bears moving into the community to seek out alternative food sources (Macpherson 1996).

Bylaws

Revelstoke put a bylaw amendment in place in 1996 to limit placement of garbage at the curb for pick-up to between 6 am and 7 pm on the day of collection. The bylaw only affects putting garbage on the street and not storing garbage on the property. Although many people are complying with the bylaw regarding placement of garbage at the curb, they are not storing garbage in a bear-proof manner on their own properties outside of these hours. This has been identified as a continuing problem in Revelstoke (Robinson 1998, Maltby 2000, Couturier 2002).

Discussion

Revelstoke's successes stem from a very committed Management Committee and overall support from the community. Revelstoke has had considerable success in implementing one of the most intensive education programs of any community and has documented its program with annual reports. Revelstoke is to be commended and used as a model for other communities. Revelstoke's detailed reports on its bear awareness education program are a good example of the value of these annual reports because they are being used by many other communities to establish their education programs.

Recommendations

While Revelstoke has made huge strides in its management of bear attractants, it still has a few issues that have to be dealt with. The following is a list of necessary actions.

- 1. Conduct a brief hazard assessment using the Preliminary Hazard Assessment guidelines. The "urban bear habitat mapping" will be a valuable tool for the assessment.
- 2. Conduct a committee review of the management strategies contained in this report, in particular, green space management, community planning strategies, waste management system, and monitoring system. Specific issues to address include those previously identified in annual bear awareness reports:
 - removal or continued harvesting of remaining fruit trees on private and public land (Robinson 2000; Maltby 2000, Couturier 2002),
 - bear-proofing of dumpsters at commercial establishments and apartments and mobile home parks (Robinson 2000, Couturier 2002),
 - an addition to the garbage bylaw that requires the use of bear-proof commercial dumpsters (Maltby 2000, Couturier 2002),
 - an addition to the garbage bylaw that requires storage of garbage and attractants in a bear-proof manner on residential properties (Maltby 2000, Couturier 2002),
 - More bear-proof containers are needed at schools, public parks and commercial campgrounds (Couturier 2002),
 - Bear-proofing of grease barrels has been an ongoing problem in Revelstoke that still needs to be addressed (Couturier 2002).
- 3. Complete a Human-Bear Conflict Management Plan to identify strategies and efforts that may be taken to address the recommended criteria.
- 4. Conduct detailed hazard assessments if deemed necessary by the Conservation Officer Service, bear committee, or Regional MWLAP office.
- 5. Produce annual reports as recommended in this report. Annual reports will also be helpful to other communities by documenting the bear-proofing process and the failures and successes of various management actions.
- 6. Continue monitoring human-bear conflicts and investigate and address conflict issues. Further development of the urban bear habitat map project should be encouraged because it shows considerable promise as a monitoring tool.

12.4 Mackenzie

The town of Mackenzie is located within the Sub-Boreal Spruce biogeoclimatic zone and has a population of approximately 6,000 people. The town site is situated along the Rocky Mountain Trench in an area of high habitat productivity for interior grizzly bear populations (BC MWLAP 1995a). Each year the C.O.S. has had

to deal with numerous complaints related to grizzly and black bears entering the town site.

Mackenzie is an example of the necessity of having a well-rounded and thorough strategy for dealing with "problem" bears prior to electric fencing of landfills. The town electric fenced its landfill (in 1995) but has not satisfied any other "Bear Smart" criteria in conjunction with this activity. Because of this, the number of bears destroyed has not declined as much as desired (Fig. 4). In 1997, one grizzly was destroyed in the town site and two were relocated. In 1999, one grizzly was destroyed in the town site and seven were relocated from the town site. Encouragingly, in 1996, 1998, and 2000 no grizzly bears had to be destroyed or relocated from the town site.

Moving Towards Becoming "Bear Smart"

Bear Stewardship Committee

No committee has been formed.

Problem Analysis

No Problem Analysis has been completed.



Figure 4. Numbers of bears destroyed in the Mackenzie District, 1992-2001. Note: graph shows bears destroyed for the entire district of Mackenzie, not just the town site of Mackenzie.

Education

In May 1992, the C.O.S. initiated an education campaign that targeted elementary schools and appeared in the local newspaper. The District Conservation Officer comments on the success of the education campaign:

By 1994, the volume of garbage being placed at the curb the night before pickup had dropped considerably. These improvements were emphasized in the ongoing education program. However, poor maintenance of commercial dumpsters was an ongoing concern (MacKay 1996:3).

The education campaign was intensified in 1995 to prepare the community for the implementation of the electric fence. Pamphlets were distributed to households, a mall display was erected, and the regional district hosted an open house. Despite education efforts, some residents did not remove their non-natural attractants, and no bylaws were in place that could enforce compliance.

Since the landfill closure, the C.O.S. has tried to continue its education program; however, the service does not have the manpower or finances to do a thorough or effective job in the long term.

Bear-Proofing and Attractant Management

In March 1995, before activating the electric fence at the landfill, the BC Ministry of Environment, Lands and Parks identified 15 locations in the community that were potential problems, suggested management actions, and requested bylaws and chains with locking hooks for commercial dumpsters. In September 1995, after several requests to the District of Mackenzie, some commercial dumpsters received locking hooks. However, problems with improperly stored garbage and grease continued at a number of these commercial dumpsters. Conservation Officers took it upon themselves to lock a number of dumpsters after business hours.

Non-natural attractants continued to be available within the community before and after fence activation at the landfill. Despite education efforts since 1992, some residents (about 30%) were found to have a number of non-natural bear attractants associated with their homes. The main attractants within the town were: improperly stored residential and commercial refuse, crab apple trees, mountain ash trees, moose carcasses hanging in sheds, and vegetation on the golf course (MacKay 1996).

In 2001, the town planned to purchase bear-proof commercial and residential waste containers to replace existing containers at various locations throughout the community. Curb side waste collection at homes will continue. However, as of May 2002, the town had not replaced existing containers. Once bear-proof

containers are in place, reducing other non-natural attractants will have to be addressed, such as crab-apple trees, mountain ash trees, the hanging of carcasses, and storing refuse on residential properties.

Landfill

The landfill was established 2 km from the town site of Mackenzie in the 1960s. Bears using the landfill were predominately grizzly bears (Murray 1991). In 1991, the BC Ministry of Environment, Lands and Parks commissioned a study to assess bear use of the landfill site, identify ways to reduce the number of negative human-bear encounters, and meet the goal of the new solid waste management plan for the province (Murray 1991). The study employed the use of a consultant to view the landfill from a tower and record bear use and behaviour. Twenty-nine grizzly bears (22 adults and seven cubs) were identified as permanent users of the landfill while another large, yet undetermined, transient population used the landfill in the fall. Use of the landfill by black bears was not identified (Murray 1991).

During the 1991 monitoring program, the contractor determined that a number of negative human-bear encounters were occurring at the landfill site. Each night, residents and tourists were observed viewing bears at the landfill. A number of visitors were found to view bears at dangerously close distances. Some people harassed bears, and even chased mothers and their cubs. Murray (1991) concluded that many Mackenzie residents did not respect bears.

Prior to the installation of the electric fence, resident landfill bears were dealt with through destruction (Figure 4) or translocation. The C.O.S. attempted "to remove as many full time resident bears as possible before the electric fence was erected" (MacKay 1996:4). The landfill electric fence was activated in April 1995.

The majority of translocations were found to be ineffective because most of the bears either returned to the town site or could not adapt to the new environment (MacKay 1996). For the transient population (i.e., those present in the fall), the level of garbage conditioning and human habituation was determined to be less than that of the resident population. It was believed that most transient bears would hit the fence, receive negative reinforcement, and continue on to their destination. Therefore, the transient population was not removed prior to installation of the electric fence.

In mid- to late August 1995, the population of transient grizzly bears came to the landfill site, patrolled the fence perimeter, and attempted to gain access to garbage by digging under the fence (MacKay 1996) or jumping over the gate (J. Marley, Margo Supplies, personal communication). By the end of August, a number of the transient bears entered the town, using the green belts and frequent areas of bush surrounding the town as cover. Complaints rose

substantially during September and October of 1995 to the highest ever recorded for the District. No serious encounters between humans and bears occurred.

Grizzly bears began using locations within the town that had not experienced problems prior to fencing of the landfill, and this resulted in many complaints (e.g., the golf course). Residents circulated a petition during the height of bear problems within the community claiming that the fence drove the bears into town. Some residents did not appear to make the association between their nonnatural attractants and bears within the town (MacKay 1996).

During the period of increased complaints, Mackenzie C.O.S. required additional staff to deal with the problem. Intercept trapping between the landfill and town was performed to reduce the number of incidents within town. In one 24-hour shift, six grizzly bears were removed from the town site. Peak grizzly bear activity within the town was found to occur from 2:00 a.m. to 5:00 a.m. (MacKay 1996).

The landfill is now bear-proof and is not being breached.

Bylaws

There are no bylaws in the community of Mackenzie that address management of non-natural food sources.

Discussion

The four year total (1992 to 1995) of bear management at Mackenzie cost the BC Ministry of Environment, Lands and Parks \$85,000 above normal C.O.S. fees incurred, of which reactive management (primarily destruction) in 1995 accounted for \$27,655,37.

After 1995, grizzly bear complaints did decrease (possibly due to the decrease in population from control measures) and only 11 grizzly bears have had to be killed or translocated since 1995. However, other problems within the community did not change much. The landfill was fenced, but non-natural attractants within the community still existed, and thus, so did problems with bears. Electric fencing a landfill site should be only one part of an overall community plan, especially in areas with a high population of conditioned bears. While the objective at Mackenzie was to "increase public safety by reducing potential contact between bears and humans," it is apparent from the number of bears destroyed that the welfare of the bears themselves was not part of the management decisions. Recently, the town council has been making strides towards bear-proofing the town. Hopefully these positive steps are supported and continue.

Recommendations

The town of Mackenzie needs to implement the following to become "Bear Smart."

- 1. Create a Bear Management Committee composed of members of the city council, C.O.S., Environmental Stewardship, Environment Protection, interested residents, and other stakeholders.
- 2. Conduct a committee review of the management strategies contained in this report, in particular, green space management, education program, waste management system, bylaws, community planning strategies, and monitoring system. The following are some specific recommendations.
 - The abundance of green space throughout town offers bears security cover. The preliminary hazard assessment should address the management of areas to decide if brushing is appropriate.
 - The town should create an additional agency responsible for delivering an ongoing bear education program.
 - Because Mackenzie is retaining curb-side collection, the town needs bylaws that deal with timing of curb-side garbage placement and storage of containers in a bear-proof manner at residences. In addition, bylaws should address other non-natural attractants such as fruit trees.
- 3. Complete a Human-Bear Conflict Management Plan to identify strategies and actions that may be taken to address the recommended criteria.
- 4. Conduct detailed hazard assessments if deemed necessary by the Conservation Officer Service, bear committee, or Regional MWLAP office.
- 5. Produce annual reports as recommended in this report. Annual reports will also be helpful to other communities by documenting the bear-proofing process and the failures or successes of various management actions.
- 6. Continue monitoring human-bear conflicts and investigate and address conflict issues.

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Appendix A: Animal Proof Criteria for Waste Containers

From Waste Control Bylaw No. 12-97, Town of Canmore:

- Tight lids to reduce odours.
- Lids must be self-closing.
- Latches for lids and bag removal must be bear-proof (i.e., claws unable to reach the latch trigger mechanism).
- Hinges and latches for lids must be sufficiently strong such that they can not be pried open by claws (able to withstand several thousand pounds of force). If it can be dismantled using a crowbar, it is not bear-proof.
- The container must be sufficiently stable or capable of being anchored to prevent tipping by large bears.
- Container material must be sufficiently strong to prevent bears chewing, battering or crushing the containers (i.e., able to withstand several thousand pounds of force).

While the use of bear-proof containers is essential, containers must be chosen that are user friendly or the public will not use them. Instructions need to be easy to understand for all people, including foreign visitors. Container doors must be light enough and low enough to allow use by children and the elderly (Black Bear Task Team 1998).

Appendix B: Electric Fencing of Landfills

Details from Jeff Marley, Margo Supplies Ltd. and Frazer McKenzie, Environmental Protection Compliance Officer, BC Ministry of Water, Land and Air Protection.

Properly designed, operated, and maintained electric fencing has been proven to be effective in preventing bears from gaining access to many sorts of non-natural attractants, including garbage, apiaries, and landfills. Electric fences are designed to deliver a strong enough shock to deter the animal from entering the enclosure. The first recommendation to fence landfills electrically in order to restrict bears' access to non-natural attractants occurred in 1913 in Yellowstone National Park (Harding 1987). In the 1930s, electric fencing was first implemented as a management tool to keep bears out of apiaries in California (Storer et al. 1938). Between the 1940s and 1960s, electric fencing went on to become a popular tool for domestic livestock control. Since then, electric fencing has been used consistently as a management tool to keep black bears and grizzly bears out of specific areas. The first electric fenced landfill site in Canada was in Jasper National Park in 1981. In 1991, Norman Wells was the first community to electric fence a landfill.

Voltage

The maximum amount of voltage output is determined by the unit's design and must be tested and approved by the Canadian Standards Association (CSA) and Underwriter Laboratories (UL). The output voltage can be as high as 12,000 volts, depending upon the total amount of resistance and how well the system is grounded. The minimum voltage needed to deter bears and all long-haired animals (e.g., raccoons and dogs) is generally accepted to be 6,000 volts. Black, grizzly, and polar bears all respond to the same voltage. Hairless animals, such as pigs, require substantially less voltage. Zoos and agricultural activities employ the same systems and use similar voltage levels to those recommended for bears.

Human Safety

An electric fence must hurt but not harm. Modern fence energizers can deliver the desired effect to bears while ensuring human safety during accidental human contact. The type of current used in electric fences must not be confused with the continuous alternating current (AC) electrical system that powers lights and tools. In standard household electrical systems of 120 volts AC at 60 cycles, the power is on continuously, causing the muscles to contract and only partially release, and making it very difficult to let go of the shock source. In electric fencing, high voltage is combined with low amperage in a pulsating charge at 60-65 pulses/minute. When a shock is experienced, there is an involuntary muscle contraction. The pulsating charge allows the person receiving the shock to let go of the wire during the 3/4-second time off. It is important to use smooth wire and

not barbed wire because it is possible for a person's clothing to get caught in the barbs.

Permanent vs. Portable Electric Fences

Permanent electric fencing can remain in place for a period of years and provide a more formidable structure than portable fences. Landfill sites are good candidates for permanent fences because bears are consistently attracted to these areas, which have a high lure value, and in most cases, the bears are already conditioned to the site.

Permanent structures require less maintenance than portable designs and will withstand environmental conditions (e.g., snow load) better than portable designs. In permanent designs, the hi-tensile wire may be tightened to 200 psi, which easily separates the animal's hair when the animal pushes against it and delivers a shock directly to the bear's hide.

Permanent fence designs are hi-tensile, multi-strand systems whose construction requires a specialized expertise and equipment. They are more expensive than portable designs, such as those used in apiary operations. However, it costs less to move a portable system than a new permanent structure.

Permanent Electric Fence Designs

Permanent electric fences are recommended for landfill sites and camps that will be occupied for longer than one year. Permanent bear-proof electric fences should meet the following specifications:

- eight strands of graduating height 12.5 gauge high-tensile galvanized wire (tightened to a minimum of 125 lbs. tension at 20°C),
- attached to fibreglass posts or wooden posts with insulators. Posts pounded into the ground rather than placed in pre-dug holes tend to be more stable (J. Marley, Margo Supplies, personal communication). Posts should be spaced a maximum of 7.5 m apart,
- the bottom wire should be 5 cm from the ground (no more than 10 cm); then, strands shall be alternating positive/negative at the following heights above soil surface: 20 cm, 35 cm, 50 cm, 70 cm, 90 cm, 110 cm, and 135 cm to the final positive wire, and
- the system is properly grounded with three 5/8" (16 mm) ground rods, buried 2-3 m deep and spaced at least 3 m apart, connected to the negative output terminal of the fence charger by ground clamps. Depending on local conditions, alternate methods are sometimes needed to ensure adequate delivery of electric current, such as the use of ground plates, or deeply driven larger diameter rods.

Alternating positive/negative wires insures that the animal will receive the electric current, even during dry periods. Also, the shock from touching both wires is intensified with this set up and localized to a specific part of the animal, resulting in a strong, negative experience.

The fence should be powered by either 1) a solar charged unit containing a built-in battery (battery operated), or 2) a connection to a regular electrical outlet (powerline input models). Powerline models tend to cost less and take more load (amperage) and are the preferred choice (J. Marley, Margo Supplies, personal communication). On-site monitoring of the fence's performance is indicated by either a built-in performance meter or flashing lights.

Aprons under Permanent Electric Fences

Digging has been a problem at some landfills after the installation of electric fencing. In some cases a chain link fence buried horizontally underground (known as an apron) in front of the electric fence has prevented animals from breaching the fence. Installing an apron at the same time as a permanent electric fence is installed is not recommended because digging up the ground to install the apron may make the soil unstable for the fence itself (J. Marley, Margo Supplies, personal communication). If there is proper maintenance of the fence (i.e., filling in holes, fence operating at full capacity) as soon as the fence is installed and turned on, digging should not become an issue. An apron should be considered only if digging persists. The installation of an apron significantly increases the cost of bear-proofing a landfill.

Portable Electric Fence Designs

There are two main types of portable electric fence designs used to deter bears: (1) positive systems and (2) alternating positive/negative systems. The portable positive system (light gauge/shock cord) normally consists of four strands of shock cord; 14 or 16-gauge wire stretched to 20 lbs of tension. The spacing of the positive wires from the ground up is 15 cm, 40 cm, 65 cm, and 90 cm. The bottom wire also aids in protecting the enclosure from animals such as skunks and racoons. This type of fence is most often used at apiaries, small camps, and in residential situations (e.g., to protect gardens, etc.).

In areas devoid of a good grounding plane (i.e., dry gravel) and where the control needed does not warrant a high-tensile fence, a portable (light-gauge wire) alternating positive/negative system is used. This system employs six wires spaced from the ground up at 5 cm negative, 20 cm positive, 40 cm negative, 60 cm positive, 85 cm negative, and 110 cm positive. Installation of this system does not require special equipment or tools.

For both fence designs, a wire apron mesh is recommended on extremely dry lands such as a gravel ridge devoid of green vegetation. This ensures good

grounding for the bear to receive the shock. Spreading calcium chloride on the ground around the fence can also increase grounding during dry periods.

Gates

The most effective models of electrified gates being installed are:

- two12-foot wide swing gates (24-foot opening) that are similar in design to the fence, with alternating positive and negative wires
- minimum voltage 6000 volts
- maximum gaps of 10 cm either side of gate panels, between panels, and between the gate and the ground

The frame of the gate is insulated, and the positive and negative gate wires are hard-wired to the fence. There is no hooking and unhooking with this design and no need for calcium chloride treatments. The drop latch mechanism is user friendly, and the risk of shock to humans appears to be minimal. Automatic cantilever gates, such as those used in Whistler, work well but are more costly. Depending on local bear behaviour, gates may need to be closed while vehicles are dumping garbage because bears may have learned to run in after vehicles drive in (J. Marley, Margo Supplies, personal communication). In other locations, gates may be left open during the day and only need to be closed at night.

Canadian Standards Association (CSA) Approval

All manufacturers of electric fence controllers must be registered with the CSA. Any device that is powered by 120 volts must have its circuitry tested and approved (Standard 22.2, document 103-M1983). The design features that CSA requires are:

- fence energizer must not have a time off (i.e., the time between pulses) less than 3/4 of a second or no more than 65 pulses per minute; and
- current (amps) output must be sufficient to push voltage but not cause fires or present a danger to animals or people.

The recommended fence chargers are 100% solid state units, with low impedance, programmable circuitry which is tested and approved by the CSA and UL. Open circuit voltage is 6000 to 10,000 volts. This high voltage presents no danger or hazards to humans. Similar systems are employed at zoos and in livestock areas where there is a requirement for animal control in close proximity to people.

CSA and UL standards are regulated by the industry itself and "policed" by the provincial power authority, BC Hydro. CSA approval is not required for units operating with voltage input (primary power) less than 48 volts nominal. Therefore, all six- and twelve-volt models do not require CSA. However, these units do require UL approval. There is no difference in voltage between permanent and temporary electric fences.
Fence Maintenance

An electric fence is only effective if it is well maintained. The perimeter of the fence should be walked routinely, preferably every day. Metal objects, vegetation, and build-up of blowing debris against the fence will cause the fence to short. Signs of bear activity must also be monitored. If bears are attempting to dig under the fence wire, all holes must be immediately filled and packed with a loader or bulldozer.

The voltage of the fence should be measured in several places and the results entered into a log book. Any drops in output voltage should be investigated and corrected immediately. The fence should be checked with a hand held digital meter at each side of all gates. Battery and off-season maintenance is also required.

The electric fence needs to be functional only during the non-denning season. This can be highly variable in different parts of British Columbia, especially in the area of a landfill, so local information will have to be collected to decide what these dates may be. The fence must be on whenever bears are active in the area of the landfill.

Appendix C: Potential Suppliers

The following companies state that they sell the items listed; however, the authors of this report have not tested their claims. They are listed in no order of preference.

Electric fencing of landfills

Jeff Marley Margo Supplies Ltd. P.O. Box 5400 High River, AB T1V 1M5 phone (403) 652-1932 fax (403) 652-3511 www.margosupplies.com

Bear-proof containers, dumpsters, waste management systems

Haul-All Equipment Systems 4115-18th Ave. North Lethbridge, AB phone 1-800-661-1162 fax (403) 328-9956 <u>www.haulall.com</u> contact: Dennis Neufeldt, President BC distributor: Rollins Machinery Ltd. 21869-56th Ave. RR13 Langley, BC V2Y 2W9 phone 1-800-665-9060 fax (604) 533-3820

Inground Waste Management Systems (containers, dumpsters)

Inground, or deep-collection, systems look like regular waste containers above ground but actually continue deep underground. This keeps the contents cool, reducing decay and odours, and greatly increases the length of time between waste collections (even up to only once a year). The system has a bag inside, and the contents are lifted with a truck-mounted lift system.

Sybertech Waste Reduction Ltd. (BC distributor for Alfa Products Inc.) 2284 Marshall Avenue Port Coquitlam, BC V3C 1M2 phone 1-888-888-7975 fax (250) 523-9699 www.equinox-industries.mb.ca contact: Rob Mitchell, President Molok North America (call for nearest distributor) 618 Main St. N. Mount Forest, ON N0G 2L0 phone 1-877-558-5576 fax (519) 323-9910 <u>www.molok.com</u> contact: Marja Loshkov, President

Commercial Bear-Proof dumpsters

Universal Handling Equipment Co. Ltd. 4024-39139 Hwy 2A Red Deer County, AB T4S 2A8 phone (403) 346-1233 fax (403) 340-8720

Worm Composters

All Things Organic 471 Pemberton Terrace Kamloops, BC phone/fax (250) 372-1835 www.allthingsorganic.com

Collection of Large Animal Carcasses (horses and cows)

Lower Mainland

Carson Stock Farm. Aldergrove. (604) 856-2414. Dargatz Mink Ranch Ltd. Chilliwack. (604) 795-7890. K-9 Products. Chilliwack. (604) 864-9322 or (604) 795-3640.

Outside Lower Mainland

McLeod's By-products Ltd. covers all of BC except the lower mainland and northeastern BC (250) 546-3046 for the local contact in your area. In most locations animals would have to be delivered to a truck by the owner.

Appendix D: Outline of Reports

Example Outline for Preliminary Hazard Assessment

Executive Summary

Introduction

• including rationale for the study and objectives.

Goals and Objectives

Study Area Description

• including general details about the community location, study area boundaries, biogeoclimatic zones, population of the community etc. that will put the results and discussion into context.

Methods

• methods used to for each component of the assessment.

Results and Discussion

 including, but not limited to, the results and discussion of known or potential bear movements and travel issues in the community, known or potential food habits of bears, known or potential habitat quality, visibility and other sensory issues, garbage and attractants issues, green space issues, high risk sites, areas, and trails, high risk natural food sites, history of human-bear conflicts, regional issues, interagency issues (i.e., areas outside the community that may potentially affect the behaviour of bears within the community), and data limitations.

Recommendations

• general recommendations, specific to the community, that will assist the community in becoming "Bear Smart" and are not in this background report should be included here. This section should include recommendations for: the bear awareness education program, securing garbage and attractants from bears, green space, bear incident reporting, data collection, interagency exchange of bear incident reports, management of "problem" people and "problem" bears (i.e., how can management of human-bear conflicts in the community be improved, other issues, interagency commitment to reduce human-bear conflict,

- identify gaps in knowledge, and
- recommendations for subsequent phases of hazard assessments.

Example Outline for Human-Bear Conflict Management Plan

The bear management plan should be developed based on the Preliminary Hazard Assessment, information collected by the Bear Stewardship Committee and the information in this report. The plan should include, but not be limited to, the following sections.

Introduction

Goals and Objectives

Responsibilities

• who is responsible for what parts of the plan?

Interagency Cooperation to Reduce Conflict

• how will agencies co-operate?

Human-Bear Conflict Education Program

• how the education program be delivered?

Bear-Proof Waste Management System

- how will waste management issues be addressed?
- what bear-proof structures will be used and what criteria will be used to select placement sites?
- how will carcasses be removed or disposed of?

Waste Management Bylaws

- what bylaws will be developed?
- how will bylaws be developed?

Green Space Management Strategies

• how will green space be managed?

Community Planning Strategies

- how will community development plans address human-bear conflict issues?
- how will ecosystems around the community manage for bears?

Human-Bear Conflict Monitoring System

- who will develop and maintain the monitoring system?
- how will bear observations and human-bear conflict be reported?

Annual Reports

- who is responsible for writing annual progress reports?
- what is the review processes?
- how will recommendations be review and selected for implementation?

Research Priorities

• what information is needed to manage human-bear conflict and what are their priorities?

Implementation Plan

• who will do what, when and how?

Program Budget

- what are the costs of various bear management strategies?
- make recommendations on a budget cycle to finance implementation of the plan.

Example Outline for Annual Progress Report for Education Programs

The following is an example of information to include, but should not be limited to, in a progress report. Other information that will assist in the future delivery of the program should also be included.

Introduction

Goals and Objectives

Methods

• including all methods used to disseminate information and methods used to monitor success.

Results and Discussion

• including a summary of staff and volunteer activities, number of households, businesses, and agencies visited, events attended, schools and students reached, media relations, identification of hazardous area, sites

and practices that were focused on, media relations, bear-proofing and elimination of attractants progress, and surveys, and

• the level of success achieved through various methods.

Recommendations

- recommendations for subsequent delivery of and improvement to the program delivery, and
- identify gaps in existing knowledge that are important to the continuing delivery of the program.

Appendices

- including media coverage, educational materials distributed, school program outline, and data collection and survey forms,
- program budget.

Example Outline for Annual Progress Reports for the "Bear Smart" Community Program

The annual progress report should include the following:

Introduction

Objectives

Methods

Summary of "Bear Smart" Committee Meeting

Progress Report and Results

- Preliminary Hazard Assessment
- Bear Education Program
- Waste Management System
- "Bear Smart" Bylaws
- Green Space Management System
- Community Planning Strategies
- Human-Bear Conflict Monitoring System, including map display of data collected

Discussion

• summary of annual progress, including the level of success achieved for various methods and strategies used.

Recommendations

- recommendations for continuation of or adaptation to strategies to resolve human-bear conflicts,
- research priorities, including recommendations for Detailed Hazard Assessments, and
- recommendations for continuing development and implementation of the "Bear Smart" Program.

Program Budget

- year completed program budget, and
- forecast budget for the upcoming year.



BEAR SMART

The <u>Provincial Bear Smart program</u> is based on a series of criteria that communities must achieve in order to be designated "Bear Smart". The responsibility of managing these conflicts rests with everyone and requires participation from the provincial and municipal governments, and local citizens to be successful.

Do you already know where the bear activity is in your community? Do you have bear- resistant garbage containers? Is there fencing around the local landfill? Is there some kind of bear education program in place? These are just a few of the ways that British Columbia communities are working towards achieving the Bear Smart criteria. The following is an outline of the six steps and where we are in the process:

1. Prepare a bear hazard assessment of the community and surrounding area.

October 2008 - NBA Bear Hazard Assessment Prince George, British Columbia is complete and available for download.

2. Prepare a human/bear conflict management plan that is designed to address the bear hazards and land-use conflicts identified in the previous step.

October 2009 - <u>Human-Bear Conflict Prevention Management Plan for Prince George, British Columbia</u> is complete and available for download.

3. Revise planning and decision-making documents to be consistent with the human/bear conflict management plan.

The City of Prince George 2011 <u>Official Community Plan (OCP)</u> includes bear smart policy direction for bylaws, education, development, and management to dissuade human/bear conflicts, and neighbourhood plans for new development areas reflect the ear smart OCP policy direction.

4. Implement a continuing education program, directed at all sectors of the community.

Ongoing since 2000. Northern Bear Awareness Society provides free presentations to schools and community groups. We also deliver brochures to homes and canvass door-to-door to provide advice on managing bear attractants in high bear-use areas. Regular media releases and interviews, garbage tagging, and attendance at public festivals and markets are some other ways that we continue to educate our community.

5. Develop and maintain a bear-resistant municipal solid waste management system.

Bear-resistant waste containers have been installed in parks and other public areas across the city. A pilot project of 300 bear-resistant garbage carts was implemented in 2019 in a high bear-use neighbourhood in the city, to assess the feasibility of broader usage of the carts. The Regional District of Fraser-Fort George landfill fencing and Solid Waste Management Plan reflect Bear Smart policies. There is still work to be done to satisfy this criterion.

6. Implement "Bear Smart" bylaws prohibiting the provision of food to bears as a result of intent, neglect or irresponsible management of attractants.





Bear Smart Logo (BC Government)

Where is Prince George in all of this?

Our community has already met a number of the Bear Smart Criteria. We have completed a bear hazard assessment of Prince George and surrounding area. We have also completed most aspects of criteria numbers 2 and 3. Prince George implemented a continuing education program in 2000, called Northern Bear Awareness. This program has been incredibly successful at reaching all sectors of the community.

Every year, the Northern Bear Awareness Society speaks to thousands of people about bear attractants, human-bear conflicts, and bear safety. This includes elementary school kids, secondary school students, and lots and lots of interested adults. We have also been officially endorsed by the Mayor and Council of Prince George when a resolution for a Bear Smart bylaw was passed on June 29, 2009. While Prince George isn't Bear Smart yet, it is something we are working on!

More than 20 communities in B.C. are actively pursuing Bear Smart status.

Congratulations to Kamloops, Squamish, Lions Bay, Whistler, Port Alberni, Naramata, New Denver, Coquitlam, Port Hardy, and Castlegar for achieving Bear Smart status!

Contact Us

NBASociety@gmail.com 778-281-BEAR (2327)

Join Us on Facebook

Bear Smart



Reporting Bear Activity

Improperly managed bear attractants such as garbage, bird feeders, and fruit trees should be reported to the City's Bylaws department:



Dial 311 or call 250-561-7600 or email <u>311@PrinceGeorge.ca</u>

Bears that are damaging property or posing a threat should be reported to the Conservation Officer Service:



Bear Hazard Assessment for Prince George, British Columbia

Application for Bear Smart Community Status Phase I

02 October 2008



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Previously conducted bear hazard assessments were provided by: M. Badry, Wildlife-Human Conflicts Strategy Coordinator, BC Ministry of Environment; G. Greenaway, Executive Director, Miistakis Institute; D. Wellwood, Raven Ecological Services; and, M. Paquet, consultant. D. Hodder provided information on black bear den sites in the UNBC John Prince Research Forest.

M. Anderson conducted a directed study under the supervision of Drs. R. Wheate and L. Ciarniello through the University of Northern British Columbia during the fall 2007 term. Her report, *Prince George Problem Bears: Corridors, Greenness and Attractants* formed the bases for a portion of the GIS work and analyses presented in this report.

"When we put our houses and cabins next to good bear habitat, the onus falls on us to learn how to live with bears." Chuck Schwartz, chief researcher with the federal Yellowstone Interagency Grizzly Bear Study team.

<u>Cover Photo</u>: Male black bear using cover adjacent to a roadway. Copyright[©] Lana M. Ciarniello.

Disclaimer

This document was prepared in accordance with the Bear Smart guidelines for conducting a Provincial bear hazard assessment (Davis et al. 2002) and uses expert knowledge and recent data to address the potential risk of human-bear conflict within the city of Prince George. Input was also provided by the Conservation Officer Service, Northern Bear Awareness Society members, University of Northern British Columbia staff, City staff, the public, and others. This report is based on the most accurate information available; however, *bears are wild animals that can occur anywhere in Prince George at any time and the author assumes no liability with respect to use and application of the information contained herein.*

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EXECUTIVE SUMMARY

The following *Bear Hazard Assessment for Prince George, British Columbia: Application for Bear Smart Community Status Phase I* is the first phase of a series of 6 steps required for Prince George to achieve Provincial Bear Smart Status as established by the BC Ministry of Environment (Davis et al. 2002):

Steps	Description of Activity	Completed for Prince George
1	Prepare a Bear Hazard Assessment using the criteria outlined.	
2	Prepare a bear-human conflict management plan designed to address the bear hazards and land-use conflicts identified in the hazard assessment.	In progress at time of report
3	*Revise planning and decision-making documents to be consistent with the bear-human conflict management plan.	
4	Implement a continuing education program directed at all sectors of the community.	
5	*Develop and maintain a bear-proof municipal solid waste management system.	
6	*Implement "Bear Smart" bylaws prohibiting the provision of food to bears as a result of intent, neglect, or irresponsible management of attractants.	

*Fulfillment of these steps requires partnership between the Northern Bear Awareness Society, the Conservation Officer Service, and the City of Prince George, which is currently being worked towards.

This document presents a problem analysis for the City of Prince George in which the results of the analyses will be used to form the basis for a management plan aimed at reducing the number of bears destroyed and preventing bear-human conflicts (Phase II of the Bear Smart requirements). The hazard assessment rates the probability of selected areas for creating problem bears and/or negative bear-human encounters and concludes by detailing bear hazards by select neighbourhoods, schools and Parks.

The reader is reminded that hazard ratings represent the likelihood of a bear becoming food conditioned and/or habituated to humans, which increases the probability of a negative bear-human encounter and/or destroying the bear(s). Hazard ratings <u>do not</u> represent the probability of simply encountering a bear but rather the hazards that exist for the development of 'problem' bears and the potential for a negative bear-human encounter. For example, one would have a greater likelihood of encountering a bear at Otway during spring and summer than on Ridgecrest Road in the Hart Highlands but the hazard associated with encountering a bear is rated higher for the residential area and lower for Otway. For more on methods for hazard ratings refer to Section 3.4.

Readers of this hazard assessment are asked to keep in mind these Notes of Caution:

• Bears are wild animals and can occur anywhere on the landbase at any time. Prince George is situated within prime interior bear habitat and all areas of the City have the potential to have a bear present. Therefore a 'problem' bear(s) could be present within an area assigned a rating of "low".

- Not all areas were surveyed due to budget limitations and the size of the City of Prince George. It is possible that some hazards were not identified.
- Field assessments were completed in 2008, which was also a year with abundant berry productivity and lower bear complaints (to date) than previous years. Bear sign within the City may not have been as prevalent had the field work been completed in a year with more bear complaints.

For further limitations to Please refer to Section 7.0 Potential Data Limitations.

Some selected report highlights include:

- Prince George is within bear habitat and lies at the confluence of 2 major rivers: the Nechako and the Fraser Rivers. The natural topography of the landscape funnels wildlife movement towards the "bowl." This means that bears will be a part of Prince George and surrounding areas.
- The focus of this report is to examine the hazards present for bears within the City and Regional District of Fraser Fort George in order to determine ways bears can fulfill their life requirements while also reducing the number of negative encounters for bears and humans.
- Prince George has one of the highest records of bear complaints and numbers of bears destroyed in the province.
- The premise behind achieving "Bear Smart" status is to move from reactive management of "problem" bear behaviour to applying a proactive approach.
- Achieving provincial Bear Smart status requires a commitment by the City of Prince George where the City must lead by example, for example by instituting a bylaw addressing the storage of garbage.
- Achieving provincial Bear Smart status requires an alliance between the City, the Regional District of Fraser Fort George, the Conservation Officer Service, and the Northern Bear Awareness Society.
- 2,124 bear occurrences ($\bar{x} = 531/yr$) were reported within City limits for 2004-2007 (4-years).
- The majority of bear reports were from densely populated neighbourhoods that backed onto large tracks to undeveloped land.
- Highest number of occurrence reports that persisted throughout the 4 years: (1) College Heights; (2) Charella Gardens; (3) Hart Highlands upper and lower, (particularly the Hoferkamp road and Inverness Trailer Park areas to the south Hart); and, (4) Foothills immediately west and east of the Nechako River Bridge / Moore's meadow.
- Bears sighted by the public were the most common occurrence reported followed by problems with garbage.

- After removing sightings and not recorded occurrences from the database, 68% of the remaining reports were due to garbage, 17% were bears attracted to fruit on trees, 13% were bears attracted to domestic items, and 2% were bears that had been injured or orphaned.
- Of the <u>non-natural attractant</u> categories by season: Spring bears feeding on garbage; summer garbage decreased and problems with fruit trees increased; and, fall problems with garbage increased to highest level of the 3 seasons, problems with fruit decreased slightly from summer but remained.
- Bear reports were highest in the fall, followed by the summer, and spring.
- 17 of approximately 50 elementary, middle and high schools (34%) in Prince George and surrounding area reported bears on or immediately adjacent to their property (2004-2007).
- ✤ All schools assessed had non-bear resistant garbage receptacles on their properties.
- A number of schools had vegetation overgrowing the fence line and poor lines of sight between the school and play area(s).
- The majority of schools with bears reported were within neighbourhoods identified as being primary areas with a history of bear reports, particularly College Heights and the Hart Highlands.
- ♦ 624 bears have been recorded destroyed within the city of Prince George and surrounding areas (1994-2007), with 135 (22%) destroyed in the last 4 years (2004-2007).
- ✤ The majority of bears destroyed were black bears (91% versus 9%).
- The discrepancy between the criteria used to destroy a bear and results from the database suggest a problem with the way Bear Occurrence Reports are recorded by the Conservation Officer Service.
- Highest number of bear deaths within the City by neighbourhood: College Heights and Charella Gardens to the south and Hoferkamp Road-Inverness Trailer Park in the lower Hart Highlands (3 areas).
- Clusters of bear destructions within the City appear to be related to green-spaces, and identified travel routes and movement corridors.
- Some residents of the Hart Highlands area believe the introduction of the automated system increased problems with bears and garbage in their neighbourhood, while the City claims it has reduced problems with bears.
- To date, the introduction of the automated residential garbage system does not appear to have reduced or increased bear complaints or destructions.
- Residential and commercial garbage was readily available to bears and was <u>not</u> being managed to reduce bear conflicts.
- The majority of Prince George residents appeared to keep their automated garbage cans in non-bear resistant locations.

- Some residents report switching to storing their garbage receptacle outside since the introduction of the automated system because they stated that they bin was "designed to be kept outdoors".
- Primary hazards associated with transfer stations were: (1) improper user compliance resulting in garbage being left outside the bins and/or bin lids left open; (2) insufficient frequency of emptying bins resulting in garbage overflowing (volume of garbage received was too large for the number of bins); (3) chain link perimeter of transfer stations (particularly those in remote areas) were not complete and/or gates were left open at night; and, (4) lack of proper bear aware user information signs.
- Improper management of fruit on trees, even in densely populated residential areas with numerous bear complaints such as the Hart Highlands, was noted and contributes to the conditioning of bears caught within or attracted to these areas.
- Natural bear foods were in abundant supply within the City due to clearing forested areas which increases the amount of light thereby allowing for the release of the shrub and herb layers.
- Numerous early seral habitats were present adjacent to residential areas due to clearing associated with the mountain pine beetle epidemic and these areas are expected to become more productive for berries for a period of years.
- The distribution of high-quality natural food resources, such as berry producing species, <u>will shift</u> in response to changes to the landbase.
- As Prince George continues to develop and expand the spatial distribution of bear problems/occurrence reports will also shift in response to shifts in distribution of natural bear foods and habitat loss.
- Access for bears to artificial food sources is greatly enhanced by the numerous green spaces within the urban areas such as the Varsity Creek corridor retained off of the Fraser River providing a network of trails through College Heights.
- The retention, connectivity and spatial layout of the green spaces within the City provide numerous travel corridors for bears and other wildlife. These green spaces provide access routes from the surrounding undeveloped landscape and ultimately act to filter wildlife into the urban areas. This is especially evident in College Heights and Charella Gardens.
- A number of the large and small parklands, such as Otway and Forests for the World, back onto large tracks of undeveloped habitat. This spatial structure of the landscape allows for bears to live near the City while the numerous non-natural attractants available in these periphery areas draws bears into the City and ultimately makes "problem" bears (i.e., food conditioned and human habituated).
- The most apparent issue for the high occurrence of bears reported and destroyed in the College Heights area was connectivity of the retained human-use trail network.
- The Hart Highlands and Foothills/Moore's Meadow areas contained abundant easily accessible garbage available from residential, commercial and City run sources.

- College Heights, Charella Gardens, Hart Highlands (north and south), and Hoferkamp Road/Aberdeen are a threat to both bears and humans and require immediate management and mitigation techniques to avoid negative encounters, food conditioning, and habituation of bears to humans.
- The University of Northern British Columbia backs onto undeveloped land and bear problems were reported. Garbage overflowed from student housing outside residence buildings and stories were reported of students throwing pizzas out windows to attract bears and watch them feed.
- Some bears may get caught in town where green-spaces end at residential areas or green-space configuration acts to filter bears into residential areas.
- Other bears likely live on the periphery of the City and slowly acquire conditioned behaviour in the outlying areas soon becoming attracted into urban Prince George where abundant residential and commercial garbage and fruit on trees were available.
- If not managed, the cycle of creating and destroying problem bears can result in population sinks where animals are attracted to areas that result in high mortality. Over time population level consequences for the surrounding areas may result.
- The association between humans and food can result in serious injury or even death of a person(s) as bears become bolder in their attempts to attain food rewards. To reduce this risk, available non-natural attractants within the City and Regional District areas must be appropriately managed.

1.0 INTRODUCTION

Prince George, BC, has one of the highest records of bear complaints and numbers of bears destroyed in the province. Black and grizzly bears inhabit areas surrounding Prince George, although black bears are more frequently encountered. In 1998, the Omineca Bear Human Conflict Committee (OBHCC) was formed by a group of concerned residents to address bear-human conflicts and bear destroyed within the city limits. In 2000, the OBHCC developed the Northern Bear Awareness Society (NBA) with the goal of promoting public awareness on issues such as bear behaviour and learning. The goal of the NBA, as overseen by the OBHCC, was to focus on reducing "problem" bear behaviour, human-bear conflicts, and the number of bears destroyed within the city of Prince George. Despite considerable efforts, such as working with the City to install bear resistant garbage containers in a number of parks, running a fruit exchange program, and continuous extensive public outreach programs, between 2004 and 2007, the number of bear complaints more than doubled and 135 bears were destroyed within the city of Prince George and surrounding areas. In 2006, the NBA refocused its efforts towards achieving Provincial Bear Smart Status for the City in an effort to further identify and examine ways to reduce the number of bears destroyed and the potential for negative bear-human conflicts.

Prince George is a rapidly expanding city located within bear habitat. The natural topography of the surrounding landscape tends to filter wildlife movement into a bowl area that is nestled within the confluence of 2 major river systems, the Fraser and Nechako Rivers. The resulting natural travel and movement corridors means bears will continue to inhabit areas surrounding the city and may occasionally wander through residential and commercial areas. Bears may be attracted to areas of human use as they forage, especially when non-natural attractants are available. Food rewards are often associated with nuisance behaviours as bears learn that available garbage and residential fruit trees provide abundant easily obtainable calories.

Current management of problem bears within the city of Prince George has focused on employing a reactive approach as evidence by the large numbers of bears destroyed within and adjacent to the city limits each year. The primary concern with employing a reactive approach is that it does not address the underlying cause of the problems but rather focuses on removing bears and alleviating immediate dangers and the potential for liability issues. However, by not addressing the development of problem bear behaviour the root cause of the problem remains; the constant and predictable availability of non-natural attractants throughout the City will continue to draw new bears into the area being quick to replace gaps where others have been destroyed. This leads to a predictable cycle of destroying bears and in extreme cases can cause what biologists term a population sink. The lure of easily obtainable calories through improper garbage and other non-natural attractant management effectively draws bears into the City from the surrounding areas with unknown consequences to the surrounding/source bear numbers.

The premise behind achieving "Bear Smart" status is to move from reactive management of "problem" bear behaviour to applying a proactive approach. Achieving a proactive approach requires the city of Prince George to dissuade bear-human interactions <u>before</u> they occur. Proactive management, then, is achieved largely through

managing human-provided attractants, particularly through restricting bear access to garbage (landfills, residential garbage bins, commercial bins, etc.), discouraging the planting of fruit trees, and encouraging proper management of gardens, bird feeders, pet food, composts, livestock calving areas, and livestock carcass removal before they encourage bears to develop "problem" behaviours. Achieving provincial Bear Smart status, then, requires a commitment on the part of the City of Prince George where the City must lead by example, for example by instituting bylaws pertaining to garbage collection and the planting fruit bearing trees.

1.1 Criteria for Phase 1 Hazard Assessment and Bear Smart Status:

The goal of this hazard assessment follows the Province of BC's Bear Smart guidelines for conducting a bear hazard assessment and is to "qualitatively and/or quantitatively identify existing and potential hazards in and around communities" (Davis et al. 2002:21). Specifically, there are 5 main criteria required to a Prepare a Phase 1 Bear Hazard Assessment of the community and surrounding area:

- 1. Identify high-use bear habitat by species (grizzly or black) in the community and surrounding area (travel corridors, natural food sources such as berry patches and salmon streams, breeding areas, denning areas, etc.)
- 2. Map non-natural attractants within the community and surrounding area that attract and/or are accessible to bears such as landfills, transfer stations, park and highway pull-out litter barrels, orchards, residential garage collection routes, downtown dumpsters, etc.
- 3. Review and map patterns of historic bear-human conflicts based on complaint records to assist with the identification of bear hazards.
- 4. Map human-use areas that may conflict with bear habitat such as school yards and residential areas located adjacent to heavy bush, walking trails that pass through berry patches, etc.
- 5. Using the above information, identify and map existing and potential bear hazards. The hazards should be mapped with a ranking scheme of high/moderate/low.

Once the Bear Hazard assessment has been completed for the community and surrounding area, there are 5 main criteria that communities must follow to be designated as Bear Smart:

Remaining criteria for communities to be designated as Bear Smart:

- 1. Prepare a bear/human conflict management plan that is designed to address the bear hazards and land-use conflicts identified in the hazard assessment.
- 2. Revise planning and decision-making documents to be consistent with the bear/human conflict management plan.
- 3. Implement a continuing education program, directed at all sectors of the community.
- 4. Develop and maintain a bear-proof municipal solid waste management system.

- 5. Implement "Bear Smart" bylaws prohibiting the provision of food to bears as a result of intent, neglect, or irresponsible management of attractants.
- (The above criteria are from: <u>http://www.env.gov.bc.ca/wld/bearsmart/bearsmintro.html</u> [accessed May 28, 2007] and Davis et al. 2002).

1.2 Report Objectives:

The overall objective of a Phase 1 Bear Hazard Assessment as stated by the Provincial Bear Smart program is to identify "the current and potential agents of human-bear conflict that occur within the community" (Davis et al. 2002:21). This requires establishing a community-specific profile as it relates to bears, humans, and bear-human conflicts (Davis et al. 2002).

The objectives of this bear hazard assessment are to present a problem analysis specific to Prince George determined by:

- 1. Reviewing and mapping patterns of past bear-human conflicts based on Problem Wildlife Occurrence Reports for bears and/or Conservation Officer experience;
- 2. Interviewing personnel from the Conservation Officer Service, local wildlife biologists and other biologists that have worked in the area to assess:
 - sites, areas, and trails that are considered high risk for human-bear conflict, and
 - practices that are considered high risk for human-bear conflict.
- 3. Examining non-natural attractants that are available within the City, such as:
 - landfills and transfer stations
 - park and highway pull-out litter barrels
 - residential and commercial garbage containment
 - orchards, honeybee colonies, and ranching and agricultural attractants
- 4. Identifying bear routes and travel corridors, including:
 - major non-natural features that may influence the travel patterns of bears (major roads, edges of the community, and security cover/green space within the community)
 - natural movement patterns of bears in the area (including travel corridors)
- 5. Identifying general bear habitat suitability within and adjacent to the City.
- 6. Identifying human-use areas that have high risk for conflict with bears (schools, playgrounds, community campgrounds, and residential areas located adjacent to bear habitat).
- 7. Identifying regional, inter-provincial and/or international issues in areas outside the community that may affect the effectiveness of the "Bear Smart" program.
- 8. Providing ranks of hazards as identified above (high/moderate/low); and,
- 9. Presenting potential data limitations.

These objectives have been modified from the Provincial Bear Smart document (Davis et al. 2002).

2.0 STUDY AREA

The city of Prince George lies at the confluence of the Fraser and Nechako Rivers in central British Columbia, Canada $(53^{\circ}53^{\circ}N, 122^{\circ}47^{\circ}W)$ (Figure 1). Prince George has often been referred to as the capital of the north partly because it is home to the primary pulp and paper processing mills for the northern timber industry, a rail line used to access Prince Rupert or Vancouver, the University of Northern British Columbia, and numerous large department stores and restaurants. Approximately 77,000 people live within the city and surrounding area. The average elevation is 575 metres (1,886 ft) above sea level. Yearly precipitation averages 36.5 cm (14.4") rainfall and 166 cm (5.5') snowfall. The average temperature is $16^{\circ}C$ (60F) for July and $-5^{\circ}C$ (22.5 F) in January.

Prince George is located in the sub-boreal spruce (SBS) biogeoclimatic zone within 3 major subzones: dw3 (dry warm), mk1 (moist mild), and mh (moist hot) (DeLong et al. 1993). Most forests are a mix of white spruce (*Picea glauca*), pine (*Pinus contorta*), and subalpine fir (*P. engelmannii*). The dominant climax tree species is a mix of hybrid white spruce and subalpine fir (*P. engelmannii x glauca*) or pine stands. Black spruce (*Picea mariana*) bogs occur in lower elevation wet areas and commonly include willows (*Salix* spp.), scrub birch (Betula glandulosa), and sedges (*Carex* spp.). Interior Douglas-fir (*Pseudotsuga menziesii*) occurs on dry, warm sites (Meidinger and Pojar 1991). Aspen (*Populus tremuloides*), cottonwood (*Populus balsamifera*), and paper birch (*Betula papyrifera*) are present within these forests, especially along riparian areas and in areas disturbed by logging or wildfires.

The city and surrounding area is home to black bears and some transient grizzly bears. Radiocollared grizzly bears have been documented to use the Salmon Valley, Nukko Lake, Chief Lake, Nechako Bench, Lower Mud River areas, and Foothills landfill (Ciarniello unpublished data). Grizzly bear den sites have been located in the Salmon Valley and Pilot mountain areas (Ciarniello 2005). Because Prince George lies at the confluence of 2 major rivers, the Nechako and the Fraser, it is likely that the lay of the land contributes to a natural movement corridor for bears.

Figure 1. Location of Prince George, British Columbia, Canada.



*Canada and BC image were obtained and modified from various web sites.

3.0 METHODS

3.1 Conservation Officer Service Bear Occurrence Reports

Areas with high potential for human-bear conflict were identified through mapping Conservation Officer Bear Occurrence reports, 2004-2007, obtained from the BC Ministry of Environment, Conservation Officer Service (Prince George, BC). These reports indicate complaints received by the public and bears destroyed by the RCMP, COS, or the public. COS reports were limited to the years 2004-2007 because of significant changes to the City of Prince George's landbase, primarily resulting from the introduction of large department stores to the College Heights area, expanding residential dwellings, and extensive land-clearing as a result of infestations of the mountain pine beetle. Therefore, complaints received prior to 2004 were not felt to be representative of the current state of the landbase. For those interested, the Northern Bear Awareness organization provides maps detailing bear occurrence reports from 1999 to present (http://www.northernbearawareness.com/index_files/Page400.htm).

The reader is cautioned that bear occurrence reports represent those areas where bears are reported sighted and are therefore are not necessarily representative of bear use of the city of Prince George and surrounding area. For example, bear numbers are likely higher in adjacent pristine or lightly developed areas but bears are also less likely to be sighted or reported in these areas. Furthermore, rural residents appear to be less likely to report bears unless there is a direct threat to persons or property than urban residents. An additional reminder when viewing these data is that bears may be sighted multiple times by different people resulting in more than one report of the same animal to the COS. Bear occurrence reports should not be used to estimate the number of bears using an area but may provide insight into potential problem neighbourhoods.

Databases were visually searched and a preliminary list of 21 attractants types was developed. Fifteen of the 21 attractant types represented only 140 of 1,247 complaints received (11 %), and therefore were pooled for analysis purposes into 5 primary attractant categories: (1) domestic attractants which included apiary, BBQ, bird feeders, carcass, cookhouse, crops, freezers, hunter kills, and livestock; (2) fruit trees including gardens; (3) garbage; (4) sightings including bears feeding on vegetation, bears along the road, bear-dog interactions; and, (5) unrecorded. Comparison of attractant types between years was calculated using a Mann-Whitney U-test with a significance level of $\alpha = 0.05$.

3.2 Geographic Information Systems

Bear occurrence reports and locations where bears were destroyed were plotted using ArcMapTM 9.2 (ESRITM, ArcGIS version 9.2, Environmental Systems Research Institute, Inc., Redlands, California). Plotting the UTM locations identified clusters of bear occurrences. In an attempt to identify the root cause(s) of complaints the description of each occurrence report was reviewed and the attractant type noted, such as commercial establishments, accessible garbage, topographical features and the like. Although reports and destructions in the outlying areas were examined most data presented were restricted to within the city boundaries omitting outlying areas. Plotting of the bear report locations on LandSatTM images were also used to examine how bears may be moving through and around Prince George.

3.3 Literature Review and Interviews

Previous research, information, and reports on black and/or grizzly bears for Prince George and Regional District of Fraser-Fort George include:

Northern Bear Awareness Society / Omineca Bear-Human Conflict Committee (1998 to present)

- Primary contact: Sandra Nahornoff
- Board of volunteer members
- Students hired yearly through the BC Conservation Corps.
- Extensive public education initiatives (schools, camps, radio, TV, newspaper)
- Year end reports available
- Public Surveys on Prince George resident attitude towards bears
- Web site: http://www.northernbearawareness.com/

Parsnip Grizzly Bear Project (1998 – 2004)

- Primary contact: Dr. L. Ciarniello
- 59 radiocollared grizzly bears
- Only major research project on radiocollared grizzly bears that had been conducted within and adjacent to Prince George
- Combination of GPS and VHF telemetry
- Provides bear food species list
- Provides bear use of habitat types and biogeoclimatic zones
- Yearly progress reports and study end report
- PhD thesis
- 5 peer-reviewed journal publications available
- Web Site: http://web.unbc.ca/parsnip-grizzly/index.html

Peace-Williston Compensation Program (2000 - 2003)

- Primary contact: M. Wood
- 12 radiocollared grizzly bears
- Combination of VHF and GPS telemetry
- Grizzly bear response to the scheduled closure of the McLeod Lake in 2001
- One progress report available (2000)
- Web Site: http://www.bchydro.com/pwcp/index.html

University of Northern British Columbia

- 1. John Prince Research Station black bear den site study (2005): Evaluating specific ecological conditions around three types of American black bear dens in central British Columbia.
- Primary Contact: D. Hodder & R. Rea
- Black bears incidentally encountered den sites
- Web Site: http://researchforest.unbc.ca/jprf/jprf.htm
- 2. Directed study 4th year: student M. Anderson, title, Prince George problem bears: corridors, greenness and attractants (2007).

Numerous correspondences with Conservation Officer, G. Van Spengen were used to assess problem bear reports, problem areas, and potential access routes. Further individuals contacted included: D. Heard and D. Wilson of the Prince George Ministry of Environment; T. Hamilton of the Victoria Ministry of Environment; Marten Geertsema. BC Ministry of Forests; D. Hodder of the University of Northern British Columbia John Prince Research Forest; Sean LeBrun City Parks and Solid Waste Services; members of the Northern Bear Awareness Board of Directors; attendants present when transfer sites were visited, such as Shelly, Chief Lake, Pine View and Foothills landfill; and, any opportunistic discussions with residents regarding garbage disposal in their neighbourhoods, problems with fruit on trees, and bears in their neighbourhoods.

3.4 Hazard Ratings

Hazard ratings were determined based on the potential for a negative bear-human encounter. Areas with higher bear occurrence reports were rated higher than those with lower or no reports. Further, areas with bear problems within the city limits were rated higher than those outside or adjacent to city limit boundaries because of the increased amount of undeveloped landbase available to bears with farm land or large country acreages. Criteria evaluated included: (1) number of bear occurrence reports; (2) number of multi-year bear occurrence reports; (3) proximity to non-natural attractants, primarily garbage and fruit; (4) proximity to high-density city dwellings; (5) proximity to green spaces and travel corridors (natural topographical features and created green spaces); and, (6) proximity to schools.

Problem neighbourhoods identified through GIS applications were evaluated for their seasonal habitat potential, travel route capability, cover/visibility and sensory attributes, accessibility of non-natural attractants, and proximity to schools and known child-care facilities. The resulting subset of neighbourhoods with a high 'cluster' of bear occurrence reports were field visited to allow for a more quantitative assessments of site specific hazards and development of management recommendations. Ground visits were not feasible for all neighbourhoods due to funding and time constraints. Ground sampling was conducted by hiking, driving, bicycling or all terrain vehicle around previously identified neighbourhoods.

High risk areas that received on-site assessments included:

- Schools with known bear sightings or occurrences reported;
- Greenbelt trails within the city (identify representative habitat types, cover and security values, and available food items). Focus was placed on greenbelts in the lower College Heights and Hart Highland areas.
- Transfer stations and the Foothills landfill; and,
- Potential movement corridors along the Nechako and Fraser Rivers, focusing on those pass through parks, such as Cottonwood Park.

Field assessment ratings were used to examine the suitability of the habitat to support bears and were based on the amount of natural food sources, adjacent habitat, evidence of past and present bear activity, and availability of non-natural attractants. Areas were evaluated for the connectivity to continuous habitat, amount of security cover present, and amount and season(s) of bear foods present. Typically, areas rated as high contained: (1) connectivity with larger undeveloped areas; (2) a high abundance of bear foods; (3) a variety of bear foods across multiple seasons; and, (4) available non-natural attractants. Data recorded included evidence of bear activity, cover or line-of-sight, UTM coordinates, and lists of potential bear foods and non-natural attractants. Photographs were used to document sites.

4.0 RESULTS

4.1 WHY ARE BEARS ATTRACTED TO PRINCE GEORGE?

Bears are not attracted to Prince George rather Prince George is within bear habitat. Prince George lies at the confluence of 2 major rivers: the Nechako and the Fraser Rivers. The natural topography of the landscape funnels wildlife movement downwards towards the valley/bowl. The Fraser River allows for North-South (and vice versa) movement of bears, whereas the Nechako allows for East-West (vice-versa) movements. Due to the placement of Prince George both movement corridors ultimately pass through the City. The slope of the land and the confluence of these 2 major rivers contribute to the increased likelihood that bears naturally travel through the Prince George area. Once within the city, there are a number of moderate to high quality bear habitats available to bears, such as riparian areas along rivers' edges, parks, green spaces, and undeveloped tracts of land. The Sub-Boreal-Spruce Biogeoclimatic Zone contains a variety of bear foods for spring and summer easons (Table 1). The availability of bear foods combined with large tracts of undeveloped land surrounding the City allow for a permanent population of bears within and immediately adjacent to the City limits.

In the spring bears primarily forage on emergent shoots of vegetation such as grasses (graminoids), dandelions (leaves, flower heads, and roots), fireweed (green portion tops of small plants), horsetails, cow parsnip, pea vines, and clovers (Table 1). The first areas to become available to bears in the spring (i.e., green-up) are normally wet (hygric) areas, such as bogs, fens and riparian habitats. These habitats tend to be lowlying occurring in valley bottoms. During the spring season bears increase their movements likely in search of winter carrion and available green vegetation, while large May-June movements tend to be influenced by breeding opportunities. Typically, the lower elevation of the bowl area becomes snow-free earlier in spring thereby providing better foraging opportunities than higher elevations. Bears will switch to feeding on berries as soon as they are available, which is primarily during the summer. Berries are an easier source of calories for bears than green vegetation and bears capitalize on calorie-rich forage at any opportunity. In the fall, bears continue to feed on berries but once again supplement their diet with increased amounts of green vegetation, especially as the availability of berries decreases. Bears will feed on meat or carcasses whenever available because they are the highest source of nutrition.

		Seasonal Use Intensity		
Latin Name	Common Name	Spring	Summer	Fall
Trees		~prg		
Populus tremuloides	Trembling aspen	High		
Shrubs, herbs and dwarf s	hrubs	Low	High	Medium
¹ Amelanchier alnifolia	Saskatoon		High	Medium
¹ Arctostaphylos uva-ursi	Kinnikinnik	Low-medium	8	
¹ Cornus stolonifera	Red-osier dogwood		High	Medium
Empetrum nigrum	Crowberry	Low	Medium	Low
¹ Lonicera involucrata	Bracted honevsuckle		High	Low
¹ Oploplanax horridus	Devil's club		High	Low-med.
¹ <i>Ribes lacustre</i>	Bristly black currant		Medium	Medium
Ribes oxvcantholdes	Wild gooseberry		Low	Low
¹ Rosa acicularis	Prickly rose	Low		Low-med.
Rubus idaeus	Wild red raspberry		Low	Low
¹ Rubus parviflorus	Thimbleberry		Medium	Low
Salix spp.	Willow	Low	Low	
Sambucus racomosa	Red elderberry	2011	Low	Low
Sumo wells recomosa	Canada buffalo-berry or soap		2011	2011
¹ Shepherdia canadensis	berry		High	Medium
Sorbus scopulina	Western mountain ash		Medium	Low
Sorbus sitchens	Sitka mountain ash		Medium	Low
¹ Vaccinium caespitosum	Dwarf blueberry		High	Medium
¹ Vaccinium membranaceum	Black huckleberry		High	Medium
¹ Vaccinium myrtilloides	Velvet-leaved blueberry		High	Medium
Vaccinium ovafolium	Oval-leaved blueberry		High	Medium
Vaccinium oxycoccos	Bog cranberry	Low	Medium	Low
Vaccinium scoparium	Grouse-berry			Low
Vaccinium uliginosum	Bog blueberry		Low	
Vaccinium vitis-idaea	Lingonberry		Low	Low
¹ Viburnum edule	Highbush cranberry		High	Medium
Forbes		High	Medium	Low
Angelica arguta	White angelica	Low	Low	
Aster spp.	Aster species	Medium	Low	Low
Astragalus spp.	Milk vetch	Medium		Medium
Caltha leptosepala	Alpine white marsh marigold		Low	
Epilobium angustifolium	Fireweed	High	Low	
Epilobium ciliatum	Purple-leaved willowherb	Low		
¹ Eauisetum arvense	Common horsetail	High	Medium	
¹ Equisetum pratense	Meadow horsetail	Medium	Medium	
Erythronium grandiflorum	Glacier lily	High	High	Low
Fragaria virginiana	Wild strawberry	8	Low	
¹ Heracleum lanatum	Cow parsnip	High	Medium	Low
Hieracium albiflorum	White-flowered hawkweed	Low		2011
Lathyrus ochroleucus	Creamy pea vine	Low		Low
Lysichiton americanum	Skunk cabbage		Low	

Table 1. Bear foods that commonly occur throughout the city of Prince George and in the SBS biogeoclimatic zone. This table is modified from Ciarniello et al. (2003).

		Seasonal Use Intensity		
Latin Name	Common Name	Spring	Summer	Fall
Menyanthes trifoliata	Buckbean	Medium		
² Osmorhiza species	Sweet cicely	Low		High
Pedicularis bracteosa	Bracted lousewort	High	Low	
Petasites sagittatus	Arrow-leaved coltsfoot	Low		
Potentilla palustris	Mash Cinquefoil	Medium	Low	
Rubus pubescens	Dewberry		Low	
Senecio triangularis	Arrow-leaved groundsel		Low	
Streptopus amplexifolius	Twisted-stalk	Low	Medium	Low
¹ Taraxacum officinale	Common dandelion	High	Low	Medium
¹ Trifolium repens	White clover	High	High	Low
¹ Trifolium pratense	Red clover	High	Medium	Low
Urtica dioica	Stinging nettle	Medium	Low	
Ferns		Medium	None	None
¹ Athyrium filix-femina	Lady Fern	Medium		
Dryopteris		_		
expansa/assimilis	Spiny wood fern	Low		
Matteucia struthiopteris	Ostrich fern	Medium		
Gramminoids		High	Medium	Low
Bromus species	Bromes	High	Low	
Carex species	Sedges	Medium		
Deschampsia caespitosa	Tufted hair grass	Low	Low	
Poa species	Bluegrass species	High	Medium	
Trisetum spicatum	Spike trisetum	Low		
Other Sources				
Formicidae	Ants	Low	High	Low
Vespidae	Wasps		Low	
Ungulate/bear	Carcasses	High	Low	High
Alces alces	Moose (adult & calf)	High	Low	Medium
Ursus arctos	Grizzly bear	Opportunistic	Low	
Ursus americanus	Black bear	Opportunistic		Low
Castomomus commersoni	Common white sucker	Low		
Castor canadensis	Beaver	Medium		
Human Influenced Foods				
Alfalfa		Medium	Low	
Carcasses	Ungulate	Opportunistic		
Domestic cow	Carcass	Opportunistic		Low
Fruit trees (planted)		Low	High	High
Garbage		High	Medium	High
Gut piles	Ungulate	Opportunistic		Medium
Oats	~	••	Medium	High

¹Common plants of the SBS zone ²Primarily digging by grizzly bears.

There are likely 2 types of black bears in Prince George: residents and transients. The large areas of undeveloped land surrounding, for example, Forests for the World and adjacent areas are large enough to contain the home ranges of a few resident black bears, particularly females. Transient bears are those that are using the river systems and movement corridors to travel north-south or east-west through the City in search of breeding opportunities, seasonal food resources, and/or their own home range (i.e., recently dispersed subadult males). Research suggests that grizzly bears are transient to the City area largely due to their large home range sizes (Ciarniello et al. 2003). Resident and transient bears may become attracted to certain areas of the City because of the readily available and abundant non-natural attractants, such as garbage and ripe fruit on trees. The potential for creating problem bears, and therefore for negative bear-human encounters within the City, is greatest due to the availability of these attractants.

4.1.1 Habitat Characteristics of Black and Grizzly Bear Den Sites in Prince George

One black bear den site has been reported within the City limits across from the penitentiary (M. Geertsema pers. comm.) and it is highly probable that more bears den within the City. The City contains habitat characteristics suitable for den sites (Table 2). Both grizzly bear and black bear den sites have been investigated adjacent to the City limits. Grizzly bear den sites have been located in the Salmon Valley, Nukko Lake, and Pilot Mountain areas (Ciarniello et al. 2003). Two of these dens were excavated into the side of small slopes while 1 was under the cut stump of a Douglas fir tree (Photo 1, Ciarniello et al. unpublished). Black bear den sites have been located in the Saxton Lake area (M. Geertsema pers. comm..) and UNBC's John Prince Research Forest (D. Hodder pers. comm.). Hodder et al. (2005) provide characteristics of black bear den sites located in the SBS dw3 and mk1 that could be used to predict areas suitable for black bear den site areas within the City limits (Table 2).

Photograph 1. Den site used by a radiocollared grizzly bear under the root of a cut Douglas fir tree in the Pilot mountain area of Prince George, BC.



Note: Out of 86 den sites located on the Parsnip Grizzly Bear Project was the only den located under a cut stump and is considered atypical. Photo ©: Lana M. Ciarniello **Table 2**. Characteristics of black bear den sites in the John Prince Research Forest in

 Central British Columbia as identified by Hodder et al. (2005).

Den site	en site Den Types		
Characteristics	Excavated	¹ Tree hole	Rock cavities
Aspect	various	various	various
Slope	mid to upper	valley bottoms	mid to upper
Soils	sandy, loamy minor	sandy soils (alluvial	exposed bedrock &
	clay	floodplains)	boulder piles
	well drained	wet	very dry
Moisture regime	mesic	hygric	xeric

¹Requires large DBH trees, mainly cottonwoods.

<u>4.2 HISTORY OF BEAR SIGHTINGS AND OCCURRENCE REPORTS</u>

<u>4.2.1 Bear occurrence reports by neighborhood</u>

From 2004-2007, 2,124 bear occurrences were reported within the City limits to the Prince George COS (n [2004] = 204, n [2005] = 490], n [2006] = 553, n [2007] = 877). Areas with the highest number of bear occurrence reports were Hart Highlands, Charella Gardens, College Heights, and west Foothills areas (Figure 2). The majority of bear reports were from areas along the boundaries of urban development, particularly the western boundary (Fig. 2). These areas contained urban dwellings that tend to back onto largely undeveloped bear habitat. Few reports occurred in "sparsely-populated areas like Blackburn and Cranbrook Hill, despite abundant bear habitat" (Anderson 2007). Areas such as Hoferkamp road and west Nechako bench have a higher probability of grizzly bear occupancy because they back onto undeveloped tracks of land and are adjacent to river corridors. With the exception of 2007, few complaints were reported within the bowl area where intensive urban development occurs.

Anderson (2007) used a kernel analysis to identify "hotspots" of bear occurrences throughout the city. Her analysis revealed the following primary occurrence locations for 2004: North Hart Highlands, Hoferkamp road, College Heights, and the Fort George Park; in 2005: Hart Highway at Northwood Pulp Mill Road, Noranda Road Charella Gardens, College Heights trailer park, and west Foothills at the Nechako River; in 2006: Hart Highlands, Hoferkamp road, College Heights, Charella Gardens, Lafreniere, and Foothills at the Nechako River (Anderson 2007). 2007 had higher occurrence reports than previous years but a similar distribution; however, more occurrences were reported downtown and on the periphery of City, which can be expected as development rapidly expands into forested areas.

The primary cluster areas with a history of bear reports that persisted throughout the 4 years were:

- College Heights
- Charella Gardens
- Hart Highlands upper and lower, particularly Hoferkamp road and Inverness Trailer Park areas in the south Hart
- Foothills west and east of the Nechako River Bridge / Moore's meadow, and
- Outskirts/periphery of the City

Figure 2. Bear sightings for the city of Prince George, BC, 2004-2007. Notice how each year sightings clustered along the outskirts of town and in specific neighbourhoods, such as the Hart Highlands, College Heights, and Charella Gardens (yellow dashed lines).



Plotting occurrence reports to identify clusters areas aids in targeting management actions, such as where to focus the installation of latches for the automated garbage collection system.
4.2.2 Bear Occurrence Reports by Attractant Category

Bear occurrence reports provided by the public listed 21 activities of the bear at the time of the report. These 21 activities have been combined into 5 primary categories (Table 3).

Table 3. List of attractant categories recorded by the COS for the city of Prince George, 2004-2007. The category column represents the combined category the attractant was placed within for analysis purposes. An * indicates attractants reported for grizzly bears as well as black bears.

Original Activity Reported	No. Reports	Combined Activity Category
Apiary	1	(domestic attractant)
BBQ	4	(domestic attractant)
*Bird feeders	63	(domestic attractant)
Carcass	1	(domestic attractant)
Compost	10	(domestic attractant)
Cookhouse	1	(domestic attractant)
Crops	2	(domestic attractant)
*Dog	12	(sighting)
Freezer	4	(domestic attractant)
*Fruit trees	129	
Fruit trees & secondary reason	5	(fruit trees)
*Garden	11	(fruit trees)
*Garbage	538	
Garbage & secondary reason	42	(garbage)
*Hunter kills	3	(domestic attractant)
*Injured/orphaned	21	(2007 only)
*Livestock & livestock feed	15	(domestic attractant)
*Pet food or pets	5	(domestic attractant)
Pool	1	(domestic attractant)
Road	49	(sighting)
*Sighting	682	
Vegetation	36	(sighting)
*Not recorded	489	
Total	2124	

*Also recorded for grizzly bears.

In 2007, 52% of calls to the COS centre lacked information on an attractant type or sighting (Table 4). For 2004-2006, reports of attractant types between years were consistent and variation between years was not significant (P = 0.95). The highest bear occurrences for those years were bears reported "sighted" by the public, which included bears feeding on vegetation or sighted along roadsides. The next highest recorded activity was bears feeding on garbage, followed by bears attracted to fruit trees, and lastly, domestic attractants (Table 4).

Excluding 2007 due to the large number of not recorded attractants, for all years combined bears sighted by the public was the most common occurrence reported followed by problems with garbage (Table 4, Figure 3). Conservation Officer G. Van Spengen believes that a number of the activities recorded as sightings actually involved bears that obtained garbage and therefore have been wrongly recorded in the database. Consequently, numbers provided for garbage may be higher than those reported here. The remaining attractant types (i.e., fruit trees, domestic, and not recorded) accounted for 36% of occurrences reported for 2004-2007 but only 13% when 2007 is omitted due to the large number of unreported occurrences in that year.

		No. R	eported		Percent (%)	Percent (%)
Attractant	Year	Black bear	Grizzly bear	Total	by Year	2004-2007
Domestic	2004	10	1	11	5	
Fruit tree	2004	13		13	6	
Garbage	2004	39		39	19	
Sighting	2004	141		141	69	
Not recorded	2004	0		0	0	_
2004 Total		203	1	204	100	_
Domestic	2005	19		19	4	
Fruit tree	2005	23		23	5	
Garbage	2005	134		134	27	
Sighting	2005	312	2	314	64	
Not recorded	2005	0		0	0	_
2005 Total		488	2	490	100	
Domestic	2006	22	1	23	4	_
Fruit tree	2006	33		33	6	
Garbage	2006	152	3	155	28	
Sighting	2006	295	14	309	56	
Not recorded	2006	33		33	6	
2006 Total		535	18	553	100	All Years
Domestic	2007	56	2	58	7	5
Fruit tree	2007	73	3	76	9	7
Garbage	2007	247	4	251	29	27
Sighting	2007	14		14	2	37
Not recorded	2007	443	14	457	52	23
Injured/orphaned	2007	20	1	21	2	1
2007 Total		853	24	877	100	100
All 5 Years		2079	45	2124		

Table 4. Number of bear complaints recorded by the COS by year, 2004-2007, for each of the main attractant categories. Also provided is a subset of the number of reported grizzly bears.

Figure 3. Percent of occurrence reports recorded by the COS for each of the main attractant categories, 2004-2007.



Given that an undetermined number of sightings and not recorded occurrences may have actually been related to bears being attracted to available garbage (G. Van Spengen pers. comm.) those categories were removed from the database (Figure 4). Of the remaining reports 68% were due to garbage, 17% were bears attracted to fruit on trees, 13% were bears attracted to domestic items, and 2% were bears that had been injured or orphaned (Figure 4).

Figure 4. Percent of occurrence reports for the non-natural attractants categories (i.e., excluding bear sightings) recorded by the COS, 2004-2007.



Bears forage on a number of different food items dependent upon the season, digestibility of forage, and availability of foods. Within the City, reports of bears are highest in the fall, followed by the summer, and spring (Table 5). During the spring green-up season (den emergence through mid-July as defined by Ciarniello et al. 2003) natural fruits and berries are generally not available to bears and therefore bears will forage primarily on green vegetation (see Section 4.1 above). Garbage is a higher source of calories for bears than green vegetation and accounted for 26% of the spring occurrence reports, followed by attraction to domestic items (10%), and reports of bears attracted to fruit trees (0.5%). Bear occurrence reports within the City increased during the summer (15 July to 20 September) coinciding with the ripening of fruit on trees and a number of berry species. Reports of bears feeding on garbage decreased during the summer to 18% of occurrence reports, while fruit increased to 10%, and domestic attractants were 4%. In the fall (21 September to den entry) reports of bears feeding on garbage again increased to 34%, while attraction to fruit on trees accounted for 7%, and domestic attractants were 4%.

¹ Season	Year	Domestic Attractant	Fruit Tree	Garbage	Sighting	Not recorded	Injured / orphaned	Total
Greenup	2004	2	0	5	34	0	0	41
	2005	3	0	5	30	0	0	38
	2006	12	1	46	76	0	0	135
	2007	22	1	48	0	105	7	183
Subtotal gro	een-up	39	2	104	140	105	7	397
	-	(10%)	(0.5%)	(26%)	(35%)	(26%)	(2%)	(19%)
Summer	2004	3	5	5	36	0	0	49
	2005	9	10	35	138	0	0	192
	2006	5	15	41	109	1	0	171
	2007	10	43	47	11	185	6	302
Subtotal S	ummer	27	73	128	294	186	6	714
		(4%)	(10%)	(18%)	(41%)	(26%)	(1%)	(34%)
Fall	2004	6	8	29	71	0	0	114
	2005	7	13	94	146	0	0	260
	2006	6	17	68	124	32	0	247
	2007	26	32	156	3	167	8	392
Subtotal fa	ıll	45	70	347	344	199	8	1013
		(4%)	(7%)	(34%)	(34%)	(20%)	(1%)	(48%)
Total		111	145	579	778	490	21	2124

Table 5. Bear occurrence reports by year, season, and attractant type for Prince George, BC and surrounding area, 2004-2007.

¹Definition of seasons follows Ciarniello et al. (2003) where spring = den emergence to 14 July, summer = 15 July to 20 September, and fall = 21 September to den entry.

4.2.3 Bear Occurrence Reports for Schools

School District No. 57 has 35 elementary schools, 1 middle school, and 10 secondary schools. A few private and/or religiously oriented schools also occur within the City. Seventeen schools have reported bears within their school grounds or immediately adjacent areas from 2004-2007 (Table 6). The majority of these schools are within neighbourhoods previously identified as being primary areas with a history of bear reports, particularly the College Heights and Hart Highlands neighbourhoods. Two schools (Westside Christian and Immaculate Conception) are on the south side of Highway 16 west leading into urban Prince George. One school was located in Central Fort George (Carnie Hill Elementary). For bear attractants at the University of Northern British Columbia please refer to section 5.1.6-B. UNBC Compost Facility and University Grounds.

Table 6. Schools with reported bear sightings and destructions for Prince George and surrounding area, 2004-2007.

School Name	Area	Year
Austin road elementary school	Hart Highlands (Austin west)	2005, 2006
¹ Beverley Elementary School	Beaverley	2004
¹ Buckhorn Elementary School	Buckhorn (South-East)	2006
Carney Hill Elementary School	Central Fort George (Bowl)	2005
College Heights Elementary School	College Heights	2005
College Heights Secondary School	College Heights	2007
² Glenview Elementary	Hart Highlands (Glenview)	2006, 2007
Heather Park Middle School	Hart Highlands (Austin west)	2006, 2007
		(x4)
Hart Highland Elementary School	Hart Highlands	2007
Immaculate Conception School	College Heights (Westgate)	2006, 2007
Kelly Road Secondary School	Hart Highlands	2007
³ Malaspina Elementary School	College Heights	2006
Quinson	Foothills (Bowl)	2007
Sacred Heart School	Bowl	2005
Vanway Elementary School	College Heights (east Lafrenier)	2007
West Wood Elementary School	Bowl (lower Peden/Charella)	2007
Westside Christian School	Highway 16 West (College Heights)	2004
¹ Outside city limits		

²Grizzly bear reported

³Trail between Rochester Crescent & Malaspina Elementary School

4.3 BEARS DESTROYED IN PRINCE GEORGE AND SURROUNDING AREA

4.3.1 Number of bears destroyed

From 1994-2007 (14 years), 624 bears have been recorded destroyed within the city of Prince George and surrounding areas (Table 7). One hundred and thirty-five (22%) of those bears were destroyed in the last 4 years (2004-2007). The reader is

cautioned that only those data for 2004-2007 have been verified and checked and therefore errors in the 1994-2003 data may have been included.

From 2004-2007, the majority of bears destroyed were black bears (91% versus 9%). More black bears were destroyed within the city limits than the surrounding areas. No grizzly bears were destroyed within the city limits; however, in 2007 a grizzly bear was relocated from Hoferkamp road and was shot by a rancher at the release site. In addition, some grizzly bears were destroyed in areas immediately adjacent to the City limits (e.g., Salmon Valley).

Bear destructions were highest in 2005, followed by 2007, 2006, and 2004 (Table 7). Due to suspected irregular entries into the bear occurrence database, it has been stated that the number of bears destroyed in 2004 under-represents the actual number of bears destroyed but more detailed records were not available (G. Van Spengen pers. comm.). There is no difference in the number of bears destroyed since the introduction of the automated garbage system in 2005 (2005 date listed on the City's web site; Figure 5).

Although forage productivity was not measured for these years it is likely that the number of bears destroyed varied according to the amount of natural forage available to bears; in years of high natural forage availability bear destructions tend to be lower than those years when natural foods are scarce. Bears are more likely to take risks and enter human-use areas in search of foods when their natural foods are scarce. Young male bears that have dispersed from their mother and are attempting to establish their own home range tend to be the primary offenders.

	Black	Grizzly	No. Bears	Yrs. Used to	Mean No. Bears	Standard
Year	Bear	Bear	Destroyed	calculate Mean	Destroyed	Error
1994			56			
1995			33			
1996			41			
1997			24	1994-97	38.5	6.8
1998			80			
1999			56			
2000			28			
2001			75	1998-01	59.75	11.8
2002			48			
2003			48			
*2004	14 (11)	1	15	2002-04	37	11
*2005	44 (26)	6	50			
*2006	27 (20)	2	29			
*2007	38 (27)	3	41	2005-2007	40	6.1
Total			624			
2004-	123 (84)	12	135			
2007						

Table 7. Number of bears destroyed within the city of Prince George and surrounding areas, BC, 1994-2007. Numbers in brackets indicate numbers of bears destroyed within City limits only.

*Data were only recorded by species beginning in 2004.



Figure 5. Number of Bears Destroyed (Black & Grizzly) for Prince George and Surrounding Areas, 1994-2007.

As stated by the Conservation Officer Service the criteria for destruction of a bear in Prince George are:

- the bear must be in an area where previous complaints have been reported; and,
- the bear must be considered food conditioned (G. Van Spengen pers. comm.).

Food conditioning is defined by the COS as bears feeding on garbage, feed left in bird feeders, or fruit on trees, and is determined based on the types of complaints in the area and at the discretion of the Conservation Officer (G. Van Spengen pers. comm.). However, when querying the COS Bear Occurrence Reports the primary activity contained within the database was bears reported as sighted (46%) followed by not recorded, garbage, fruit trees, and domestic attractants. The discrepancy between the criteria used to destroy a bear and results from the database suggest a problem with the way Bear Occurrence Reports are recorded. For example, in 2007 the COS stated that all bears destroyed were feeding on accessible garbage or fruit on trees with the exception of injured or orphaned bears (G. Van Spengen pers. comm.). However, when examining the data obtained from the Provincial Occurrence Reports in Victoria the majority of bear destructions (n = 19) had no associated reason for the destruction. *The reasons associated with why bears were destroyed helps determine which management actions*

should receive priority, such as available fruit and garbage; therefore, it is paramount that these data are systematically and correctly recorded.

Four percent of the overall bear occurrence reports resulted in destruction of the bear(s) (Table 8). However, when viewing this result the reader should keep in mind that although attempts were made to remove repeat calls from the database a number of the occurrence reports received are likely the same bear. Excluding the categories "Sightings" and "Not Recorded" bears feeding on garbage was the primary reason associated with bear destructions followed by feeding on fruit on trees.

Table 8. Attractant category resulting in the death of the bear for the city of Prince George, BC, 2004-2007. Bear deaths outside the City limits have been removed from analysis. Percents are in relationship to the grand total of bear attractant categories for the combined 4 years.

		Ye	ear		% of overall	% death by	
						reports by yr.	attractant
. ~						resulting in	type
Attractant Category	2004	2005	2006	2007	Total	bear death	
Domestic attractant	1	1	1	0	3	3	4
*Fruit tree	0	0	0	6	6	4	7
Garbage	0	8	2	0	10	2	12
*Injured/orphaned	0	0	0	2	2	14	2
Sighting	10	17	12	0	39	3	46
Not recorded	0	0	5	19	24	44	29
Total	11	26	20	27	84	4%	100%

4.3.2 Location of bears destroyed

Three areas previously identified as primary areas with a history of bear reports had the highest number of bear deaths within the City: College Heights and Charella Gardens to the south and Hoferkamp Road-Inverness Trailer Park in the lower Hart (Figure 6). Unlike previous years in 2007 a number of bears were destroyed in the North Hart Highlands as well as in the downtown Bowl. *The clusters of bear destructions helps to determine the high priority areas for management of green-spaces, movement and travel corridors in an attempt to dissuade bears from entering these areas.*

Travel routes and corridors were developed without examining the location of bear destructions (refer to Section 4.4 for methods used in potential travel routes and corridors placement); however, plotting potential movement routes and corridors against the location of bear destructions appeared to reveal a pattern - clusters of bear destructions within the City appear to be related to green-spaces, and identified travel routes and movement corridors (Figure 7). It may be possible to reduce the attractiveness <u>and</u> connectivity of these cluster areas to bears through various management techniques thereby potentially reducing the number of bears destroyed.

Figure 6. Location of bears destroyed within the city of Prince George, BC, 2004-2007. Notice how the destructions cluster in Charella Gardens, Upper College Heights, and Hoferkamp Road-Inverness Trailer Park as identified by the yellow dashed lines.



Figure 7. Location of bears destroyed within the city of Prince George, BC, 2004-2007, as they relate to green-spaces, identified travel routes and corridors. Destructions appear to follow a pattern of being associated with identified green-spaces, travel routes and movement corridors.



4.4 POTENTIAL CORRIDORS AND TRAVEL ROUTES

A number of potential travel routes and corridors have been mapped for bears (Figure 8). Corridors tended to follow the edge of the Nechako and Fraser Rivers, with the exception of areas where the bank becomes too steep. Travel routes tended to follow drainages and creeks. Bears are known to travel along areas where the River's edge remains somewhat flat and lush riparian habitats are present. Areas with steep sided topography where the slopes fall sharply towards the river are less likely to be used as travel corridors. In those areas bears will move to the upper bank to travel. For example, the west side of the Fraser River after Cottonwood Island park, passing through Fort George Park to the Hudson Bay Slough is likely an irregularly used travel route by bears due to steep sided terrain and limited river's edge available for travel. Therefore, the lay of the land tends to force bears into Fort George Park to travel along the upper edge of the Park's terrain. It is expected that there would be increased use by bears of retained green-spaces in these areas as bears attempt to stay within forested security cover. Bears that have found themselves in areas where human development severs natural movement corridors tend to be forced into closer distances with humans and development. For example, using the upper edge of the Park or retained green-space human-use trails acts as a filter for these bears to be attracted into town. Bears accessing interior residential areas of urban Prince George and Carrie Jane Gray Park likely do so when attempting to travel through this area presumably by the Hudson Bay Slough immediately to the south of Fort George Park. Bears accessing downtown may use the backchannel of the Fraser River between Cottonwood Park and the highway bridge.

From the Northwest, radiocollared grizzly bears have been located in Gavin's canyon, the undeveloped forest behind Foothills landfill (Pidherny), south to the Nechako bench, and <u>across the Nechako River</u> to the Lower Mud River (Ciarniello unpublished data). The lack of fencing on the west side of the Foothills landfill, which backs onto undeveloped forest lands, allows bears access to the landfill area. Both black and grizzly bear tracks have been noted at the Foothills landfill area (Ciarniello unpublished data) and 2 black bears have been destroyed by the COS at the landfill site. The amount of undeveloped habitat from the northeast Hart Highlands affords bears close proximity to residential areas. The extensive network of walking trails and bush brings bears and humans into close proximity. Easily accessible residential garbage and access to the Foothills landfill leads to food conditioning of bears using these areas. The Hoferkamp Road area is likely accessed by bears using the large tracks of surrounding forested habitat to the north and east. The south bank to the Nechako River travel corridor is believed to be too steep to filter bears into the Hoferkamp and Inverness areas.

Large tracks of undeveloped land surround the south-west portion of urban Prince George. College Heights contained a travel corridor along the River's edge with numerous walking trails that access interior urban College Heights. The extensive cover and bush allows bears to travel into the interior of this residential area. Easy access to unsecured garbage attracts bears into homes that back onto these retained corridors. Although it is possible that a few bears may cross over from the College Heights area into Charella Gardens it is more likely bears accessing Charella do so using travel routes that follow drainages off of the south side of Forests for the World, crossing Tyner Boulevard, following the ephemeral drainage behind Ginter's Hill (Figure 8). If new urban residential areas expand from the Tyner Boulevard development north towards UNBC and east to Ospika road complaints are expected to shift from Charella Gardens to Tyner Boulevard.

Figure 8. Potential bear corridors and travel routes through the city of Prince George, BC. Corridors tend to follow the major river systems while travel routes tend to follow drainages leading from the corridors and those areas where undeveloped landscapes and trails remain.



5.0 NON-NATURAL ATTRACTANTS AND HAZARD RATINGS FOR PRINCE GEORGE AND SURROUNDING AREAS

5.1 NON-NATURAL ATTRACTANTS

5.1.1 Residential Garbage Containment

In 2004/2005 the City changed the residential garbage program to an automated collection system for every household within the City limits. The City purchased garbage containers that were designed to be "placed curbside on their collection day" and emptied using an articulating arm

(http://www.city.pg.bc.ca/city_services/solidwaste/automatedgarbage/; accessed Sept 4, 2008). The articulating arm on the collection vehicles allows the driver to remain within the vehicle and not handle the bins. During the development of the automated system the Northern Bear Awareness Society worked closely with the City to change to bear resistant bins. At the time, the City did not want the additional cost of bear resistant bins and there also were concerns with the possibility of residents forgetting to release the bear resistant bin latches resulting in the bin not being emptied and anticipated associated complaints from homeowners.

Despite NBA supplying designs to the City that had been implemented in other areas of the Province the City did not purchase any bear resistant containers for the automated system. Rather, homeowners were provided with their choice from three sizes of non-bear resistant receptacles: a large 360 litres (95 gallons is equivalent to four average-size garbage cans), medium 250 litres (65 gallon), and a small 135 litres (35 gallons). Residents are required to wheel carts to the curbside before 8:00am the day of collection and remove the containers from the roadway no later than 7:00pm (City web site; accessed Sept 4, 2008).

NBA also urged the City to adopt a 'bear-friendly' garbage storage bylaw, which was stated to hold particular importance if the new bins were not to be bear resistant. At that time, the City stated that a bylaw placing enforceable time restrictions on garbage curbside placement and removal may negatively affect shift workers and could be met with resistance from residents. As of September 8, 2008, information on the City's web site under the section frequently asked questions: where do I store my carts states: "Most residents choose to store carts in a convenient location such as their carport, garage or at the side of their house. The footprint (dimensions at the base of the cart) is not appreciably larger than average-size garbage containers."

To date, the introduction of the automated garbage collection system does not appear to have reduced or increased (i.e., no effect) the number of bears destroyed within the City limits (see Section 4.3.1, Figure 5) contrary to suggestions that it has contributed to reducing human/bear conflicts:

> "The implementation of automated garbage collection has also contributed to reducing bear/human conflict. The fixed lid automated carts reduce bear attractants by reducing odours and significantly impairing the ability of crows and dogs to rip apart garbage bags at curbside, events that attract bears. In addition, when the City distributed collection carts to residents, NBA took the opportunity to attach to the carts brochures on reducing bear/human conflict."

Staff Report to Council. Dated June 19, 2006. To George Paul, City Manager from Bill Gaal, Manager of Parks and Solid Waste Services. During field assessments of neighbourhoods it was apparent that for all neighbourhoods assessed the majority of residents stored their bins in open carports and/or adjacent to their house. Bears can easily access these containers and a number of residents, particularly in the North Hart Highlands, voiced concerns with bears accessing garbage from these bins. Residents also noted an apparent increase of storing bins in non-bear resistant locations since switching to the automated system. A few residents stated that these garbage cans were meant to be kept outside due to their design and structure. Even in neighbourhoods with high bear use and destructions there appeared to be a general lack or ignorance of ways to deter bears from entering ones' property through proper garbage storage (Photographs 2-4).



Photographs 2 and 3 - This resident made "Beware of Bear" sign was located immediately across the street from the house in photograph #3 that pictures a half-full automated garbage bin outside the front window despite having a 2-car garage available for garbage storage (Charella/Peden area). Numerous digs for ants and feeding on berries were recorded starting just 50 meters up the trail from the sign (July 23, 2008).



Photograph 4. This residence was located just outside of the Inverness trailer park and appears to be the typical way of storing automated garbage cans, even in this high bear destruction area (July 10, 2008).

5.1.1- B Trailer Park Garbage Containment

In trailer parks homes and property are smaller and tend not to contain areas where garbage may be secured from bears. A number of bears have been destroyed at the Inverness trailer park each year. The Inverness trailer park backs onto a track of undeveloped habitat that remains connected to large tracks of forested land. The trailer park itself was kept clean but the majority of residents stored their garbage immediately outside their homes (Photo 5). Single dwelling home owners in the Inverness area also stored garbage bins in non-secure locations (Photo 4 above). A central bear-resistant location was not available at the Inverness Trailer Park; however, it was noted that some trailer parks within the City have switched to bear resistant bins. The Sintich trailer park noted a significant reduction in bear problems since changing their garbage handling policies and installing a bear-resistant container (G. Van Spengen).



Photograph 5. Residents of trailer parks often do not have a place to store their garbage bins and the majority of homes had bins located in carports or outside their back doors. This home had 3 bins located to the right of the stairs (July 10, 2008).

The Caledonia Trailer Park offers a large, open bin where residents can deposit their garbage. However, the bin did not contain a lid, emitted a foul odour, and garbage overflowed from the bin (Photo 6). Garbage in this bin can be easily obtained by a bear. The Caledonia Park backs onto large tracks of land associated with the Pidherny Triangle and the Foothills landfill.



Photograph 6. This large bin served the residents of the Caledonia Trailer Park off North Nechako and backs onto large expanses of undeveloped land surrounding the Pidherny Triangle to the North and the Nechako River to the South. Abundant bear sign was located in this area (July 17. 2008).

5.1.2 Commercial Garbage Containment

Commercial establishments in Prince George tended to use the same type of garbage containers (Photos 7 & 8). The bin in Photograph 7 may be made bear resistant by keeping the metal lid shut and latched. The bin in photograph 8 requires changing the plastic lid to metal and in its current state is not considered bear resistant.





Photograph 7. Behind Save On Foods and other shops in College Heights mall (July 9, 2008). Photograph 8. Typical commercial bin with plastic lid. These are also popular at schools and other City establishments.

A number of commercial establishments reported problems with bears. For example, the College Heights Pub noted bears in their garbage and grease bins. Garbage receptacles at the Pub were contained within a wooden perimeter fence; however, the odour associated with the garbage was evident and the storage area was not bear resistant. Further, staff noted that on occasion they leave garbage beside the bin or the bin lid open. The Pub is immediately adjacent to lush stream habitat with berries and some spring forage items. At the time of the assessment there was a bear that slept on the sand in front of the pub. Bear problems are so persistent at the Pub that employees are walked to their cars nightly. The night before the assessment a bear was reported in the pick up box of one of the employee's trucks. The handling of garbage and grease and the placement of the Pub along a strip of connected forested habitat means bears will be attracted to the Pub area. An employee claimed that the perimeter of the Pub was planned to be fenced with chain link this fall or next spring specifically to reduce bear problems.

Other establishments, such as the Pumphouse Pub stored their grease in barrels directly outside the establishment (photo 9).



Photograph 9. Grease barrels outside Pumphouse Pub at Noranda Road. In addition to these there were 3 open 45-gallon drums at the adjacent playing field and a large garbage bin that required a new lid (July 10, 2008).

5.1.3 City Placed Open Garbage Bins

A list of 100 non-bear resistant garbage bins was developed. Some bins were associated with high 'problem' bear neighbourhoods in green spaces (photo 10) or bus stops (photo 11). Bins will require removal, new lids, or changing to bear-resistant varieties.



Photograph 10. This garbage bin was located at the end of Bernard Street off Domano in lower College Heights in a residential area rated as "high" for problem bears (July 9, 2008).



Photograph 11. This can was chained to bus stop, close to a green area and Moore's meadow. It smelled of garbage (Foothills Blvd just south of Freimuller Street). Additional 'bus stop' can were noted along Foothills Boulevard (July 17, 2008).

5.1.3-B. Park Bins Non-Bear Resistant

In 2005, at the urging of NBA, council approved a \$20,000.⁰⁰ Capital Expenditure Program and replaced 15 park bins with bear resistant garbage cans. In 2006-07, an additional 10 containers were replaced. Unfortunately, in 2008 the capital project for bear proof litter containers did not make the short list for funding (T. Kadla pers. comm.). Some additional containers remain within Parks, such as Cottonwood (Photo 12) and Fort George Park that require changing to bear-resistant options. In addition, regular park maintenance is required to minimize bear-human conflicts in areas where bear resistant bins have been installed (Photo 13). Park employees should regularly clean up litter, empty and inspect containers.





Photograph 12. This garbage can was located between west Cottonwood Park & Heritage Trail and requires immediate changing (July 24, 2008).

Photograph 13. Garbage left at the base of the Sybertech can at Moore's meadow. The lid of the can is also open (July 10, 2008).

5.1.4 Fruit Trees

The most common tree bearing fruit encountered on residential properties was mountain ash (*Sorbus spp.*; Photo 14), followed by apple trees (Photos 16 & 17), and planting of berries (such as raspberries; Photo 15). In July 2007, two sibling black bears were reported feeding on mountain ash berries in the Charella Gardens area, where they also broke apart the resident's compost bin.



Photograph 14. Residential mountain ash trees with abundant fruit. This property is off Foothills Boulevard close to Moore's meadow.



Photograph 15. Residential property in the College Heights area containing an automated garbage can, garden and planted raspberry bushes. This residence was located on Gladstone just up from the bear warning sign (July 9, 2008).



Photograph 16. Apple tree with abundant fruit that hangs over onto the trail behind the houses in the Hart Highlands. Bear sign was noted along the trail (July 10, 2008).



Photograph 17. Abundant crab apple trees were located along the trail that follows the Nechako River across from Moore's meadow (513580 5976363; July 14, 2008).

5.1.5 Agricultural Attractants (orchards, honeybee colonies, and ranching)

Prince George is surrounded by agricultural activities. Ranching of cattle and sheep and planting of hay and oats appear to be the primary agricultural activities. There does not appear to be one area of the City/outskirts that is worse for agriculturally related bear problems than the others. Rather, problems with agricultural attractants and bears tend to shift depending on the year, crops planted, animals farmed, availability of natural attractants and the like.

The COS states that sheep are the primary animal agricultural attractant to bears in the area as they appear to be "easy targets" (G. Van Spengen pers. comm.). In 2005, a grizzly bear was destroyed for killing sheep in the Pineview area. The bear was reported sighted following streams leading from the Tabor Mountain area to Pineview (G. Van Spengen pers. comm.). In the first week of September 2008, an approximately 800 lb male grizzly bear was destroyed by the COS for killing sheep and a black bear at a farm in the Salmon Valley area of Prince George. The bear was old as evidenced by a number of missing and extremely worn teeth (G. Van Spengen pers. comm.). In the spring of 2008, a black bear was killing goats in the Willow River area and was removed by COS; however, problems between bears and goats tend to be minimal. The COS rarely receives problem reports with cattle and bears. Rather problems with cattle in the area are primarily due to predation by wolves and coyotes (G. Van Spengen pers. comm.).

Bears are known to be attracted to oat fields where their foraging behaviour causes extensive damage to the crop (Ciarniello et al. 2001, 2002; Photo 18). In 2000, the Parsnip Grizzly Bear Project reported that the most commonly fed upon non-natural attractant was oats in the fall (Ciarniello et al. 2001). The Project trapped 3 additional female grizzly bears in a privately owned forested stand adjacent to an oat field during attempts to recapture a female grizzly bear that had dropped her collar after feeding on oats in his field. The farmers reported not planting oats in 2001 to deter grizzly bears from loitering around their residence (Ciarniello 2002). The COS reports few bear destructions in association with oat fields although it is possible that ranchers and farmers may be removing bears themselves and not reporting it to the COS (G. Van Spengen pers. comm.).

There are a few honeybee colonies around Prince George and surrounding areas but the COS reports that the majority of hives are contained within an electric fenced perimeter. The COS does not receive complaints from owners of honeybee colonies (G. Van Spengen pers. comm.).

A noted agricultural attractant to bears within the City/outskirts is the disposal of domestic animal carcasses (Ciarniello et al. 2001, 2002, 2003). The Parsnip Grizzly Bear Project trapped one female grizzly bear with 3 cubs of the year using a cow carcass the bears had dug up in the Nukko Lake area. In addition, the Project tracked a different radiocollared grizzly bear in the Salmon Valley area to a dead cow/fetal calf carcass that the farmer had intentionally placed in a retention patch on his farm (Ciarniello et al. 2002). Intentionally disposed of carcasses were recorded throughout the Project study years and radiotracking bears lead to many carcasses disposal areas including an area that contained several domestic carcass bones and horse mane and tail. This site was associated with heavy bear sign leading investigators to conclude that it was a regular carcass disposal location for livestock (Ciarniello et al. 2001). The disposal of carcasses associated with butcher operations were also noted (Photo 19).



The Prince George Regional Landfill takes horse, sheep, and other animal carcasses at \$100 per ton but *does not take* cow carcasses because of the possibility of mad cow disease (attendant at Foothills Regional Landfill per. comm. 250-962-8972). Landfill attendants recommended either burning or burying cow carcasses on the farms' property. The City (S. LeBrun and T. Kadla pers. comm..) and the COS were not aware that the Landfill did not take cow carcasses. The COS advises people to examine and follow the *Agricultural Practices Code* with respect to proper ways to bury carcasses. The COS also advises ranchers to bury carcasses in an area that is least likely to contain domestic animals at that time or in the near future.

5.1.6 Composts

5.1.6-A. Residential Compost Bins

Bears have been reported to knock over and break residential compost bins within Prince George (Photo 19). In July 2007 in the Charella Gardens area a compost bin was tipped over and broken by a subadult sibling pair that also fed on mountain ash berries within the resident's yard. On site assessments composts were knocked over in the Hart Highlands and College Heights areas. Composts make up a small portion of the domestic attractant occurrence reports (see Table 3) and are not considered to be a significant attraction for bears by the COS. Regardless, bear investigations of compost bins are believed to contribute to food conditioned behaviour of bears within the City.



Photograph 20. This knocked over compost lies at the base of a dig for ants and was presumably knocked over by a bear. It was located along the trial behind houses in the Upper Hart leading south towards Nechako Road (July 10, 2008). Composts were also found to be knocked over in Charella Gardens and College Heights.

5.1.6-B. UNBC Compost Facility and University Grounds

Attendants at the UNBC compost facility reported a bear problem at the facility in the spring 2008. An assessment of the site revealed that is was located at the west side of the University backing onto large tracks of forested land that connect with Otway and Forests for the World (Photo 21). In addition, the perimeter of the site was not bear resistant and a number of naturally occurring bear foods such as berries as well as spring forbs and planted gardens were present (Photo 22). The facility itself was well maintained to minimize odours associated with compost. The attendant noted that a black bear(s) had frequented the facility for a number of consecutive years. The site assessment revealed abundant garbage associated with the nearby residence buildings (Photo 23). A bear warning sign was also posted on some walls and outside residence building doors (Photo 24). In addition, the attendant stated that students in the dorms threw pizzas out of their windows to attract bears and watch them feed. The large garbage receptacles in the residence parking lot were not bear resistant (Photo 25). The compost facility, residences and large garbage bins in the parking lots were also within hundreds of meters of the daycare. In addition, most entrance ways at the University were associated with open, 45-gallon style garbage receptacles, as were parking lots (Photo 26).



Photograph 21. UNBC compost facility with residence in back. Notice the surrounding forested habitat. All photos July 3, 2008



Photograph 22. Raspberry bushes planted in the UNBC compost facility.



Photograph 23. Overflowing garbage bin outside Keyoh Residence with daycare in background.



Photograph 24. Bear warning sign outside Keyoh Residence.



Photograph 25. This type of large bins pictured in the resident parking lot requires new lids to be bear-resistant.



Photograph 26. Parking Lot B contained 2 cans non-bear-resistant cans, which occurred near 2 bear-resistant cans.

5.1.7 Other Non-Natural Bear Attractants

Hoferkamp Road is a high area for bear destruction and has also had a number of grizzly bears reported. During site assessments it was noted that some people are throwing garbage off the cliff accessed from Hoferkamp Road (Photo 27a-b). A 'no dumping' sign was posted but ignored. The majority of garbage appeared to be large appliance items however it is possible that some residential garbage was present. Bears are likely accessing the Hoferkamp road area by moving north to south through the agricultural areas of the Salmon valley down McMillan Creek and/or by the large tracks of surrounding forested habitat to the east. Although it is less likely for bears to be accessing this area by coming up the cliff, the lower elevation habitat of the North Nechako was conducive to bears (Photo 28) and the presence of this non-natural attractant may serve to food condition and/or habituate bears to humans and their structures. Residential households along Hoferkamp Road were also noted to contain mountain ash trees.



Photographs 27a & b. Garbage thrown down cliff off Hoferkamp road (July 10, 2008).

Photograph 28. Expanse of the view surrounding the garbage thrown off Hoferkamp Road.

5.2 SITE ASSESSMENTS AND HAZARD RATINGS

5.2.1 Neighbourhood Assessment and Hazard Ratings

Four areas have been identified as high to extreme for their potential for negative bear-human interactions to occur: College Heights, Charella Gardens, Hart Highlands (north and south), and Hoferkamp Road/Aberdeen (Table 9). Three areas have been ranked as a high and 2 areas moderate to high, respectively (Table 9). Areas ranked high and extreme have human influenced attractants readily available to bears and were surrounded by tracks of forested land. These areas are a threat to both bears and humans and require immediate management and mitigation techniques to avoid food conditioning and habituation of bears to humans.

Area	Rating	Field Visit	Comment
Aberdeen (see Hart Highlands assessment)	High	Yes	Surrounding land area available, esp. along river to east and linked up with powerline. Noranda Rd area contains lush spring forage wetlands. Available residential and commercial garbage a problem, especially in the <i>Hoferkamp road area</i> .
¹ Airport/Blackburn	Low to Moderate	No	Surrounding land area available. Curbside pick-up not available to portion outside city limits.
BCR/Danson	Low	No	Low residential area. This area will require assessment if residential developments are to occur.
¹ Beaverley	Low to Moderate	Yes	Land area available. Curbside pick-up not available. Vanway transfer station well maintained for exclusion of bears.

Table 9. I	Hazard I	Ratings	for neighb	ourhoods	within	the city	y of Prince	e George	and
surroundi	ing area	s. BC.							

Area	Rating	Field Visit	Comment
Bowl (see Hudson Bay Slough assessment in Parks section)	Low	Partial/ Slough	Habitat largely developed. The Slough connects off the River and leads into the bowl area; however, the habitat becomes increasingly poorer towards Victoria Street.
¹ Buckhorn	Low to Moderate	No	Land area available. Curbside pick-up not available. Transfer station.
Charella/Peden Hill	High to extreme	Yes	Surrounding habitat on west side of Tyner Blv. Bears likely access from drainages south of UNBC/west of Tyner. Residential garbage, composts, and fruit trees available. Trails with high bear foods connect into area.
^{1,2} Chief Lake	Moderate to Low	No	West Chief Lake areas out of city limits. Curbside pick-up not available. Transfer station. Access to fruit and domestic livestock may be a problem.
College Heights	High to extreme	Yes	Adjacent to travel corridor and large tracks of undeveloped land. Available residential and commercial garbage, open garbage bins, fruit available. Forested trails connect from the River into College Heights area, especially Varsity Creek. Trails have very poor line of sight.
Cranbrook Hill (see Otway assessment under Parks)	Moderate	Partial (Otway)	Hiding cover available. Surrounded by large tracks of forested stands. Large acreages. Access to available garbage and fruit was reported and may be a problem. High abundance of berries and spring wetland areas.
Haldi	Moderate to high	No	Some land area. Edge of town leads to more problems with bears. A number of bears destroyed. <i>Curb-side garbage pick-up available in remote</i> <i>area and likely food conditions more bears.</i>
Hart Highlands – north	High to extreme	Yes	Includes Austin west & Glenview. Adjacent to Foothills landfill. Available garbage, open garbage bins, fruit available. Greenspace trail leading from north to south had fresh bear sign. Residents reported bears crossing Foothills Boulevard from landfill area.
Hart Highlands – south	High to extreme	Yes	Easily accessible garbage from Foothills landfill, residential automated bins, and the Caledonia trailer park. The change in elevation allows for spatially separated foods and a variety of foods by season.
² Hoferkamp Road (part of Hart South)	High to extreme	Yes	Part of Hart south but an extreme rated area as it backs onto undeveloped land, contains an illegal refuse dumping area, and residential fruit trees. McMillan Creek leads from agricultural areas of the Salmon Valley into Hoferkamp Road. Abundant non-natural attractants available. Haul-all garbage containers installed at Park but often left open.

Area	Rating	Field Visit	Comment
Lafreniere / Parkridge / Bearspaw (see College Heights assessment)	High	Partial (drive through only)	Numerous bear sightings throughout years. Outskirts of town as it expands into undeveloped habitat. Includes West Gate park which requires a bear-resistant bin. Commercial establishments require changing bin lids or switching to bear resistant bins.
¹ Miworth	Low- Moderate	No	Park area available with abundant summer forage and good spring forage. Curbside residential garbage pick-up not available. Transfer station often overflowing.
Nechako River – north	High	Yes	South of landfill. Trails with abundant summer forage follow the upper bank of the Nechako River. This trail backs onto residential dwellings. Curbside garbage pick-up.
Nechako River South / Foothills	Moderate to high	Yes	Adjacent to travel corridor and parks. Non-natural attractants available. Abundant bear sign noted in Moore's meadow which backs onto residential dwellings. Requires proper storage of automated garbage containers. Travel corridor along river and Wilson Park with crab apple trees. Curbside garbage pick-up.

1Outside city limits.

²Grizzly bears known to use this area.

5.2.1-A. Charella Gardens & Peden Hill Assessment

Three routes were assessed in the Charella Gardens and Peden Hill neighbourhoods. The first route was approximately 1.6 km and began on the east side of Tyner Boulevard at the cutblock passing through a young stand regeneration of alder and willow with a high abundance of clover, fireweed, and dandelions for spring forage and raspberries, twinberry, wild strawberries, thimbleberry, and highbush cranberry for summer. The trail descended into lower elevation areas that were moister and followed creeks and ephemeral drainages. Feeding on red elderberry was noted in these areas. Devil's club and cow parsnip was also present in wet areas but berries were not yet ripe. Bear sign was apparent throughout the route with feeding on ants, twinberries, elderberry, tracks (Photo 29), and older spring fireweed feeding. There was also an aspen tree about 10 meters off an old game trail/forest path that had in the past been climbed by a bear to approximately 40 meters (Photo 30). Other wildlife sign noted included deer tracks, moose tracks, and coyote scat. Towards the end of the route 3 large, fairly fresh digs for ants were within 16 m of each other (Photo 31) and backed onto a residential area (Photo 32). The resident made "beware of bear" sign (see Photo 2) was posted at the end of this route at Hopkins Road. Part of this area was scheduled for new development(s) lots. Residential garbage cans were noted in non-bear resistant locations and contained garbage (see Photo 3).

The second route focused on Peden Hill and particularly the green-space between Hwy 16 and Ospika. We were unable to access the entire greenbelt/forested area along Peden Hill because the bank was very steep and trails were not present. Garbage was noted in the forest belt and there were a lot of foul odours. Due to the steep bank the assessment focused on the houses that backed onto this green-space in the lower Peden, west up Hwy 16, north across the upper houses that backed onto the green-space, and across Ospika to Bona Dea. The band of this greenbelt appears to be approximately 100 m wide and quite steep with houses back onto the top from both upper and lower sides. Some bear forage items were present, such as soap berry (*Shepherdia canadensis*) but were more abundant in clearings than the forested stand. It is unlikely that bears are accessing the Charella Gardens area from College Heights (off the Fraser River) because it would require them to cross Hwy 16 and move along this steep bank.

The third route was approximately 1.5 km long and began at the end of Bona Dea road in Charella Gardens eventually meeting with Route 1. The vegetation was similar to the upper elevations of Route 1 passing through young regeneration cutblocks abundant with spring (clover, fireweed, dandelions, and the like) and summer (twin berry, raspberries, blueberries) forage items. Overall the average elevation was higher than route 1, contained more clearcut areas, and a higher abundance of young spruce, aspen, and birch stand regeneration. At one point the route passed through an upper elevation wetland area with moose sign and tracks (Photo 33). We noted a possible cougar track that had been preserved in the clay.



Photograph 29. Fresh black bear track.



Photograph 30. A bear climbed this aspen tree to approximately 40 feet. Note the claw marks.



Charella/Peden areas.

elevation wetland areas with fresh moose sign.

5.2.1-B College Heights Assessment

Five routes were assessed in the College Heights area: (1) Varsity Creek to the Fraser River; (2) Fraser River to Cowart Road; (3) Domano-Varsity Creek connector; (4) Upper College Heights to College Heights Pub; and, (5) the clearcut area at the end of Domano. The most apparent issue for the high occurrence of bears reported and destroyed in the College Heights area was connectivity of the retained human-use trail network which is believed to act as a filter for bear movement and attract bears into this residential neighbourhood. The human-use trail network tended to follow a number of small Creeks, such as Varsity Creek, and linked directly to a number of high bear forage and travel areas (Figure 9). The trails themselves contained lush bear habitat associated with moist areas (Photo 34) as well as abundant berry producing plants (Photos 35 & 36). The line-of-sight (ability to spot a bear or have a bear spot a person) was extremely poor along most sections of these trails increasing the potential for a negative bear-human encounter and also increasing the likelihood of a bear being filtered into the College Heights area (Photo 36). The trails back onto houses that contained gardens (Photo 37), fruit trees, composts, and garbage (Photos 10 & 15). Bear sign was evident along portions of these trails, particularly where the start of the trail met with the Fraser River (Photo 38). The Fraser River trail provided a nice movement corridor along the upper edge of the River. The abundance of lush vegetation, hiding cover, and dirt/gravel road provide for foraging opportunities as well as ease of travel. The cutblocks at the end of Domano were rated as providing the best bear forage of the areas assessed. The blocks contained an abundant variety of bear foods for all 3 seasons (Photos 39 & 40). The challenge for the College Heights area is to maintain the human-use trail network but to make it less attractive to bears. The current structure of the trail network acts to filter bears into the residential neighbourhoods of College Heights and directly contributes to the bear problems in this neighbourhood.

Of the neighbourhoods assessed, College Heights contained the highest mix of residential and commercial establishments. The abundance of non-natural attractants bears may encounter once within the College Heights area leads to food conditioning and habituation of bears to humans. Easily accessible garbage was noted at the majority of commercial establishments in the College Heights area, such as the College Heights Pub (refer to Section 5.1.2 Commercial Garbage Containment) and Westgate Plaza (refer to Photos 7) as well as non-bear resistant City placed bins (Photo 10). Even in areas where "Bear Aware" signs were posted the majority of receptacles for the residential automated garbage collection system were noted to be kept in non-bear resistant locations, and mountain ash trees were abundant in residential yards.







Photograph 34. Looking east	Photograph 35. Abundant	Photograph 36. Pointing at
down Varsity Creek (Route 1).	Saskatoon (pictured) and	Shepherdia canadensis berries.
July 9, 2008	other berries were noted	Note the extremely poor line of
-	along the trail.	sight (Varsity Creek trail)



Photograph 37. Houses back onto	Photograph 38. Fresh bear	Photograph 39. An abundance of
these trails. This house had	digs for ants and larvae	bear foods for different seasons were
planted rhubarb along the fence.	were noted where Varsity	recorded in the cutblock at the end
-	met the Fraser River.	of Domano including twinberry and
		cowparsnip (pictured).



Photograph 40. A bear tore apart this log to feed on ants/larvae. Located in the cutblock at the end of Domano.

Abundant non-natural attractants that contribute to food conditioning, habituation to humans, and potentially aggressive bear behaviour were also noted in the College Heights area, for examples refer to Photographs 7, 10, and 15.

The networks of human-use trails are connected to the River and/or high bear forage areas (red arrows) and lead directly into the College Heights residential areas (yellow arrows). **College Heights** HowheadHiv Lalonde High Bear Travel Area High Bear Foraging Areas (cutblocks, powerlines, early seral stages) Image © 200

Figure 9. Greenspaces and human use trails leading off high bear travel and foraging areas into the residential and commercial areas of College Heights.

5.2.1-C. Hart Highlands – North and South Assessment

Ten routes were assessed in the north and south Hart Highlands: (1) McMillan Creek Trails A and B; (2) Hoferkamp Rd (see Section 5.1.7 Other Non-Natural Bear Attractants); (3) Aberdeen Rd/Antree/Inverness Trailer Park; (4) Pulpmill and Noranda Roads; (5) Upper Hart greenspace-1; (6) Upper Hart greenspace-2; and, (7-10) Pidherny Triangle (contained 4 routes).

The Hart Highlands are surrounded by large tracks of undeveloped land to the North, East and West. The topography allows for 2 primary features that make the area attractive for bear movement and foraging: (1) the gradation from high to low elevation

tends to filter movement downwards towards the Nechako River, particularly in spring as these areas are snow-free earlier, and (2) the difference in elevation is enough to offer a variety of bear foods by season that tend to be spatially separated. The bank leading up from the Nechako River at McMillan Creek is thought to be too steep to draw bears off the River and likely acts as a barrier for bears entering the lower Hart areas. Rather, bears are more likely to access the Hart using the large tracks of surrounding habitat to the north, north-east, and north-west. McMillan Creek runs from the agricultural areas into the Hart/Hoferkamp Road area and may act to filter the movement of wildlife. Development of 'problem' bear behaviour in the agricultural areas of Chief and Nukko Lakes and the Salmon Valley must be managed to reduce the likelihood of "problem" bears in the Hart area.

The Hart Highlands contained abundant easily accessible garbage available from residential, commercial and City run sources. Accessible garbage was the most commonly noted non-natural attractant in the Hart Highlands area, followed by fruit (mountain ash and apple) trees. The Aberdeen Road, Antree Road, and Inverness Trailer Park areas contained a number of non-natural attractants, particularly residential automated garbage bins and open and accessible commercial receptacles. This area backs onto a greenbelt and the Inverness Trailer Park backs onto bush on its east side (See Section 5.1.1-B). The power line provides bears with travel opportunities as well as early spring forage. These areas tend to be snow-free earlier due to the removal of the canopy allowing increased light to penetrate the ground. Pulpmill and Noranda Roads contained an abundance of highly rated spring habitat and wetlands that are attractive to bears; however, abundant non-natural attractants were also noted such as the open grease bins at the Pumphouse pub (Photo 9) and residential non-natural attractants.

Similar to College Heights but not as defined were green-space human-use trails that backed onto residential households and connected to the surrounding 'undeveloped' or large acreage/agricultural areas. These trails contained abundant bear sign including foraging for ants and feeding on berries although they were not rated as high as the Noranda Road area for natural bear forage. The compost bin knocked over at the base of a fresh dig for ants (refer to Photo 20) was taken along the upper Hart trail as well as the backyard apple tree hanging over onto the trail (Photo 16). Overall, the trail contained a better line of sight than those in the College Heights area. Opportunistic encounters with residents of the Hart noted that bears also may be accessing the Hart Highland areas by crossing Foothills Boulevard by the Foothills landfill. A location was provided of a trail that bears were stated to use once they crossed Foothills Boulevard. Management of the Foothills Landfill should also be considered when attempting to reduce 'problem' bear behaviour (see Section 5.2.2 Landfills and Transfer stations).

The Pidherny Triangle is a series of mountain bike trails to the west of the landfill that begin at high elevation and descend to Pidherny Road/North Nechako. The 281 hectare future golf course development is also located in this area. The drier upper elevations were rated higher in early summer but lower in spring and later summer than the lower elevation, rich areas containing devil's club and cow parsnip. Bear feeding on ants/larvae and berries were evident as were deer and moose tracks. Route 1 of the Pidherny Triangle began high on a ridge in a mature/old subalpine-Douglas fir mix forest and was rated as containing poor natural bear forage. The lower elevation areas were rated higher for bear forage. Raspberries were abundant in clearings, as was fireweed,

low bush blueberries, and a high abundance of thimble berry. The second route assessed was at lower elevations and contained better natural forage than route 1. Alder thickets were mixed with cow parsnip, a high abundance of thimble berry, equisetum, grass and clover. Route 3 contained the best habitat assessed as it passed through wet areas with Devil's club and equisetum while the upper elevations contained berries, particularly in regenerating clearings. Deer tracks and moose droppings were noted. The final route passed through a number of regenerating cutblocks with plentiful raspberries and thimbleberries. Garbage left by mountain bikers along the trail was noted. A number of wildlife trails spurred off the trails. The Pidherny triangle backs onto the residential areas of west North Nechako road to the south and the Foothills Landfill to the northeast. The large track of undeveloped land, adjacent North Nechako and Hart Highland residential areas, access to the landfill, and abundant seasonal bear foods and movement corridors affords this area an extreme hazard rating. Some portions of the assessed trails fell within the proposed golf course route. Golf course development is predicted to change the nature and distribution of bear conflicts in this area.





Photograph 41. Start of Route 3. Overall the]	Photograph 42. Shepherdia canadensis (buffalo /
trails of the Pidherny triangle were wide and	5	soap berry) feeding with feeding on ants in back of
made for easy movement (July 16, 2008)	I	photo. Taken along Route 3.





Photograph 43. Start of Route 1. Garbage left	Photograph 44. Older sign from spring feeding on
by mountain bikers.	dandelion flower heads along route 4.

The majority of bear problems in the Hart Highlands are believed to be related to bear access to non-natural attractants available at the foothills landfill combined with storage of the residential automated garbage cans, garbage available at the trailer park and unpicked fruit on trees.

5.2.1-D. Lower North Hart / North Nechako River Trail Assessment

Four routes were accessed using an all-terrain-vehicle in the lower north Hart / North Nechako River area. The first route was along a major access road that was gated but easily bypassed. The stand was a young regeneration and appeared to be only a few years old in some areas. The surrounding habitat was a mature pine forest with a low bush blueberry and kinnikinnik understory. Soapberry was in moderate to high abundance in open canopy areas, combined with rose, Indian helabore, clover, purely everlasting, junipers, and trembling aspen. In the forested areas there was an abundance of low bush blueberries. The habitat was rated low for spring, low-moderate for early summer, and high for late summer. The powerlines that run through this area allow for easy movement and act to link up the Upper Hart and the Nechako River, effectively acting as corridors (Photo 46). Deer tracks were noted along the road while a very large, deep, bear dig for ants/larvae was recorded (Photo 47). The second route was along a new road the passed through an old growth fir/spruce forest to the powerline and then south towards the Nechako River. The lower elevations were a mixed fir and spruce stand with alder. This route ended behind the old school and the Caledonia trailer park. Fresh foraging on ants (Photo 48) and berries by bear(s) were noted. Overall, the habitat was rated lower than the other routes; however, the houses of the North Nechako area that backed onto this route were surrounded by alder making it more likely for bear(s) to enter yards. Route three was drier and less productive than the previous routes and it passed predominately through a pine forest with soapberry abundant in clearings. Twinberry and low bush blueberries were common in the pine understory. This route was rated as low in spring, moderate in summer (due to the abundant soapberry), and low-moderate in late summer. A bear trail coming up from a wetland/gully to the powerline was noted. This area was rated high to extreme hazard due to surrounding large track of undeveloped land, adjacent residential areas, access to the landfill and Caledonia trailer park garbage, numerous movement corridors and the presence of a variety of seasonal bear foods.

North Nechako River Trail Assessment: The lower portion of the Nechako River (north-west side) could only be accessed for a few hundred meters before becoming overgrown. A cabin was noted along the River's edge while garbage was present on the north-east side of the River. The trail along the upper Nechako River bench contained a high abundance of soapberry and a well used bench travel corridor/trail for wildlife and people. Bear foraging on ants, soapberry, and twinberries were noted. This route was rated as high hazard due to the abundance of bear foods and adjacency of the lower North Nechako residential areas. Bear foods included a high abundance of soapberry, rose, thimble berry, dandelions, and moderate abundance of Saskatoon, highbush cranberry and forbs. This route ended at the backyard of residential houses (Photo 50) and had a very poor line of sight.



Photograph 45. Panorama facing North up Powerline to the East and the South. These features make for easy movement/travel and act to link up the North Nechako with the Hart.



Photograph 46. Large deep fresh dig for ants and
larvae. Route 1. July 17, 2008.Photograph 47. Fresh foraging for ants.
Route 2. July 17, 2008.



5.2.2 Landfills and Transfer Stations Assessments and Hazard Ratings

There are 8 transfer stations and 1 landfill (Foothills) within the City or immediately surrounding areas (Table 10, Figure 9) and all were assessed. Two of the transfer stations, Vanway and Quinn Street, are managed by the municipality while the remainder is managed by the Regional District of Fraser-Fort George. Interagency cooperation is therefore required to manage these sites for Bear Smart status.

Residential users of transfer stations often noted 2 major concerns: (1) overflow of garbage prior to collection, and (2) container lids left open allowing bears to access garbage. In 2005, a black bear was destroyed behind the Vanway Transfer Site due to reports of a bear in dumpster. On Sept 29, 2005, 2 black bears were trapped and destroyed at the Foothills Regional Landfill. The attendant at the Shelly landfill reported frequent use by a mother bear and 2 cubs in 2007. He also noted that when the site is gated people leave their garbage bags at the gate or throw them over the hill.

Old "bear aware" stickers were on bin lids at Miworth and West Lake transfer stations only. None of the transfer stations had separate 'bear information' signs stressing to visitors to assure bin lids are closed and that garbage is placed properly inside the bins. At most transfer stations one or more of the lids were left open/ajar. The primary hazards associated with transfer stations were: (1) improper user compliance resulting in garbage being left outside the bins and/or bin lids left open; (2) insufficient frequency of emptying bins resulting in garbage overflowing (volume of garbage received was too large for the number of bins); (3) chain link perimeter of transfer stations (particularly those in remote areas) were not complete and/or gates were left open at night; and, (4) lack of proper bear aware user information signs.

¹ Rating	Comment
Moderate	Partial fence, approximately 5 feet on 3-sides. No attendant. No gate. Surrounded by scrub-land (pine had been removed) with few trees, and residences. No bear sign. Some lids left unlatched.
Moderate	Partial fence. Site had an attendant on duty for most of the day, including Saturday. Attendant stated that she has not seen bears at the site. Residents reported bin lids were often left open.
Moderate	Partial fence on 2-sides. Gated only to road. Attendant on
to high	duty. Bears have been observed as reported by attendant. Surrounded by trees and bush.
Moderate	Garbage frequently overflows. Lids often left unsecured. Station is fenced with chain link but front gates remain open at all times. Bins require more frequent emptying and/or more bins available. No attendant on duty.
Low	Surrounded by development. Person in attendance. Fenced.
	¹ Rating Moderate Moderate to high Moderate Low

Table 10. Hazard Ratings for the Foothills landfill and transfer stations within the city of Prince George and surrounding areas, BC.

¹ Shelly	High to extreme	Partial fence. Extreme garbage violations with garbage left at gate or down at lower appliance dump site. Surrounded by bear habitat. Mother with cubs reported late May 2007. Attendant reports that people often leave their garbage at the gate when the site is closed. He reports seeing many bears
Vanway	Low	Fenced area but open containers. Person in attendance during the day but not monitored at night. Stated that bin lids are closed at night and emptied regularly. No open pit areas. Close to undeveloped land.
¹ West Lake	High to extreme	Area only partially fenced. Containers often overflowing with garbage & lids left open. Residents report that garbage bags are frequently left on ground beside containers. Visible bear aware signs on containers. Bear sign present at transfer station and residents reported bears/sign as a common occurrence.
Landfills		
Foothills landfill	High	Not fenced on side that backs onto land connecting travel corridors. Very well managed site for smell and covering garbage. Bear sign noted in past. Bears trapped and destroyed at site in past.
Outside aity limite		

¹Outside city limits.

Figure 10. Location of the Foothills Regional Landfill and Transfer Stations for Prince George and Surrounding areas.



Foothills Landfill: The Foothills landfill is the main deposit area for the garbage of Prince George and surrounding areas. During the assessment the site was very well managed and had very little smell. No bear sign was noted at the landfill; however, garbage was currently being managed in a central, upper elevation area that was a distance from the surrounding forest perimeter. In 2001, the Parsnip Grizzly Bear Project monitored a radiocollared male grizzly bear that appeared to make regular use of the Landfill (Ciarniello et al. 2002). This bear regularly travelled between the Foothills Landfill and the Lower Mud River Landfill presumably crossing the Nechako River. He dropped his collar in the Chief Lake area in the berry bushes surrounding a house's lagoon. The resident was unaware there was a grizzly bear on her property. He denned in the Salmon Valley. At that time site visits to the landfill revealed grizzly and black bear tracks; however, the primary dumping area was much closer to the forested perimeter than during this assessment. During this assessment garbage was noted strewn in the bushes surrounding the landfill suggesting that bears still access the landfill. The primary concern with the Landfill is that it is largely surrounded by undeveloped, connected bear habitat (Photo 50) and the chain link fencing perimeter is not complete (Photo 51) on the sides that back onto the forested habitat (Pidherny triangle area and north-west) including a gully that was rated as high bear habitat.





Photograph 50. The Foothills Landfill site was well managed and smells were minimized. However, the landfill site was surrounded by large tracks of forested land (July 16, 2008)

Photograph 51. The chain link fence surrounding the Foothills landfill is not complete on the west side that backs onto the Pidherny Triangle (July 16, 2008).

5.2.3 Parks, Green- spaces, and Golf Course Assessments and Hazard Ratings

Anderson (2007) examined the relationship between parks and problem bear occurrence reports. She concluded that larger and more "wild" parks with an "ecological focus", such as McMillan Creek, Moore's Meadow, and Forests for the World, had fewer bear complaints than the smaller city parks. Similarly, green spaces, such as the Hudson's Bay Slough had very few complaints. Generally, bear occurrence reports were
higher in residential areas that were immediately surrounding the parks than those that were further from parks (Anderson 2007). The reader is reminded that the hazard ratings presented are not necessarily in relationship to a person's probability of encountering a bear; rather they refer to the hazard(s) present that may result in a bear becoming food conditioned and/or habituated to humans, and/or the probability of a negative encounter with a bear (refer to Section 3.4 for determining hazard ratings for greenspaces).

Area	Rating	Assessment	Comment
¹ Parks, Green	spaces, and		
Aberdeen Glen Golf Course	High	No	Backs onto undeveloped land and adjacent to cleared powerline (early green-up). Inverness area has high bear problems and a lot of residential garbage available.
Carrie Jane Gray Park	Low	No	Generally surrounded by development. Haul-all at entrance.
Cotton-wood Island Park	Moderate to Low	Yes	High bear use Park as it is along river corridor and contains abundant variety of bear foods by season, particularly spring and summer. Lower portion of Park contains high rated bear habitat as due surrounding islands. Low human occupancy. <i>All garbage cans bear-resistant, except one.</i>
College Heights Park	High to Extreme	Yes	Residential garbage available. The 2 garbage bins were not <i>bear resistant</i> . Residential garbage and fruit on trees available to bears. Connected to green-trails.
Connaught Hill	Low	No	Surrounded by development.
Fort George Park	Low	Yes	Steep bank generally separates river corridor from park. Park is largely manicured thereby reducing security cover. High human use. <i>Bear-resistant</i> <i>garbage cans recommended for main Park areas</i> (currently exist only for upper River edge).
Forests for the World	Low to Moderate	Yes	High bear use area but appears to be controlled for non-natural attractants. Large portion of area to separate wildlife from humans. Unleashed dogs may provoke encounters. Proximity to UNBC and other non-natural attractants could be a problem.
McMillan Regional Park	Low	Yes	Backs onto undeveloped land and river corridor. Bear resistant bin installed and warning sign at entrance. Park itself is managed well but surrounding residences and area had a number of non-natural attractants present.

Table 11. Hazard Ratings for selected parks, green spaces, and golf courses within the city of Prince George and surrounding areas, BC.

Area	Rating	Assessment	Comment
Moore's	High to	Yes	Garbage available in surrounding residential
Meadow	Extreme		neigbourhoods. A lot of bear sign noted.
			Sybertech garbage cans in park require more
			frequent emptying. Moderate lines of sight.
Otway Ski	Low-	Yes	Connects to large tracks of undeveloped lands,
Centre	Moderate		Forests for the World, and large acreages. High
			bear foods for spring, summer, and fall. Bear in
			area during assessment.
PG and Pine	Low	No	River bend comes closer to golf course areas.
Valley Golf			Adjacency to College Heights area. Bears would
courses			be required to cross busy streets to access.
Rainbow	Low	No	Surrounded by development.
Park			
Rotary Park	Low	No	Potential exists due to proximity to Cranbrook
			Hill and non-natural attractants but generally in
			developed area.
Wilson Park	High	Yes	Adjacent to river travel. Very poor lines of sight
			in places. Garbage strewn in Parking lot. Crab
			apple trees abundant in one area.
Wilkins Park	Low-	Yes	Bear resistant garbage cans. Bears known to
	Moderate		frequent the trails. Abundant bear foods,
			particularly berries and ants. Garbage in
			surrounding area generally unavailable to bears.
Yellowhead	Moderate	No	More rural. Garbage management requires site
Grove Golf			visit to check.
Course			

¹Parks or golf courses in problem neighbourhoods, large parks and/or green spaces only. *Not all Parks were assessed.*

5.2.3-A. Cottonwood Park Assessment

Three routes were assessed in Cottonwood Park: (1) Cottonwood - Heritage Park Trail; (2) Upper Cottonwood Park; and, (3) Lower Cottonwood Park. Heritage Park Trail was a paved path that ran along the Fraser River with a good line of sight (574 meters to the closed sign). It was primarily a people walk/bike route and not a bear route. The probability of encountering a bear increased towards Cottonwood Park. Potential spring forage included forbs, clover, grass and dandelions. Saskatoon berries increased in abundance towards Cottonwood Park. The clear line of sight and few cottonwood trees along the River (i.e., open to River) decrease the likelihood of bears in this area; however, there is a need to change the open 45-gallon garbage can at end of Route 1 (see Photo 12). No bear sign was noted and overall this trail contained minimal bear forage.

The second route began in the upper Cottonwood park area to the west but focused on the lower park area. At the time of the assessment the lower park area was closed but we foraged the backchannel to conduct the assessment. The lower park area contained the highest abundance of bear forage and security cover. There were an abundance of berry species, including dogwoods (high), Saskatoon (moderate), lonicera (moderate), rose (moderate), as well as lush riparian areas with cow parsnip and purple pea vine. In addition, there was an abundance of hiding cover that occurred a good distance from areas with high human use. A small island was within swimming distance of the Park and contained excellent bear habitat for spring. The line of sight in the lower park area was extremely poor but could also have been a factor of the winter 2007 ice jam. Wildlife was encountered on the island but the forest/bush was thick and species could not be determined. The lower park area was rated as high for spring and summer bear forage; a high potential exists of encountering a bear. It was believed that bears would access this area from the North side of the River (swim) or from the Shelly area. Bear resistant garbage containers were installed. No bear warning signs were noted.

The upper Park area was more open and paved with a much better line of sight than the lower park area. Saskatoon berries were in high abundance in the upper Park. Bear resistant garbage cans were noted, closed, and overall the litter appeared well managed. The upper Cottonwood Park area had the potential to attract bears due to its proximity to the lower Park area and abundance of berries. The only black bear warning sign encountered occurred at the main entrance to Cottonwood Park. Overall the upper Park was rated as moderate-low hazard for creating problem bears or a negative bearhuman encounter but the lower park area holds a high potential for encountering a bear.

5.2.3-B. Cottonwood/Fort George connector Assessment

The Cottonwood-Fort George Park connector began at the "bridge out" sign in Cottonwood Park, passed under the Yellowhead Highway Bridge, and concluded at Fort George Park. After the bridge the route traversed up the bank and through a residential area (Taylor Drive) to Fort George Park. In high tide it would be difficult for bear(s) to travel along the banks of the River, particularly in places where the bank is steep and the River's edge is minimized.

Overall the trail was open with a good line of sight. Forested stands were retained along the river and backchannels. Bears could access this area from the north and northeast as there were a number of forested/shrub islands that connect across the Fraser River. There were a high abundance of Saskatoon berries and willow species. This was a noisy route that was overall rated as low-moderate hazard due to its location by the River and proximity to lower Cottonwood Park area.

5.2.3-C. Fort George Park and the Hudson Bay Slough

The steep bank leading up to Fort George Park from the Fraser River likely deters bears from entering this Park. Bear movement through this area would be restricted along the River's edge. Fort George Park contained bear-resistant garbage containers along the upper bank (Taylor Drive); however, human-use areas a short distance away within the middle Park such as the Children's play area, water works areas, and picnic areas were supplied with non-bear resistant barrels. The Park contained minimal bear forage items but was located between the green-space coming off the River that connected to the Hudson Bay Slough and Cottonwood Park.

The second route began at the green-space southwest of Fort George Park (that connects to the Hudson Bay Slough), to the residential neighbourhood on Banks Street, doubled back to the green-space, crossed Queensway Street, and followed the Hudson Bay Slough to Massey Drive. Although there was limited visibility to assess the River's edge at this location, it was believed that bears could travel on the bank of the River to Banks road, particularly in low tide. Higher human use and density once at Bank's Road makes travel less likely and may trap bears using this corridor forcing them into the green-space, Fort George Park or Slough area. Crossing Queensway during the cover of darkness is possible for bears due to low traffic volume. The Sough area contained a high abundance of Saskatoon, rose, and alder, and a moderate abundance of thimble berry, aspen, spruce. There were low to moderate rated riparian habitats available as the Slough crossed Queensway Street. This route contained kilometers of connected green-spaces that allowed travel to Massey Drive but residential areas become increasingly denser and green-spaces become narrower as one advanced towards Victoria Street. The lower Slough area was rated as containing the best habitat for bears (low to moderate) with ratings becoming poorer and the habitat becoming more degraded as the green-space advances towards Victoria Street. Bear sign was not noted. King Fishers were spotted using the green-space between Fort George Park and the Slough.

5.2.3-D. McMillan Creek Park

Two routes were assessed passing through and adjacent to McMillan Creek Park. The primary purpose of the McMillan Creek assessment was to determine if bears were accessing the Hoferkamp and Inverness areas by being drawn off the Nechako River. The bank leading down to the River to Pulp Mill Road at the south end of McMillan Park was believed to be too steep to draw bears off the River into the Park or Hoferkamp Road areas. McMillan Creek itself connects onto large tracks of land to the north-east and bears are likely access the Park from those areas. Although less likely, bears could also cross the John Hart Highway at night. The Park contained a variety of berry species but a low abundance of wetland vegetation. Bear resistant bins and a bear warning sign were installed at the Park entrance. There was a good line of sight along the trails. The Park was rated as low bear forage for spring forage, moderate-high in summer, and low in fall. However, the surrounding residential area on Hoferkamp road contained fruit trees which increase the probability of bears in this area during fall.

5.2.3-E. Moore's Meadow Park

Moore's Meadow Park contained an abundance of fresh bear sign within the first 50 meters of the entrance trail. In addition, the sybertech garbage can located in the parking lot had the lid open and garbage at the base (see Picture 13 above). The Park contained spring forage, such as fireweed, clovers and dandelions and older bear foraging sign for spring was noted (Photo 52). Numerous digs for ants/larvae were recorded (Photos 53 and 54) and the Park contained a number of large ant nests. Saskatoon, thimble berry, wild strawberry, and mountain ash were present. Wildlife trails were evident through the meadow, which contained abundant patches of cow parsnip, with some horsetail, dandelions and peavines. The line of sight along the trails was rated as moderate. Houses and a school back onto the Park area. The majority of garbage cans in the Clare-Heritage Crescent areas were not secured properly. The juxtaposition of meadow habitats, abundant ants and berry species, adjacent residential areas with garbage available, and high human use of this Park contributed to a high to extreme rating this park for potential negative bear encounters, particularly during late spring and summer. Further, the neighbourhoods surrounding the Park rate high for bear hazards.



Photograph 52. Spring bear	Photograph 53. This large ants	Photograph 54. This foraging
foraging on the tips of fireweed	nest had been recently dug out.	on ants/larvae was also fresh
(photo taken July 14, 2008).		and was within an area with
		soveral digs for ants

5.2.3-F. Wilson Park and Associated River Trail

Wilson Park and associated Nechako River trail was assessed from the gravel pit east of the Foothills Bridge to just before the Caribou Highway Bridge where travel was no longer possible without breaking trail. Riparian habitat was present at the gravel pit near the Foothills Bridge. A bear trail with bear sign was noted in this area and appeared to originate off of the River/backchannel, across the railroad tracks, and towards Moore's Meadow Park/residential area in the vicinity of a gravel pit.

A bear warning sign and bear resistant garbage can was present in the main Wilson Park parking lot entrance; however, garbage was strewn throughout the lot (Photo 55). Generally, the human use trails along the River were overgrown with a poor line of sight (Photo 56). Berry producing plants were abundant along the route. To the east of the parking lot there was a concentration of crab apple trees that may have been associated with an old orchard (Photo 57). Abundant, lush forage was available to bears in Wilson Park. The combination of an acceptable travel route, combined with abundant non-natural attractants and a high human density contribute to this park's high hazard rating.



Photo 55. Bear resistant can and warning sign but garbage strewn in parking lot (photo taken July 14, 2008).





Photo 56. Poor line of sight was noted along a number of trails including this one that passed by an old crab apple plantation?

Photo 57. Crab apple trees were abundant in this area.

5.2.3-G. Otway, Wilkins Park, and Forest for the World Assessments

Otway, Wilkins Park (Miworth), and Forests for the World were considered wilder parks with an increased ecological focus. These Parks were located either outside the City limits (Wilkins) and/or contained very large tracks of connected forests (Otway, Forest for the World). The large, wilderness Parks were limited in their assessments in relationship to their area. Regardless, some of the highest rated bear habitat occurred in Otway, Wilkins Park, and Forests for the World. These areas contained a juxtaposition of lush spring habitats, including wet lands and riparian areas with abundant cow parsnip, clovers, sedges, grasses, and fireweed and a variety of berry producing species. Moose and deer sign was apparent in Forests for the World and Otway, while bear sign was recorded in Otway and Wilkins Parks.

The garbage cans in Wilkins Park were bear resistant and the line of sight along the loop trail was rated as moderate. Bear sign included scat, digs for ants and spring foraging. The Park was closed and remained wet due to floods from the 2007 ice jam. In addition to a variety of spring forage including cow parsnip, sedges and clovers, dogwood (a late summer berry) and twinberry were abundant within the Park.

Forests for the world contained numerous upper elevation wetlands that were highly rated spring bear habitat once snow-free. In addition, many berry species were present including Saskatoons, thimble berry, and moderate soap berry. Although the entire park trails were not assessed due to time limitations it appears garbage cans were bear resistant. Despite being a leashed dog area many dogs were noted to be off-leash and this could be a potential problem if encountering a bear or moose. Overall, line of sight was moderate along trails being the highest from the Parking lot to the Lake but decreasing from the lake onwards.

Otway was rated as containing the highest natural bear foods of all the areas assessed. The ski/bike trails descended in elevation passing through regenerating cutblocks and lush wetlands. Otway contained more low elevation wetlands with abundant cow parsnip, fireweed, clovers and peavines. A black bear was encountered in the cutblock directly above the ski chalet which contained abundant raspberries, twinberry, thimble berry, and Saskatoon. In the west side clearing there was abundant blueberries. Bears have been observed on the trails on numerous occasions. Overall, the line of sight for Otway was moderate to high; however, some sections contained poor lines of sight due to overgrown vegetation. No garbage cans were noted except for those contained within the chalet itself.

5.2.4 Hazard Ratings for Schools with Bears Reported

Only those schools with bear(s) reported within the last 4 years were assessed (see Section 4.2.3). Primary criterion used to determine ratings for schools were: (1) the availability of non-natural attractants to bears; (2) the line of sight (visibility) between the children's play area(s) and the school; (3) fencing of the perimeter of the play area(s); and, (4) the surrounding landscape and neighbourhoods. For school assessments the hazard ratings reflect the likelihood of a bear(s) entering school grounds. Generally, schools located adjacent to connected green-spaces were rated higher than those that occurred in areas surrounded by development because the probability of encountering a bear increases in areas where green-space connectivity is maintained (Table 12).

School Name	Rating	Comments
Austin Road	Low	7 open 45-gallon receptacles on grounds 2 large plastic lids
Elementary	Low	locked Adjacent fire hall has 1 large hin with open lid right
		beside play area. Residential areas tend to surround school.
		Fruit trees with abundant apples noted in neighbourhood.
Beverlev	High to	6. open 45-gallon drums on grounds. 1 large garbage receptacle
Elementary	moderate	with plastic lid in parking lot. Very poor line of sight from treed
,		play area to school. Brushing back of vegetation required along
		fence line as well as clearing surrounding school. Treed play
		area is high hazard as it backs onto green-space and has very
		poor lines of sight.
Buckhorn	Moderate	5, open 45-gallon receptacles on grounds, large bins in parking
Elementary		lot. Generally surrounded by residential areas but could brush
		out forbs in area where the chain link is double fenced.
Carney Hill	Moderate	9, open 45-gallon receptacles on grounds, 2 large bins with
Elementary	to low	plastic lids locked in parking lot. A lot of non-natural attractants
		were noted at both the school and surrounding area including
		strewn garbage and foul smells. Large, low chain link fence
		partly surrounds play areas. School is close to Slough and bears
		could get trapped in this area. High visibility and good lines of
		sight.
College	Moderate	5 open 45-gallon drums on grounds, 1 large garbage receptacle
Heights		with plastic lid in parking lot. Very poor line of sight from treed
Elementary		play area to school. Brushing back of vegetation required along
		fence line as well as clearing surrounding school. I ended to be
		from bigh to moderate
Callaga	Low	2 open 45 celler recenteries on arounds along with 4 longs hins.
Heights	LOW	s, open 45-gallon receptacies on grounds along with 4 large ons
Secondary		bins Good visibility and minimal bear foods School is
Secondary		currently under construction Minimal green space surrounds
		Automated garbage cans stored in carports surround.
Glenview	Moderate	2. open 45-gallon receptacles on grounds, 2 sybertechs, 1 large
Elementary	to high	plastic lid not locked in parking lot. New housing development
,	0	being built to the northeast. Currently school backs onto green
		space to east with notable bear foods and this contributed to
		rating. Some of the fence line is clear and has good example of
		proper lines of sight. Other areas require brushing along fence
		line. Warning sign should be placed along fence line.
Heather Park	High to	8, open 45-gallon receptacles on grounds, 2 large bins with
Middle School	extreme	plastic lids. 3 on surrounding street including 1 City bin chained
		to light post. Line of sight is good on school grounds but very
		poor for surrounding green space. The landscape filters bears
		towards school grounds and surrounding green spaces. Gate is
		needed at the back fence northwest corner to green space. Brush
		out along back and side to increase sight in green space. Place
		warning signs at entrance to green space. Residential area needs
		campaign to clean up garbage.

Table 12. Hazard Ratings for schools with bear(s) reported between 2004 - 2007 within Prince George and surrounding areas.

School Name	Rating	Comments
Hart Highland Elementary	Moderate	4, open 45-gallon receptacles on grounds, 1 large plastic lid in parking lot. 3 of the 45 receptacles are metal boxes. Mountain ash trees with abundant fruits available on grounds! Lines of sight are moderate for back play areas because very poor in the back corners and treed play area. Only partial view of east side play area from school. School has limited side windows for viewing outside. No views of west side play area with garbage can. Treed area to southwest back corner can not be viewed from school. Possible relocation of play area to increase lines of sight. Brush removal required for back areas. Remove ash tree.
Immaculate Conception	High	4, open 45-gallon receptacles on grounds, 1 large plastic lid in parking lot. Very nice, high chain link fence surrounds play areas. Good lines of sight but the windows tend to be small, rectangular which can obscure lines of sight from within the school. Green space cover availability in surrounding areas makes this school a high hazard. As the residential area builds up to the SW of the school the ratings will decrease but bear problems are expected as development continues. Houses in back neighbourhoods have automated cans visible. Signs for the neighbourhood and school are required as is bear country education.
Kelly Road Secondary	High to extreme	9, open 45-gallon receptacles on grounds, 2 large bins with plastic lids (1 front, 1 back). Abundant green spaces to north and west. Berries and forbs in green space. Gully ends right at school with fireweed and forbs and an open garbage can. Garbage is strewn all over school grounds and into bushes. Surrounding neighbourhood has fruiting trees, garbage and city garbage cans with bus stop. Residential bear aware campaign required, clean up school grounds and garbage dragged into green space, complete the chain link fence and make it higher, brush removal along fence line to increase lines of sight, warning signs.
Malaspina Elementary	Moderate	4, open 45-gallon receptacles on grounds, 2 large bins in parking lot with plastic lid are locked. Sybertech bin in adjacent park. Low chin link fence surrounds large area and fields. This school is close to the River and end of Domano cutblocks. On the NW side is a small green space. Fruit and mountain ash trees in residential yards surrounding school. Automated garbage cans abundant in neighbourhood. Green space has minimal foods but does contain berries.
Quinson	Low	9, open 45-gallon receptacles on grounds, 1 large bin with metal lid that was locked. Very good lines of sight. Low chain link fence surrounds play area and fields. Surrounded by residential houses, some have automated cans visible. No close green spaces. Mountain ash trees with abundant fruits and residential garbage would have to pull bears off Nechako River area. No treed play areas.

School Name	Rating	Comments
Sacred Heart	Low to moderate	2, open 45-gallon receptacles on grounds, 1 large plastic lid in parking lot. Low chain link fence surrounds. Compost and garden at residence that backs onto play area. School is located just west of where the bank of the Fraser River becomes quite steep. Mtn ash trees in yards right next door as well as automated garbage cans. Potential for a problem exits if bear(s) trapped in this area. Rating due to proximity to Park and River.
Vanway Elementary	Moderate to high	6, open 45-gallon receptacles on grounds, 2 large in parking lot. Concern is with the east side green-space that backs onto Henry Road and Bear Road (across the street from play area). Also, open garbage receptacle in this area. Typical, low chain link fence surrounds large area. Brush removal and warning sign needed on east side. Hazard rating reflects adjacent green space and available garbage with moderate lines of sight to east.
Westwood Elementary	Low	6, open 45-gallon receptacles on grounds, 1 large bin parking lot with plastic lid. Good line of sight. Low chain link fence surrounds play areas and fields. Surrounding houses have automated cans visible. No treed play areas with good lines of sight.
Westside Family Fellowship Christian	Low to moderate	3, open 45-gallon receptacles on grounds, 1 large in parking lot. Houses built up in this area and surround the school. Some have automated garbage containers visible. Small green space immediately adjacent to east. A warning sign entering the green space required. Partial brush removal would open up line of sight to east. The play area in back is small and backs onto houses.

There were a number of similar hazards associated with the majority of the schools assessed:

(1) Numerous non-bear resistant garbage receptacles occurred on school grounds:

- All schools assessed had non-natural attractants present on their property (45-gallon type garbage receptacles).
- Up to 9 open 45-gallon receptacles were associated with schools (Photo 58). These included cemented down but open at top bins, bins in metal boxes that had openings at top, and plastic bins. None of these bins were considered bear resistant.
- The majority of schools had cemented in 45-gallon receptacles associated with each entrance way. Although they were cemented to the ground they were open at the top and were not considered bear resistant.
- All schools except Quinson had large, *plastic lid*, non-bear resistant garbage receptacles located in the parking lot (for an example, see Photo #8).

(2) Some schools had multiple play areas and not all areas were visible from inside the school.

• A bear could enter school property and not be viewed by attendants prior to allowing the children outside.

• Limited visibility could result in a decreased reaction time of attendants in emergency situations.

(3) Treed play areas were commonly associated with elementary schools; however, these areas were often located the furthest distance from the school and tended to back onto overgrown green-spaces (Photo 59).

- Overgrown vegetation along fence lines provides a bear with hiding cover and increases the probability of a close encounter between a child/person and bear.
- Green-spaces immediately adjacent to treed areas increase the probability that a bear will be in the area surrounding the school.
- The distance between the school and the trees and vegetation retained in these areas increases the probability of an encounter and decreases the response time of attendants should a problem occur.
- Line of sight tended to be poor in a number of these areas.
- Bear forage items were found in these areas, particularly berry producing species.

(4) Surrounding vegetation had overgrown the fence in a number of areas providing hiding cover for an animal(s) to approach at closer distances (Photo 59).

(5) Schools that backed onto tracks of undeveloped, unmanaged habitat that were conducive to a bear's natural foraging behaviour were rated higher than schools where green spaces were further away.

(6) Schools with reported bear encounters in developed areas tended to be located in neighbourhoods with high bear occurrence reports and destructions, neighbourhood wide garbage management problems, and closely associated with the retention of connected green-spaces.

(7) Recent development surrounding some schools with older bear complaints reduced the probability of future bear problems due to habitat lost as long as green-space connectivity to the school area was not maintained and garbage in the surrounding neighbourhood was managed.







Photograph 58. Open 45-	Photograph 59. Many schools	Photograph 60. Hiding
gallon garbage cans	contained play areas that were in trees.	cover/overgrown vegetation
appeared to be commonplace	These often had abundant hiding cover	along fence line at Beaverley
on school grounds.	for bears as pictured at Ecole College	elementary (July 8, 08).
	Heights Elementary (July 9, 2008)	

6.0 INTER-PROVINCIAL AND/OR INTERNATIONAL ISSUES

A Provincial objective for hazard assessments is to "identify regional, interprovincial and/or international issues in areas outside the community that may affect the effectiveness of the "Bear Smart" program." The following issues have been identified and require partnerships between the City/municipality, Regional District of Fraser-Fort George (RDFFG), outlying agricultural farms, Conservation Officer Service, and the Northern Bear Awareness Society:

1) This Bear Hazard Report and the accompanying Bear Management Plan were initiatives of the Northern Bear Awareness Society (NBA). The NBA does not have the authority to develop, legalize, or enforce garbage storage bylaws required to achieve Provincial Bear Smart status. Nor does NBA have the authority to change the current automated garbage collection system to a bear-resistant system, change commercial garbage storage requirements, complete the fencing of Foothill Landfill, and the like.

Partnerships and a commitment to move forward with pursing Bear Smart status between the City of Prince George, the RDFFG, the Conservation Officer Service, and NBA are required to carry the program forward.

2) Transfer stations outside the City limits are managed by the Regional District of Fraser Fort George. *Interagency cooperation between the Regional District and the municipality are required to manage these sites for Bear Smart status.*

3) Bears are using the large tracts of retained green-spaces surrounding and within the City such as regional parks, connected green belts, and river corridors to access residential areas. The City must be willing to alter current green-space configurations and Parks management plans to dissuade use by bears. In addition, all non-natural attractants including garbage, planting of fruit bearing trees, bird feeders and composts management require the cooperation of and implementation by the City. Partnerships between biologists specialized in bear behaviour and the City are required to alter the spatial distribution of those green-spaces.

4) RDFFG and the City must work with the outlying communities to minimize the development of 'problem' bear behaviour in agricultural areas. Bear complaints overlap between the City and the RDFFG. Outlying agricultural areas of the Salmon Valley for example likely require interagency cooperation to proactively manage for bear problems in the Hart Highlands, particularly the Hoferkamp and Inverness Road areas. Similarly, a radiocollared bear in the Salmon Valley used the Foothills landfill and Lower Mud River areas (Ciarniello et al. 2002). Examples include examining ways to restrict access by bears through altering green-space configurations and examining domestic carcass disposal and/or crop placement and management. It is possible that food conditioning and habitation to humans of *some* 'problem' animals that use the City is a process that begins in the agricultural/rural areas and increases until the bear(s) become bolder and move closer to the City.

7.0 POTENTIAL DATA LIMITATIONS

The data presented contains the following potential limitations:

- (1) Bear occurrence reports did not contain a number of vital information:
 - UTM Locations were generalized from street names and occurrence information. Reports that did not contain this information were omitted from the database.
 - Attractant categories were lacking for most 2007 occurrence reports. In previous years attractant categories were obtained by manually searching through paper copies of reports for details.
 - The COS stated that all bears destroyed were food conditioned (as per their definition) but this did not match reasons provided in the database.

(2) There is no way to determine repeat bear occurrences with confidence:

• Data should not be used to infer population size or trends as one bear may be reported by a number of different individuals over a long period of time.

(3) The City of Prince George is large in area and it is not feasible to assess the entire City:

- Ground visits were not feasible for all neighbourhoods, parks, schools and green-spaces due to funding and time constraints. It was essential to prioritize areas for assessments due to the size of the City and the time, person power and money required.
- Areas were selected based on professional opinion, occurrence reports, and number of bears destroyed. A potential area may have been mistakenly omitted.
- Large tracks of green-spaces were not assessed and their value was inferred based on professional opinion.

(4) The City limits are narrow in relationship to actual distribution of dwellings of the people that comprise Prince George:

- Miworth, Shelly, Buckhorn, and most of Beaverley neighbourhoods fall outside the City limits but bears using these areas likely use areas within the City.
- Occurrence reports used for this document had been clipped to the City boundary and therefore under-represent actual number of reports and deaths as the outlying areas are not considered.

(5) The City is continually expanding:

- As the City expands into forested areas the distribution of complaints can be expected to change from what is presented in this report. It is anticipated that occurrence reports will follow the edge of developed Prince George and decrease towards the City core.
- As development expands further into bear country there is anticipated to be an increase in conflict between bears, City residents, and agricultural areas.

(6) Hazard assessments are largely based on informed, but subjective, professional opinions of biologists:

• Bears are wild animals and can be anywhere around Prince George at any time. Although the most up-to-date data available was used for this report an area rated as low, such as the inner Bowl, could have a bear present. This is particularly true for Prince George because green-spaces and trails tend to spur off high bear use areas acting as a filter into areas that may be ranked as a low hazard.

8.0 DISCUSSIONS

Between 2004 and 2007, the number of bear complaints more than doubled despite considerable efforts by the Omineca Bear Human Conflict Committee such as working with the City to install bear resistant garbage containers in a number of parks, running a fruit exchange program, removing some City maintained fruit trees, and delivering consistent extensive public outreach programs. The management of problem bears also remained very reactive as evidence by the large numbers of bears destroyed each year. Prince George is located within bear habitat and along natural bear travel corridors and bears should be expected to be a part of the larger Prince George area. The focus of this report is to examine the hazards present for bears within the City and Regional District of Fraser Fort George in order to determine ways bears can fulfill their life requirements while also reducing the number of bears destroyed and negative encounters between bears and humans.

Reducing negative bear-human encounters requires an understanding of the biology of bears. Bears are quick learners as evidenced by their ability to learn behaviours required for a solitary life in the short time they spend with their mothers (approximately 1.5 years for black bears and 2-3 for grizzly bears). During hibernation bears do not eat, urinate, or defecate and therefore must rely on fat reserves built up over their active season. Bears in the Prince George area may spend as long as 5-6 months in their dens relying on these reserves (Ciarniello et al. 2005). Female bears also have delayed implantation where the number of cubs produced is dependent upon the amount of fat she has stored; if she has only enough fat to sustain herself then no cubs will be produced. Therefore, obtaining as many calories as possible during their 6-7 month active season is paramount to their survival, reproduction, and achieving a 'good life' as a bear.

Although carnivores, bears' diet primarily consists of vegetation and berries. In spring bears forage on newly emerging grasses, dandelions, and pea vines, switching to berries once available. Curiosity and constant learning by bears means they may be attracted to areas of human use as they forage, especially if non-natural attractants are available. If non-natural attractants are <u>not</u> available the majority of bears can be expected to pass through non-productive foraging areas on their way to seasonal breeding, good foraging, or denning habitats. Although we may view discarded foods as waste most contains high-calorie forage items for bears that may be obtained with little energy expenditure in a short amount of time. For example, a bear would be required to consume hundreds of berries or ants to be equivalent to the calories present in a discarded hamburger, fries, or rotting fruit.

Associations between humans, human developments and food rewards may be made by the bear when non-natural attractants are obtained. These associations, termed food conditioning and/or habituation to humans, can quickly develop due to the remarkable ability of bears to learn, possibly from a single instance, and often result in 'problem'/nuisance behaviours. Problem bears tend to be destroyed; however, if the non-natural attractant(s) remain another bear often quickly fills the void perpetuating the cycle of making and destroying 'problem' bears. If not managed, this cycle of creating and destroying problem bears can result in a population sink or ecological trap (see Delibes et al. 2001, Battin 2004). In these situations, animals are attracted to areas that result in high mortality. Prince George is within bear habitat and contains abundant, easily available non-natural attractants; bears may be drawn into the City by the availability of non-natural attractants or find themselves trapped as they attempt to travel by the City. Over time ecological traps can result in population level consequences for the surrounding areas (Kristan 2003).

Rural residents appear to have more tolerance for the presence of bears than urban residents. Despite backing onto abundant bear habitat there were few reports from sparsely-populated areas outlying the city limits such as Blackburn, Beaverley, Buckhorn, and Cranbrook Hill. Bear complaints followed the periphery of urban Prince George and lessened towards the urban core. The distribution of future bear complaint reports is expected to follow the pattern of expanding development. That is, as the City expands into formerly undeveloped habitats bears that live in those areas become displaced and are either forced to live in close proximity to humans or must attempt to find new unoccupied range. An increase in bear occurrence reports and bear-human interactions can be expected as new concentrated residential developments (e.g., Tyner Boulevard) expand further into areas formally unoccupied by people. Bears in these areas need time to learn to avoid humans and to find new land for their home ranges; as humans expand farther into bear habitat area residents need to become more vigilant against developing 'problem' bears. New development projects must be required by the City to employ proper planning in relationship to concerns for wildlife. Complaints about bears are expected to continue until such time as the habitat is no longer available to bears (habitat loss as in the City core) or attractants are managed to such a level that bears have no reason to enter or remain in residential areas.

Some bears may get caught in town where green-spaces end at residential areas or green-space configuration acts to filter bears into residential areas (examples include College Heights and Hudson Bay Slough areas). Other bears likely live on the periphery of the City and slowly acquire conditioned behaviour in the outlying areas soon becoming attracted into urban Prince George where abundant residential and commercial garbage and fruit on trees were available (examples include Hoferkamp/Inverness areas and upper College Heights/Lafreniere). For example, curbside automated garbage collection in outlying areas such as Haldi is believed to contribute to food conditioning of bears and likely influences bear use of the urban upper College Heights/Lafreniere area. In the upper Hart Highlands the availability of residential garbage and access to the Foothills landfill was believed to strongly influence the distribution of bear occurrence reports as well as the number of bears destroyed. Part of the difference in bear reports for areas such as the north Hart Highlands versus Cranbrook Hill likely lies in the type of garbage

collection. Cranbrook Hill residents bring their garbage to the Quinn Street transfer station, whereas the Hart Highlands has curbside pick-up.

This Bear Hazard Assessment provides detailed information on the potential agents of human-bear conflicts specific to the City of Prince George. In order to reduce the number of bear complaints, bears destroyed, and the potential for a serious negative bear-human encounter, the City of Prince George must take the initiative by implementing and enforcing a number of management techniques that address the hazards identified in this document. For example, regulations and bylaws will be required for residential and commercial garbage storage. Further, bears move freely between jurisdictional boundaries and therefore the City must form alliances with the Regional District of Fraser Fort George to manage non-natural attractants and reduce the likelihood of bears becoming conditioned in outlying areas and travelling into the City. Moving towards a proactive approach to bear management by dissuading negative encounters before they occur requires the Conservation Officer Service and Northern Bear Awareness Society to work with the City and District to continue to identify, remove, and manage the cause(s) of the development of 'problem' bear behaviour.

Hazards identified in this Bear Hazard Assessment are being used to form the basis for detailed management plan recommendations for the City of Prince George. Please refer to the Bear-Human Conflict Prevention Management Plan for the City of Prince George, British Columbia. Expected completion date December 2008.

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Human-Bear Conflict Prevention Management Plan for Prince George, British Columbia

Application for Bear Smart Community Status: Phase II

22 September 2009

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Cover Sketch Copyright© Sandra Nahornoff. Black bear mother and cub feeding on Saskatoon berries. Sketches are for purchase from the Northern Bear Awareness Society with all profits benefiting the Northern Bear Awareness Bear Smart program.

Disclaimer

This document was prepared in accordance with the Bear Smart guidelines for conducting a human-bear management plan (Davis et al. 2002) and uses expert knowledge and recent data to address and reduce the potential risk of human-bear conflict within the city of Prince George. Input was also provided by NBA members, the public, the Conservation Officer Service, and others. The author believes that this report is based on the most accurate information available; however, **bears are wild animals that can occur anywhere in Prince George at any time and the author assumes no liability with respect to the use and application of the information contained herein.**

Prince George, B.C., Canada

2009

Human-bear Conflict Prevention Plan

Provincial Bear Smart status requires that the bear management plan be fully supported and authorized by Municipal staff, Mayor and Council.

Recommended:

Sandra Nahornoff President The Northern Bear Awareness Society Date:_____

Accepted:

Date:_____

Derek Bates City Manager Prince George, BC, Canada

The information contained within this document has been endorsed by the City of Prince

George, BC.

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GLOSSARY OF TERMS

The following definitions apply to terms used in this management plan:

Attractant: Non-natural (e.g., human food, garbage, grease, birdseed, pet food) or natural foods (e.g., berries, forbs, native fruit trees) that draw bears to an area (Ciarniello 1997).

Bear-Human Interaction: see human-bear interaction.

Bear Resistant Container: "A securable container constructed of a solid non pliable material capable of withstanding 200 foot-pounds of energy (using the approved bear-resistant container impact-testing machine). When secured and under stress, the container will not have any cracks, opening, or hinges that would allow a bear to gain entry by biting or pulling with its claws. Wood containers are not considered bear-resistant unless they are reinforced with metal" (Interagency Grizzly Bear committee 1989:5).

City: The City of Prince George.

Conflict or Incident: A human-bear interaction(s) where a bear may make physical contact with a person, damage property, and/or charge toward people. In conflict cases people may use extreme evasive action in response to a bear(s), use a deterrent on a bear or destroy a bear (Wellwood and MacHutchon 1999). The bear's behaviour may be offensive (e.g., curious or predatory) or defensive (e.g., protecting young or a food source and/or using dominance displays such as clack its jaws, swat paw(s), and/or vocalize).

COS: Conservation Officer Service.

Cub of the Year (COY): A bear cub born the previous winter and has not yet reached its first birthday. May also be termed Young of the Year (YOY).

Defensive Aggressive Bear Behaviour: Threatening behaviour displays by bears that are the result of the bear being *provoked or feeling threaten by people* (e.g., defending young, defending a carcass, too close contact). This behaviour may be the result of a surprise encounter between bear(s) and human(s). An alternative to this behaviour is offensive aggressive bear behaviour (Ciarniello 1997).

Displacement: Bear moves away from its current location (natural environment or otherwise) due to humans and/or human activities (adapted from Wellwood and MacHutchon 1999).

District: Regional District of Fraser-Fort George or RDFFG.

Food Conditioned: Bears that are continually attracted to human food and garbage as a result of food rewards. Operant conditioning, a form of learning, is most often implicated in the process of bears habitually feeding on non-natural foods (Ciarniello 1997). Bears conditioned to feeding on human foods/wastes (hereafter food conditioned) *may or may not* be habituated to humans

(Herrero et al. 2005). These bears may deliberately approach people because they are seeking a food reward or they may move away from people.

Habituation: "The relatively permanent waning of a response as a result of repeated stimulation which is not followed by any kind of reinforcement. It is specific to the stimulus" (Thorpe 1963:60).

Habituation to People/Human Habituated: A learning process in animals manifested by a lack of, or decline in, a fleeing response by the bear(s) to people (Ciarniello 1997). Bears habituated to people may be *but are <u>not</u> necessarily* food conditioned.

Human-Bear Interaction: Any type of exchange between bears and humans, including sightings, observations, and conflicts/incidents. "Human" is intentionally placed first since "problem" bear behaviour tends to be the result of the mismanagement of attractants by humans.

Non-Natural Foods: Foods that tend to be of human origin and would not naturally occur in the diet of bears native to the area. For example, garbage, fruit not indigenous to the area and/or livestock (Ciarniello 1997).

NBA: Northern Bear Awareness Society.

Offensive Aggressive Bear Behaviour: Aggressive bear behaviour that is *initiated by the bear* (e.g., stalking people). An alternate of offensive behaviour is defensive aggressive bear behaviour (Ciarniello 1997).

Predatory Attack: Bear attacks human(s), domestic animals or livestock as prey. Predatory bears rarely threaten or vocalize during stalking (dominance displays are rare).

'Problem' Bear: 'Problem' bears are those that act on their learned behaviour to such an extent that they are a threat to human safety and/or property when seeking out human food and/or garbage, livestock, etcetera. The bear tends to display offensive behaviour when interacting with people (Ciarniello 1997).

'Problem' Bear Behaviour: Behaviour which is chronically or habitually directed toward human foods, places, or items associated with people. 'Problem' bear behaviour tends to be a consequence of a bear feeding on non-natural foods (Ciarniello 1997) which is normally the result of mismanagement of the attractant by humans.

Proactive Management: Requires planning ahead, dissuading and anticipating events (e.g., bear problems) before they occur. Proactive management, such as securing garbage in a bear-resistant location even though one has not had any bear problems, is used to dissuade the creation of 'problem' bears and reduce the probability of a human-bear conflict or incident.

RDFFG: Regional District of Fraser-Fort George or District.

Reactive Management: Reacting to an event(s) as it occurs. There tends to be no or little forethought of such events. For example, continuing to destroy 'problem' bears without identifying and removing the source of the 'problem' behaviour is reactive management.

Relocation: Capturing, moving and releasing a bear(s) a short enough distance that one believes or knows through monitoring that the bear has been released within its home range.

Sighting: Human(s) sees a bear and the bear appears to be unaware of the human (Wellwood and MacHutchon 1999), may ignore the human(s) due to habituation to humans, or voluntarily moves away (displacement).

Translocation: Capturing, moving and releasing a bear a large enough distance or across a significant enough barrier that one believes (or knows through monitoring) that the bear has been released outside of its home range.

Travel Corridor: A zone or band of habitat that permits travel and access to other habitats important to bears. Corridors are used as a link to critical habitats, and often are not linear (Ciarniello 1997).

Zero Tolerance: A term applied to an enforcement of regulation in which there is no (or zero) leniency (Ciarniello 1997).

EXECUTIVE SUMMARY

The following *Human-bear Conflict Prevention Management Plan for Prince George, British Columbia: Application for Bear Smart Community Status Phase II* is the second phase of 6 steps required for Prince George to achieve Bear Smart status as determined by the Province of British Columbia (BC) Ministry of Environment (Davis et al. 2002):

Steps	Description of Activity	Completed for Prince George
	Prepare a Bear Hazard Assessment using criteria outlined in	
1	Davis et al. (2002).	\checkmark
2	Prepare a Human-Bear Conflict Management Plan designed to address the bear hazards and land-use conflicts identified in the hazard assessment.	\checkmark
3	¹ Revise planning and decision-making documents to be consistent with the human-bear conflict management plan.	
4	² Implement a continuing education program directed at all sectors of the community.	\checkmark
5	¹ Develop and maintain a bear-proof municipal solid waste management system.	
6	¹ Implement ''Bear Smart'' bylaws prohibiting the provision of food to bears as a result of intent, neglect, or irresponsible management of attractants.	

Steps Required to Achieve Provincial Bear Smart Status

^TFulfillment of these activities requires partnership between the Northern Bear Awareness Society, the Conservation Officer Service, the RDFFG and the City of Prince George.

²The Northern Bear Awareness Society has fulfilled this objective since 1998.

The primary objectives of this human-bear conflict management plan (hereafter Plan) are to reduce the number of bears destroyed and to prevent human-bear conflicts within the City of Prince George (hereafter City) and the Regional District of Fraser-Fort George (hereafter District). The Plan addresses the hazards and land-use conflicts available to bears that use the City and immediately adjacent District areas. The *Bear Hazard Assessment for Prince George, British Columbia: Application for Bear Smart Community Status Phase I* (Ciarniello 2008)¹ presents a problem analysis and rates the probability of selected areas for creating problem bears and/or human-bear conflicts. The reader is encouraged to view the Hazard Assessment in conjunction with this Plan because it provides the background results that form the basis for the recommendations contained in this Plan.

The Plan is structured in order of priority to aid with phasing in its implementation which is anticipated to take from 3-5 years. The following tables address individual management issues by identifying major and minor recommendations and their stage of implementation².

¹ Available from: <u>http://www.northernbearawareness.com/</u> (Bear Smart sidebar)

² The format of this management plan follows: Ciarniello, L.M. 1996. Management Plan to Reduce Negative Human-Black Bear Interactions: Liard River Hotsprings Provincial Park, British Columbia.

<u>Major recommendations</u> are obligatory to the overall success of the plan in reducing human-bear conflicts. The Plan will be most effective if a number of major recommendations from more than one "Issue" area are implemented simultaneously. Alternatively, a recommendation may be considered major but its implementation may not be required until a number of other recommendations are in place; some recommendations are not as fundamental to the presanitization stage but gain importance after sanitization.

<u>*Minor recommendations*</u> are secondary to major recommendations. A delay in the implementation of minor recommendations should not impede the overall success of the Plan if the vast majority of major recommendations have been implemented.

Three stages of implementation have been provided to aid with the execution of this Plan:

<u> 1^{st} Stage of Implementation</u>: put into practice those recommendations prior to other stages. A number of fist stage implementations should be executed simultaneously;

 2^{nd} Stage of Implementation: put into practice once the majority of 1^{st} Stage recommendations have been completed or as monitoring reveals;

<u> 3^{rd} Stage of Implementation</u>: put into practice once majority of 1^{st} and 2^{nd} Stage recommendations have been completed or as monitoring reveals.

A major recommendation with a 1^{st} Stage Implementation should receive the highest priority by managers. Options have been provided where feasible with option 1 being preferred over option 2 and so forth.

The Plan, implementation stages, and issues are meant to be adaptive to the anticipated change in patterns or behaviours of bears or humans as sanitization of the City and District occurs; if occurrence reports and/or monitoring reveal that a minor recommendation with a 3rd Stage Implementation should be implemented before additional 1st or 2nd stages are completed *then the plan should be adjusted accordingly*. For example, if fencing of the Foothills landfill alters 'problem' bear occurrence reports to the Chief Lake area then an assessment of hazards for the new 'problem' area (i.e., Chief Lake) should be immediately conducted and bear-resistant measures implemented. It is recommended that proactive management always begin with Issue One: Removing the Non-Natural Attractants combined with Issue Two: Managing Humans. It is possible that refocusing and reprioritizing neighbourhoods for management may need to occur before some areas have been made bear resistant, even if those areas previously rated as high to extreme in the Hazard Assessment. Being adaptive in management strategies and implementation is recommended in the Bear Smart background document (Davis et al. 2002).

Readers of this Management Plan are asked to 'bear' in mind these Note of Caution:

Prince George is situated within prime interior bear habitat, particularly for black bears, and all areas of the City have the potential to have either species of bear present at any time. The recommendations within this plan were developed with the intent of reducing the potential for human-bear conflicts as well as the number of bears destroyed each year; however, bears are wild animals and all human-bear interactions contain an element of risk. The recommendations presented in this Plan may be limited by the short-term duration of the study undertaken and the available funding. Monitoring recommendations as they are implemented and being adaptive as

new problems unfold will be required. The author assumes no liability with respect to the use and application of the information contained herein.

Recommendations are provided in order of priority beginning with the highest priority (1) onwards. *For details pertaining to recommendations as well as additional recommendations visit the appropriate section in the document.*

STEP ONE: DEVELOP AND MAINTAIN A BEAR-PROOF MUNICIPAL SOLID WASTE MANAGEMENT SYTEM

This is a required Bear Smart step with a first stage implementation:

		САТЕ	GORY	IMPI	EMENT	TATION
Sec	RECOMMENDATION	MAIOD		1 ST	2nd	3rd
No.		MAJOK	MINOK	L Stage	2 Stage	Stage
1101		<u> </u>	<u> </u>	Blage	Blage	Blage
2.1	Residential Garbage Storage from bears:					
I	Residential Automated Garbage System:			1		
	• install bear resistant latches on bins	\checkmark		\checkmark		
	• purchase new bear-resistant bins					
	• If bears remain able to violate old	,				
	polycarts with new latches installed, carts				\checkmark	
	in that neigbourhood must be replaced					
	with new bear-resistant varieties.					
	• Newly purchased receptacles should be of					
	the bear-resistant variety:	,		,		
	• Preferred Option: brands that remain	\checkmark		\checkmark		
	locked at curbside and open only with					
	compatible automated system,					
	• Second option: brands that require the					
	user to unlock when placed at curbside.					
	Priority of purchasing & replacing cans	1		1		
	should follow: high to extreme areas, high	N		N		
	areas, moderate areas, and low rated					
	Areas. Driority within areas being fitted should					
	start with periphery and households that					
	back onto green-spaces and trails and					
	work inwards towards neighbourhood	,		,		
	core.					
	• City: include bear smart educational					
	material that contains the Northern Bear					
	Awareness Society's contact information			\checkmark		
	with each resident's garbage collection					
	schedule.				ļ,	
	• Consider having bear smart tips displayed	\checkmark			\checkmark	
	on garbage cans or on a leaflet attached to					

ISSUE ONE: REMOVING THE NON-NATURAL ATTRACTANTS

1			1	1	1	
	each garbage can.					
	• Ensure a statement is contained within the	1		1		
	Municipal Waste Collection Agreement			N		
	regarding the required emptying of bear					
	resistant bins by chosen contractor.		ļ,			
	• Consider renting bear resistant bins for a					
	monthly user fee (City).					
	City to provide sheds for garbage storage					
	through the distribution of:					
	Provide lockable storage sheds for					
	garbage totes that could be rented or					
	purchased from the City for a fee. Sheds					
	must remain locked unless in use and					
	until the day of pick up, or					
	Provide building plans for lockable					
	storage sheds for garbage totes, or					
	 Contract local building centres to provide 					
	lockable storage shed building kits for					
	garbage totes at a possible reduced rate					
	with a youcher from the City					
	 bylaw required (see bylaw section) 	2		N		
п	Trailer Parks:	v		v		
11	 nlan a residential garbage containment 					
	system for trailer parks such as a central	N				
	bear-resistant transfer area(s)	, ,		, ,		
	 bylaw required (see bylaw section) 	N				
Ш	Curbside Pick-up for Rural Areas within the	· ·		•		
111	Cirbside Tick-up for Kurui Areas within the					
	 discontinue curbside nick-un in rural 	N				
	areas within the City	, ,			v	
	 residents to bring their garbage to transfer 					
	station					
	If curbside nick-up remains for rural areas					
	it is strongly recommended garbage totes					
	he hear-resistant at all times	, ,				
	 by law required for storage (see bylaw) 	N		N		
	section)	, v		Ň		
IV	Commercial Garbage Storage Program					
1,	Replace plastic lids on metal bins with					
	metal lids with a locking mechanism	,		,		
	Purchase new bins for those that cannot					
	be retrofitted	,		,		
	• Install central bear-resistant area(s) for					
	container storage for establishments with					
	chronic bear problems.					
	Require food waste garbage be stored at					·
	all times in bear-resistant bins.					
	Prohibit the storage of grease and other					
	food waste byproducts in non-bear			\checkmark		
	resistant locations and harrels					

n					1	
	• Implement times when bins are allowed to remain unlocked and require that although	\checkmark				
	unlocked lids must remain closed (e.g. 9)					
	am = 5 pm or during open hours					
	Do not allow garbage to overflow or be	2		2		
	strewn about the area.	v		v		
	• Reduce odours - Bins should be regularly					
	hosed down during bear active season.					
	 Place bear smart and user compliance 					
	signs on containers and storage areas.					
	Additional Recommendations for					
	Commercial Establishments that also back					
	onto green-spaces:	\checkmark				
	• Keep bear-resistant food waste refuse					
	containers within an area that is enclosed					
	by a high fence.					
	• The area should not back on to a green-					
	space.					
	• The door of the enclosure must be self-					
	closing and locking. Doors should open					
	outward (that is, the user must pull open					
	from outside) rather than pushing					
	inwards.					
	Doors must be kept closed at all times					
	 bylaw required (see bylaw section) 			1		
V	Transfer Stations:	· · ·		,		
· ·	 increase bin emptying frequency and/or 					
	increase number of bins	``		``		
	 install large sign at station gates providing 					
	information on hears & requesting user					
	compliance of the site	v		v		
	Clearly mark containers with signs to					
	ensure proper use					
	 Sign all bins with bear smart signs located 	2		N		
	close to the bin handle latching	v		v		
	machanism					
	Complete high perimeter fancing around	2		2		
	transfer stations (if not completed)	N N		Ň		
	 Diago bins a minimum of 100 m away 	2			2	
	from trees and shrubs	v			Ň	
	Consider baying an attendant check					
	transfer stations that are not manned	2			2	
	during the active beer seesen	N			N	
	• Drovide a large sign at the transfer station					
	• FIOVICE a large sign at the transfer station					
	facto aposifically requesting user			al		
	acts, specifically requesting user	N		N		
	compliance. Request that all has remain					
	ciosed to deter bears.					
	• Manage transfer stations with interagency	. 1		.1		
	cooperation between municipality and	N		N		

	District.					
VI	Foothills Landfill:					
. –	• Complete the chain-link perimeter fencing					
	for the Foothills landfill					
	• Assure perimeter fencing is at a sufficient					
	height as to deter bears, particularly in the					
	gully area.					
	• Suggested height for perimeter fence is a					
	minimum of 2 meters at all points and					
	may need to be higher on sloped ground.					
	remove garbage from bushes surrounding					
	the landfill					
	Consider using an electric fence in any					
	breech areas.					
	• Monitor the fence perimeter on a regular					
	basis by a reliable individual.					
	Immediately deal with any attempted			\checkmark		
	breeches in a site-specific manner.					
	• Apply daily soil cover when the main					
	dumping area is close to the perimeter		\checkmark			
	fence to reduce smell and deter breeches.					
VII	City maintained open garbage bins:					
	Remove unnecessary bins					
	• Replace non-bear resistant bins with bear	\checkmark				
	resistant bins.					
	Sign bins for increased user compliance					
	• Begin with extreme and high			,		
	neighbourhoods and areas that back onto					
	parks and green-spaces. Move inwards					
	towards the City core.					
	• Empty bins regularly and before they					
	overflow.				, , , , , , , , , , , , , , , , , , , ,	
	Clean bins with foul odours.	√				
	• Consider cementing/securing bins to					
	ground.					
	Sybertech Bins (City and Parks)		1		1	
	• Secure lids to base of bins.		N		N	
	• Install latches where garbage is deposited.					
	• Increase frequency bins are emptied,	\checkmark				
	particularly in higher use areas.					
	• Place lime or other smell reducing agent					
	down bin if odours persist.	,		,		
	• Sign receptacles for user compliance.	√				
	• Submit bins for bear-resistant testing.					
VIII	New developments on the periphery of					
	the City:	1		,		
	City to require proper garbage	\checkmark		\checkmark		
	containment areas and structures in					
	development plans prior to approval of					

			1			
-	development plans.					
	• Pre-plan bear-resistant residential garbage					
	containment areas prior to development of					
	the site.					
	All waste receptacles (residential and					
	otherwise) must be approved bear-	\checkmark				
	resistant.					
	Developer to hire a Registered					
	Professional Biologist to aid in planning					
	strategy (garbage containment methods					
	and areas, general design layout) for new					
	developments.					
	Implement one or more of the following					
	options in order of priority.					
	1. Provide a central, communal area with					
	large transfer station bins where					
	residents deposit their garbage.	, ,		v		
	Consider enclosing the area within a					
	minimum 2 meter high chain-link or					
	similarly fenced perimeter enclosed					
	structure; or					
	II. Provide a central bear-resistant					
	garbage storage building for					
	individual bins; and/or					
	III. Mandate that all waste bins be					
	contained within an individuals' self-					
	owned bear resistant structure such					
	as their garage or privately					
	nurchased residential enclosure until					
	the stated time allowed for curbside					
	nlacement					
-	New Developments in the Regional District					
	of Fraser-Fort George					
	 Continue to require households in the 		,			v
	RDFFG to use transfer stations					
	Consider implementing bear-resistant tote					
	restrictions for households with the					
	RDEFG that use private collection	, ,		v		
	services					
IX	Unauthorized garbage disposal sites					
	• Clean up refuse at existing sites		\checkmark			
	Implement stricter enforcement and more		· ·			¥
	frequent monitoring of known dumping		~			
	sites		v		v	
 	Issue and enforce fines for violations	N		N		
	Consider Problem Wildlife Protection	V		N		
	Orders in addition to other fines for	2		2		
	violations	v		N		
	 Provide barriers that would make it 	2		2		
		1 1	1	N N	1	

	difficult to lift large household items over.					
	• Involve the public in clean-up.					
	• Post signs with fines for violations at					
	known dumping sites.					
	• Post signs warning of the environmental					
	hazard of illegal dumping.					
	Consider media messages on the effects					
	of unauthorized sites on the environment.					
2.2	Potential Pilot Projects and Testing of N	lew, Innov	ative Bear-	Resista	nt Meas	ures as
	they Relate to Garbage Waste in the Cit	y and Dist	rict:			
I.	Potential Pilot Projects in Problem	<u>v</u>				
	Neighbourhoods: Separating Food Waste					
	from other Wastes					
	(A) Communal Waste Collection Sites					
	Install bear-resistant communal waste					
	sites in new developments &					
	neighbourhoods & trailer parks that are					
	experiencing chronic bear problems.					
	Things to Consider:	\checkmark		√		
	Final operation of the press Final operation of the press					
	with self-locking or automatic gates.					
	• Selected areas for bin placement must be					
	centrally located to increase user					
	compliance;					
	Selected areas should be separated from					
	green-spaces, trees and shrubs. The					
	greater the distance between these					
	features and the bin area the better;					
	Gates should open outwards and not be					
	able to be pushed inwards.					
	(B) Separate Lockable Containers for Food					
	Wastes					
	• Separate food wastes from other wastes					
	and placed in a separate bear-resistant					
	lockable container.					
	Things to Consider:					
	• Requires bear resistant boxes/containers					
	for proper storage.					
	• Requires strict user compliance.					
	• Bears are also attracted to byproducts					
	(e.g., packaging) that contain the smell of					
	food and non-food wastes, such as diapers					
	and grease.					
	• Option: combine this pilot project with					
	the Communal Waste Collection Sites.					
	(C) Household Garburators for Food					
	Wastes:					
1	1		1	1	1	1

	Things to Consider:					
	• Remains to require bear resistant					
	containers for proper storage of wastes					
	and byproducts that cannot be garborated.					\checkmark
	• Requires strict user compliance.					
	• Professional engineer is required to					
	evaluate the ability of the waste					
	environmental effects of this pilot project					
П	Curbside Recycling					
11.	Implement a strong educational					
	component that focuses on bears and					
	proper ways to recycle in bear country.					
	Mandatory cleaning/rinsing of					
	recyclables. Disallow any recyclable			1		
	materials that contain food byproducts to					
	Purchase bear resistant recycling boxes		2		1	
	for chronic problem neighbourhoods.		N N		v v	
	Implement and enforce bylaws for times					
	totes are allowed to be placed curbside					
	and properly secured from curbside.					
	Information and bear smart messages					
	should be available on the City of Prince			√		
	George and the Regional District of					
	Fraser Fort George's web pages.					
2.3	Fruit trees, Bird Feeders, Composts & Gar	dens:				
Ι	Fruit trees:					
	Prohibit planting of fruit trees by City or					
	Kegional District.					
	* City: should not plant trut trees, especially in high to moderate					
	identified areas.					
	* City: should remove fruit trees.				\checkmark	
	* City: ensure all fruit trees are properly					
	managed.					
	* City: promote awareness on proper					
	Full tree management.					
	* City: replace fruit flees with a non-fruit bearing tree or sterile tree					
	* City: ensure all fruit is picked before it					
	is ripe.					
	* City: to endorse a list of trees and					
	shrubs attractive to bears and assure					
	now amployees are aware of the list		1			
	new employees are aware of the list.					
	Encourage through active media messages					
n		1			r	
---	--	---	---	--------------	---	----
	their fruit early					
	* Discourage rotting fruit					
	* Discourage attracting bears					
	* Support the fruit exchange program					
	Discourage the planting of fruit bearing					
	trees by all residents	•		,		
	Encourage planting of non-fruiting			V		
	varieties (residential City & Region)	•		,		
	 Suggest removal of fruiting trees in areas 					
	with chronic bear problems	•		,		
	Fnforce removal of trees from those					
	residences and/or neighbourhoods that are					
	not managing fruits after warning	•		``		
	Fnforce and issue DWPO or other fines					
	for non-compliance	v		, ,		
	Provide guidelines for developers					
	mandating that they are not to plant fruit					
	trees or low lying berry bushes	v		v		
	Provide hear smart educational material at					
	all outlet stores that sell fruit trees					
	Develop a list of alternate varieties for			N		
	planting and have it available at all stores	v		v		
	that sell fruit trees					
	Promote the use of electric fencing for					
	fruit trees on orchards where management					
	of fruit may be difficult or where		2	N		
	residents are willing to manage their trees		v	v		
	Support the NBA Fruit Exchange	2		N		
	Program	v		v		
	Bylaw required (see bylaw section)	2		N		
	(A) Divergion grave Envit Trace Bilet Project:	v		N		
	(A) Diversionary Fran Tree Fuoi Frojeci:					
	fruit bearing treas on the outshirts of					
	in the bearing trees on the outskints of		2			al
	parks of crown land that backs onto large		N			N
	Deguines menitoring and research to					
	• Requires monitoring and research to					
П	assess checuvelless. Bird Faadars:					
	Diru recuers.	2				
	• Discourage bird feeders in bear active	N				
	season (April 1 – Nov. 30).					
	• Encourage alternate forms of bird feeders	,		,		
	• If bird feeders are used, must be secured			\checkmark		
	in a bear-resistant manner.					
	If bird feeders are used:					
	• Bird feeders must be at least 3 meters (10					
	feet), and preferably 5.5 m (18 ft), above					
	the ground and 1.5 m (5 ft) from the					
	supporting structure.	1		I		
	Fnforce the use of larger catch nans that	N		N		
1	Entoree the use of funger eatern pans that	1	1	1	1	

	extend past the feeder itself.					
	Clean spilled bird feed daily					
	Consider bringing bird feeders in at					
	night.					
	• Limit the amount of seed placed in the					
	feeder.					
	• Store replacement bird seed in a bear-					
	resistant structure (e.g., house).					
	• Consider wrapping a smooth metal band					
	around the girth of the supporting					
	structure that is of sufficient width (1-2					
	meters wide) so that bears are unable to					
	climb past the banding.					
	Enforce Problem Wildlife Protection	1		1		
	Orders in addition to other fines for	N		N		
TTT	violations.					
111	• A ccent non-cooked food waste compost	2		2		
	at landfill and select transfer stations	Ň		v		
	(could be pilot project).					
	Encourage indoor composting in high					
	bear rated neighbourhoods.					
	Provide bear smart composting					
	information with composters when					
	purchased/provided.					
	• Consider purchasing bear-resistant	./			.1	
	composts for neighbourhoods with	N			N	
	If outdoor composting is promoted					
	educational material should address:					
	• Placement of composts – avoid placing					
	trails Place in open with breaks around					
	hin	\checkmark		\checkmark		
	 Encourage regular turning of composts 					
	 Discourage meats, fish, eggs, dairy or 					
	similar foods in composts.					
	• Promote the use of lime to reduce odour.					
	Educational material should accompany					
	each compost and be reviewed by a					
	qualified individual.					
2.4	Domostio Concess Domostal & Agnicultural	Attractorto				
2.4 I	Domestic Carcass Kenioval & Agricultural	Auraciants	•	[
1.	 Kunching practices general: Encourage the creation of a central grad 			2		
	for calving/birthing and peopatal care	V		N		
	101 carving/on uning and neonatal cale.	l				ļ
	• Secure grain and other attractants fed to					
	• Secure grain and other attractants fed to domestic animals in a bear-resistant					

• Investigate the use of a number of alternate deterrent techniques to dissuade bears from the site. √ √ • Encourage a rural network of bear watch. √ √ • Remove bears that habitually kill livestock but only if the attraction is addressed at the same time. √ √ • Issue and enforce DWPO for improperly managed operations that will not voluntarily comply with Bear Smart practices. √ √ II. Domestic Carcass Removal: √ √ √ • The disposal of animal carcasses is governed under the Codes of Agricultural Practice for Waste Management. Should √ √ √ • Provide fines and PWPOs for non-compliance, such as carcass buried at insufficient depth and other violations of standards outlined in the Agricultural Practices Code √ √ • Support a rendering plant for domestic carcasses at the Foothills landfill. √ √ √ • Reduce the fees for domestic carcasses at the Foothills landfill. √ √ √ • Reduce the fees for domestic carcasses at the Foothills landfill. √ √ √ • Reduce the fees for domestic carcasses at the Foothills landfill. √ √ √ • Reduce the fees for domestic carcasses at the Foothills landfill. √ √ √ • Reduce the fees for domestic carcasses at th		• Promote the use of properly trained recognized breeds of bear dogs for protection of livestock.		\checkmark			
• Encourage a rural network of bear watch. $$ $$ • Remove bears that habitually kill $$ $$ Il: Unvestock but only if the attraction is addressed at the same time. $$ $$ • Issue and enforce DWPO for improperly managed operations that will not voluntarily comply with Bear Smart practices. $$ $$ II. Domestic Carcass Removal: $$ $$ $$ • The disposal of animal carcasses is governed under the Codes of Agricultural Practice for Waste Management. Should be reviewed in consolation with a Registered Professional Biologist specializing in large carnivore behaviour. $$ $$ • Provide fines and PWPOs for non-compliance, such as carcass buried at insufficient depth and other violations of standards outlined in the Agricultural Practices Code $$ $$ • Support a rendering plant for domestic carcasses at the Foothils landfill. $$ $$ $$ • Methoduce the fees for domestic carcasses at the Foothils landfill. $$ $$ $$ • Support a rendering plant for domestic carcasses at the sourcourage carcasses is allowed, encourage carcasses is allowed, encourage carcasses is allowed, encourage carcasses is allowed, encourage carcasses is to their farm, particularly cows & $$ $$ $$ • Discourage throwing carcasses is totheir farm, particularly the placement of c		• Investigate the use of a number of alternate deterrent techniques to dissuade bears from the site.		\checkmark		\checkmark	
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• Encourage proper pracement of noneybee √ • Encourage electric fencing of honeybee √ • Colonies. √	111.	Encourage proper placement of honouboe	2				N
Spaces. Encourage electric fencing of honeybee colonies. Colo		colonies in open and away from green	v				v
• Encourage electric fencing of honeybee colonies. $$		spaces					
colonies.		Fncourage electric fencing of honeybee	N				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
		colonies.	, v				v
• Consider raising colonies on a platform. ∇		Consider raising colonies on a platform					
IV. Potential Pilot Projects & Workshops:	IV.	Potential Pilot Projects & Workshons		,			,
(A) Worshops:		(A) Worshops:					

Establish workshops for farmers that			
address farm layout and planning to deter			
predators, electric fencing for protection			
of wildlife, domestic animals for the			
protection of wildlife, etcetera			
(B) Carcass Redistribution Pilot Project:			
Contemplate a "carcass redistribution			
program" where carcasses would be	\checkmark		
distributed in remote areas during			
'problem' seasons/times, particularly			
spring and fall.			

ISSUE TWO: MANAGING HUMANS

		САТЕ	GORY	IMPL	LEMEN	TATION
Sec.	RECOMMENDATION	MAJOR	MINOR	1 ST	2^{nd}	3 rd
No.				Stage	Stage	Stage
		<u></u>	<u>L</u>			0
3.1	Bear Smart Bylaw Development:					
Ι	Residential Garbage Storage &					
	Collection:					
	• Implement a 'bear smart' bylaw	\checkmark		\checkmark		
	addressing bear-resistant storage of					
	residential garbage and allowable times					
	for curbside placement.					
	• Provide a communal bear-resistant,					
	locked bulk waste container area for new	\checkmark		\checkmark		
	multi-family dwelling development					
	projects.					
-	Enforce fines for violations.					
II	Commercial, Industrial and Institutional					
	Garbage & Cooking Grease storage:					
	• Implement a 'bear friendly' bylaw			\checkmark		
	addressing the bear-resistant storage of					
	commercial garbage and allowable times					
	for bins latches to remain unlocked.					
	• Secure wastes within an enclosure or a					
	metal bin equipped with a metal lid that					
	locks/latches closed.					
	• Enforce that lids remain closed/down at					
	all times.					
	• Enforce that lids are locked down when					
	establishment is not in operation.					
	 Institute additional measures for 					
	establishments that remain to experience					
	bear problems.					
	 Prohibit waste from overflowing or 	,				
	being placed outside of bear-resistant			\checkmark		
	bins.					
III	Fruit trees:	,				
	Implement a bylaw for the management of			\checkmark		
	fruit trees:					
	• Address maintenance of residential fruit					
	trees as they pertain to wildlife in bylaw.					
	• Enforce the maintenance of fruit as it			1		
	pertains to bears (picking, disposal,			\checkmark		
	maintenance).	,		,		
	• Enforce that fallen fruit must be	\checkmark		\checkmark		
	immediately removed from ground.	,		,	ļ	
	• Support the NBA fruit exchange	\checkmark		\checkmark		
	program.				ļ	
IV	Bird Feeders:	1		,		
	• Implement a bylaw pertaining to dates	\checkmark				

	when outside bird feeders are acceptable			
	(preferred recommendation).			
	 Implement a bylaw requiring bird 			
	feeders be properly secured from bears			
	(alternate recommendation).			
3.2	Enforcement:			
3.2 - I	Bylaw Enforcement and Fines:			
	Bylaws must be Enforced to be Effective!			
	• Enforce bylaws with fines for violations:			
	* Suggest \$100.00 fine, or			
	* \$50 for first offence increasing			
	by \$50 for each subsequent offence.			
-	• Clearly state the agencies with power to			
	enforce by laws the wildlife attractant			
	bylaw document.		,	
	• Use funds from bylaw infractions to			
	further sanitize the City as well as			
	education, outreach and research on Bear	,	,	
	Smart initiatives.			
	• Allow the COS the power to enforce			
	bylaws that relate to wildlife.			
	 Consider giving the problem wildlife 			
	specialist or contractor the power to			
	enforce bear smart bylaws.			
3.2 -	Hire a Bear Conflict Specialist (City, NBA			
IA	and/or COS):			
	• Hire a person responsible for proactive			
	management of bears to aid the COS.			
	 Responsibilities include dissuading the 			
	development of problem bear behaviour			
	& the management of 'problem' bears.			
	• Education of public regarding bears.			
	 Canvassing neighbourhoods with bear 			
	reports immediately as reports are			
	received.			
	 Conducting or supporting research. 			
	 Database management. 			
	 Consider giving the problem wildlife 			
	specialist the power to enforce bear			
	smart bylaws.			
3.2 -	The Wildlife Act and Dangerous Wildlife			
II	Protection Orders :	,		
	 Issue and enforce fines for violations 			
	whether the feeding of bear(s) was			
	intentional or unintentional.			
	• Address the issue of "intentional" and			
	"unintentional" attractants in the bear	1	1	
	smart bylaws because the word	\checkmark	\checkmark	
	"intentional" currently appears in the			
	Wildlife Act.			

	• Consider removing the word "intentional" from Section 33.1 of the <i>Wildlife Act</i> (Federal or Provincial government responsibility).					
	• Support and encourage the COS to enforce bear smart management practices through the issuing of DWPOs.	V		V		
	 Provide COS with powers to enforce infractions to the 'bear smart' bylaw(s). Support and encourage the COS to be able to issue infractions to the bear smart bylaws. 	\checkmark		\checkmark		
	• Support and encourage the COS to enforce more Problem Wildlife Protection Orders.	\checkmark		\checkmark		
	Initiate legal actions for chronic				\checkmark	
33	Education:					
I.	Promote participation in delivering bear smart education messages between the					
	 <i>City, District, Solid Waste Management,</i> <i>MOE, COS & MOF:</i> Provide funding for hiring NBA education specialists. Provide booths at events free of charge. 	\checkmark		V		
	or pay for booths.Provide volunteers.					
	• Solid Waste Management: Provide funding directed at proper use and compliance for transfer stations & issues with bears in the District.	\checkmark		\checkmark		
	City & District: Provide free message space in City and District guides, such as the Leisure services guide	V		\checkmark		
	 Public Information Signs: Place large public information signs on the highways leading into Prince George as well as within the City itself 	\checkmark		\checkmark		
	• Post bear warning signs at all trail heads in neighbourhoods with moderate and high bear activity	\checkmark		\checkmark		
	Provide a 'bear facts' article in visitor information pamphlets	\checkmark				
	Support & continue the current Bear Complaints Map.	V	<u> </u>	√		
	 Media Releases: Provide a 'bear facts' article in the newspaper during bear active season 		√			\checkmark
I	• Provide a public information release		1			

when bear occurrence reports and/or		\checkmark	
destruction begin to escalate			
• Air TV commercials during bear active			
season on PG TV			

ISSUE THREE: GREENSPACE CONFIGERATION, CITY PLANS & DESIGN, PARKS & PROTECTED AREAS, NEW DEVELOPMENTS

		CATE	GORY	IMPL	EMENT	CATION
Sec	RECOMMENDATION	MAJOR	MINOR	1 ST	2 nd	3 rd
No.				Stage	Stage	Stage
4.1	General City Design & Layout:		-	-	_	
Ι	Configuration of Green-Spaces					
	• Consider the layout and the amount of	\checkmark				
	green space surrounding the City.					
	• Avoid placing schools and children's play					
	area in areas that back onto the periphery	\checkmark				
	of the green-space.					
	 Remove the majority of vegetation and 	,				
	clear out underbrush surrounding children	\checkmark				
	play areas.					
Π	Trails & Corridors:					
	• Remove, manage or reconfigure those	1				
	trails that lead into chronic problem	\checkmark				
	neighbourhoods.					
	• Sever green-spaces from travel corridors,	\checkmark				
	especially off the 2 major rivers					
	• Remove and thin the majority of	1		1		
	vegetation, particularly surrounding	N		N		
	green-space trails heads & switchbacks.					
	• I rim vegetation along trails to increase	.1				
	Innes of signi	N		N		
	• Assure bear warning signs are placed at	N		2		
	Consult a Registered Professional	v		v		
	Biologist specializing in large carnivores	N				
	for trail network design & layout	v		, ,		
42	Parks & Protected Areas:					
7.2	Sever green spaces that lead into City	N		N		
	particularly those along corridors	·		,		
	 Consider closing portions of trails or areas 					
	of Parks if bears are noted.		,		,	
	• Remove the majority of vegetation and					
	clear out underbrush surrounding children	\checkmark				
	play areas.					
	Consider fencing with high perimeter					
	fence children's play areas in parks where	\checkmark				
	green spaces back onto the play area.					
	Assure all garbage receptacles are					
	approved bear-resistant, are properly	\checkmark		\checkmark		
	maintained and managed.					
	• Evaluate sybertech garbage cans for bear-					
	resistant status.					
4.3	New Developments on the Periphery of the	City:				
Ι	Preplan the Layout!!					

 Bear-resistant measures should be required in development plans prior to approval. Implement and establish garbage storage rules and regulations at the onset: **inform potential buyers of the bear smart management rules and regulations prior to purchase. 	V		V		
 Provide a central communal bear resistant garbage collection system (refer to Section 2.2 – I A). Enforce the use of communal garbage 		\checkmark	\checkmark		
collection sites.					
 Prohibit the planting of fruit bearing trees (use the non-fruit flowering variety instead). Prohibit the planting fruit bearing shrubs 	\checkmark				
 attractive to bears. Remove existing fruiting trees or shrubs attractive to bears. Consider a bylaw to prohibit the planting of fruit bearing trees and shrubs attractive to bears. 					
• Provide pamphlets regarding bear smart education and messages left on the counter in the kitchen for new residents.		\checkmark		\checkmark	
• Require mandatory fencing of backyards that back onto undeveloped green-spaces or land with a high (minimum 2 m) fence.	V		V		
• Consider a strip (50-100 m) of zero brush along areas and backyards that back onto greenspaces.	\checkmark		\checkmark		
Plan any contained parks and green- spaces so they do not link to larger undeveloped areas.	\checkmark		\checkmark		
• Do not place walking trails in riparian areas.		\checkmark		\checkmark	
• Avoid splicing riparian areas into 2 or more parts.	V		\checkmark		
Account and allow for wildlife movement corridors to pass well around any developments that occur adjacent to the River or a creek/stream bed (e.g., Cowart Road development).	\checkmark		\checkmark		
• Avoid retaining any heavy brush or treed areas within the development core. Remove the majority of underbrush and provide an open park-like setting	√		\checkmark		
 Plan children's playgrounds separated from green spaces. Fence children's play areas with a 2 m 	\checkmark				

 high chain link fence.			
• If a trail links to a larger system (which is	,	,	
not recommended) heavily brush the	\checkmark		
shrub layer and increase all lines of sight.			
• Sign trails that may be used by bears with	\checkmark		
'bear warning' signs.			

ISSUE FOUR: SCHOOLS

		CATE	GORY	IMPL	EMENT	TATION
Sec	RECOMMENDATION	MAJOR	MINOR	1 ST	2^{nd}	3 rd
No.				Stage	Stage	Stage
5.1	Elementary & High Schools Assessed:					0
I.	Children's Play Areas & Bear forage:					
	• Remove brush along fence-rows on both					
	sides of fence.	\checkmark				
	• Clear a strip of zero brush along areas that					
	back onto green-spaces.					
	• Clear a buffer strip free of all vegetation			\checkmark		
	surrounding green-spaces & play areas of					
	\geq 100 m for schools rated as moderate to					
	extreme.					
	• Remove all bear forage items from school					
	grounds. This includes mountain ash	\checkmark		\checkmark		
	trees!		ļ,	ļ		,
	• Consider clearing bear forage items from					\checkmark
	adjacent green-spaces.					
II.	Line of Sight:	1		1		
	• Clear vegetation obstructing the line of	N		N		
	sight between school and play area(s).					
	• Relocate all play areas where the	. /		.1		
	vegetation is not being managed and if	N		N		
III	line of sight is obscured.					
111.	Garbage Containment:					
	• Remove an non-bear resistant garbage	2		2		
	necessary replace with hear-resistant cans	v		v		
IV	Fencing:					
1	• Raise the fence line on schools rated as	\checkmark				
	high to extreme to ~ 2 meters.					
	• Assure the fencing covers the entire					
	perimeter with no breaks.	\checkmark		\checkmark		
	Consider "double fencing" in problem					
	areas that back onto green-spaces		\checkmark			\checkmark
	(McCrory).					
V.	Education:	1				
	• Encourage children to play in groups.	\checkmark		\checkmark		
	Schools to solicit presentations by NBA					
	and/or COS.					
VI.	Additional General Recommendations:					
	• Remove fruit trees & berry bushes from				\checkmark	
	neighbourhood.					
	Clean odourous garbage cans.					
	Place bear smart warning signs in					
	neighbourhood.					
	• Implement neighbourhood 'bear smart'					
	clean up waste campaigns.					

	Consider having a biologist visit schools with repeat bear occurrences to further develop site-specific recommendations		√			\checkmark
5.2	University of Northern BC					
	• Remove all non-bear resistant garbage cans from school grounds. Where necessary replace with bear-resistant cans.	\checkmark		\checkmark		
	• Remove garbage bins located directly outside the daycare.	\checkmark		\checkmark		
	• Do not allow garbage to overflow or be placed outside of bins.	\checkmark		\checkmark		
	• Replace all large, commercial garbage containers with metal lids that are closed and latched at all times.	\checkmark		\checkmark		
	• Provide 'bear smart' education to students in residents at orientation sessions & pamphlets at the student centre.	\checkmark		\checkmark		
	• Enforce punishments including fines for students that promote problem bear behaviour.		\checkmark		\checkmark	
	• Provide a presentation on bears, the campus, the dangers and bears in the area open to all students.	\checkmark				
	• Electric fence, high fence, or relocate the compost facility.		\checkmark			
	 Post warning signs regarding bears, particularly those backing onto green- space trails. 	\checkmark		\checkmark		

		САТЕ	GORY	IMPL	EMENT	ATION
Sec	RECOMMENDATION	MAJOR	MINOR	1 ST	2 nd	3 rd
No.				Stage	Stage	Stage
6.1	Defining a Problem Bear	• 				0
Ι	Change from reacting to bear problems once bears have become a problem to proactively managing bears. If proactive management is not in the COS mandate then:	\checkmark		\checkmark		
	 i. support the hiring of a bear conflict specialist (refer to 3.2 – 1A), and/or ii. support the hiring of an NBA education 					
	specialist					
II.	 Develop a consistent set of criteria used to manage 'problem' bears: 	\checkmark				
III.	 Preventing and Responding to Conflicts with Large Carnivores does not supply a definition for "food conditioned." Consistent province-wide set of criteria for levels of food conditioning and habituation to humans required. 	\checkmark		\checkmark		
III.	• Reevaluate in City and District whether all food conditioned bears should be destroyed. (e.g., is a bear feeding in a mismanaged apple tree the same as a bear on a porch?).	\checkmark			\checkmark	
III.	• Develop a set of behavioural based criteria for problem bear management.	\checkmark				
IV.	• Develop a set of criteria for the length of time traps remain set in an area.	\checkmark		\checkmark		
IV.	• Evaluate ways to determine if the correct animal has been caught.					
V	 For bears that are <u>not</u> deemed a threat to human safety: Consider capturing the bear, placing an identifiable ear tag and then releasing the bear within its likely home range 	\checkmark			\checkmark	
	• Release bears within good bear habitat for that time of season.	\checkmark				
All	 Education and/or fines (DWPO and/or bylaw infractions) should be issued for all available non-natural attractants every time a bear call is responded to. 			\checkmark		

ISSUE FIVE: CRITERIA FOR BEARS IN THE CITY

		CATEGORY		IMPLEMENTATI		TATION
Sec	RECOMMENDATION	MAJOR	MINOR	1 ST	2^{nd}	3 rd
No.				Stage	Stage	Stage
7.1	Conservation Officer Service - Bear			T		
	Occurrence Reporting Database					
	Promote the creation of a standardized,					
	user-friendly database (e.g., Microsoft Excel	1		1		
	or Access) that is designed to gather			N		
	appropriate information for managing bears					
	In the City and District.					
	bear reports taken in Victoria clearly					
	identifying those that make it to the local	,		, ,		
	COS.					
	Data Recorded should include:					
	• Activity of the bear should be recorded					
	into a standardized category beginning					
	with:					
	i. Define the behaviour of the bear:	\checkmark		\checkmark		
	• Natural behaviour, or					
	• Non-natural behaviour.					
	ii. Record the type of natural or non-					
	natural behaviour:					
	• Natural behaviours include: feeding					
	on berries, feeding on vegetation,					
	sighting or travelling.					
	• Non-natural attractants include:					
	Domestic attractants and					
	Agricultural Attractants:					
	 Domestic attractant types 					
	include: Garbage, BBQ, bird					
	feeder, pet food, hunter killed					
	carcass, cookhouse, freezers, and					
	having trees					
	A arricultural attractants includes					
	• Agricultural attractants include:					
	livestock.					
	• There should be no "unknowns" or					
	blanks in the database! Consistent &					
	accurate recording is essential.	ļ,		ļ		
	• Input occurrence reports as received into	\checkmark		\checkmark		
	the standardized database.					
	• Date and time and location of the bear.	ν		N		
	• Location (UTM preferred, address okay)					
	as specific as possible.	N		N	1	1

ISSUE SIX: SCIENTIFIC DATA GATHERING & FUTURE RESEARCH

• Name of the neighbourhood.	N		N		
		1	1		
• Age class and gender (destroyed bears).	√		N		
Human-bear encounters:	1		1		
• Record all human-bear encounters.			\checkmark		
Determine the validity of each human-					
bear encounter.					
• Define the behaviour of the bear:					
Offensive or Defensive behaviour.	,				
Estimate property damage					
Record the response of the COS:	•		,		
Necora me response of me cost.					
• No response, destruction, trap set bear	V				
caught or not caught, translocation,	· ·				
relocation, aversive conditioning, etc.	1				
• Record the advice given (if applicable).	√		N		
• Keep a record of the calls that get passed	\checkmark		\checkmark		
along to Prince George from Victoria.					
• Add the gathering and recording of those					
data into the job description of the person			1		
taking the calls at the Call Centre in			\checkmark		
Victoria.					
• The database should be able to be updated					
using a central system so that any actions					
taken by the COS are recorded in a	\checkmark		\checkmark		
consistent fashion along the same row of					
data as the original call.					
7.2 Future Research and Monitoring					
I Bear Smart Research Project:					
• Support the Urban Bear Smart Research	\checkmark				
program on radiocollared bears.					
• Develop a GIS bear habitat map at					
~1:5,000 - 1:10,000.					
Develop a GIS bear corridor & travel					
route map at $\sim 1:5,000 - 1:10,000$.					
• Identify critical corridors & travel routes.					
• Identify habitats of seasonal importance.					
• Overlay the habitat map with a human use					
layer that identifies existing and proposed		\checkmark			
developments.					
• Use the results of the research project			İ		
combined with the COS Occurrence	\checkmark		\checkmark		
Reports to monitor this plan.					
 along to Prince George from Victoria. Add the gathering and recording of those data into the job description of the person taking the calls at the Call Centre in Victoria. The database should be able to be updated using a central system so that any actions taken by the COS are recorded in a consistent fashion along the same row of data as the original call. 7.2 Future Research and Monitoring Bear Smart Research Project: Support the Urban Bear Smart Research program on radiocollared bears. Develop a GIS bear corridor & travel route map at ~1:5,000 – 1:10,000. Identify critical corridors & travel routes. Identify habitats of seasonal importance. Overlay the habitat map with a human use layer that identifies existing and proposed developments. Use the results of the research project combined with the COS Occurrence Reports to monitor this plan. Develop to monitor this plan. Oreclay the monitor this plan.				√	

INTERAGENCY COOPERATION

		САТЕ	GORY	IMPL	EMENT	TATION
Sec	RECOMMENDATION	MAJOR	MINOR	1 ST	2^{nd}	3 rd
No.				Stage	Stage	Stage
8.0	Interagency Cooperation	-				
	The management of problem bears requires sp	pecialization	in a number	of discip	olines. No	one
	person, agency or non-governmental organiza	tion can imp	olement all oj	f the requ	ired 6 B	ear Smart
	steps.					
	Bear Ecology and Behaviour:					
	 Specialist and Registered 	\checkmark				
	Professional Biologist.					
	City of Prince George:					
	 Director of Planning 					
	Engineer					
	Development Services, Representatives					
	from:					
	Building Permits					
	Current Planning and Developments					
	Fnvironmental Manager					
	Parks and Solid Waste Services					
	 Education specialists – youth & adult 	V				
	• Lawyer			v V		
	Northern Bear Awareness Society			V		
	Ranching Association					
	Regional District Fraser-Fort George:	•		,		
	General Manager of Env. Services					
	Environmental Leader	\checkmark				
	Sustainable Development	•		,		
	Ministry of Environment:					
	Large Carnivore Biologist	\checkmark				
	Environmental Protection:					
	Conservation Officer Service					
	Ministry of Forests:					
	Wildlife biologist					
8.1	Additional Responsibility of the City					
	Revise planning and decision-making					
	documents to be consistent with this	\checkmark				
	management plan (Required Bear Smart					
	Step).					
	Consult with "a liability expert"					

1.0 INTRODUCTION

1.1 Criteria for Phase II Management Plan and Bear Smart Status

The premise behind achieving Bear Smart status is to move from the reactive management of 'problem' bear behaviour to applying a **proactive approach**³. Proactive management techniques are used to deter the creation of 'problem' bears which requires forethought in order to dissuade and anticipate bear problems before they occur as opposed to reacting to an event(s) as it unfolds. Example proactive management options include securing garbage in a bearresistant location regardless of whether or not the resident or commercial operation has experienced past bear problems and to properly design green-spaces and housing developments that occur in prime bear foraging and movement areas in an attempt to deter bears both spatially and with the use of bear-resistant structures before developments are constructed. Examples of reactive management include destroying, translocating, relocating or aversively conditioning bears that are in conflicts with humans or having to reconfigure green-spaces, fence designs or garbage storage and collection methods because they were not properly planned at the onset. If proactive management techniques are properly and consistently implemented they should reduce the need for reactive management and ultimately reduce the amount of funds spent on property damage inflicted by bears, Conservation Officer Service time in managing bear conflicts, and conflicts between bears and humans.

The following Human-Bear Conflict Prevention Management Plan for Prince George, British Columbia: Application for Bear Smart Community Status Phase II (hereafter Plan) suggests ways of managing the hazards and land-use conflicts available to bears that use the City of Prince George (hereafter City) and immediately surrounding Regional District of Fraser-Fort George (hereafter District). The recommendations contained within this Plan result directly from findings within the Bear Hazard Assessment for Prince George, British Columbia: Application for Bear Smart Community Status Phase I (Ciarniello 2008)⁴ which presents a problem analysis and rates the probability of selected areas for creating problem bears and/or human-bear conflicts. It is recommended that the reader view the Hazard Assessment in conjunction with this Plan.

On 29 June 2009 City Council passed a resolution for the City of Prince George to commit to achieving Provincial Bear Smart Status. This management plan fulfills the second phase of 6 steps required for Prince George to achieve Bear Smart status as determined by the Province of British Columbia (BC) Ministry of Environment (Davis et al. 2002) (Table 1):

³ Definitions for bold faced typed are provided in the "Glossary of Terms" section of this report.

⁴ Available from: <u>http://www.northernbearawareness.com/</u> (Bear Smart sidebar)

Steps	Description of Activity	Completed for Prince George
	Prepare a Bear Hazard Assessment using criteria outlined in	1
1	Davis et al. (2002).	√
2	Prepare a Human-Bear Conflict Management Plan designed to address the bear hazards and land-use conflicts identified in the hazard assessment.	\checkmark
3	¹ Revise planning and decision-making documents to be consistent with the human-bear conflict management plan.	
4	² Implement a continuing education program directed at all sectors of the community.	\checkmark
5	¹ Develop and maintain a bear-proof municipal solid waste management system.	
	¹ Implement "Bear Smart" bylaws prohibiting the provision of	
6	food to bears as a result of intent, neglect, or irresponsible	
	management of attractants.	

Table 1. Steps Required to Achieve Provincial Bear Smart Status

¹Fulfillment of these objectives requires partnership between the Northern Bear Awareness Society, the Conservation Officer Service, the RDFFG, and the City of Prince George.

²The Northern Bear Awareness Society has fulfilled this objective since 1998.

This Plan focuses on achieving Bear Smart steps 5 and 6 by suggesting ways the City and District can alter the current solid waste management system to make it bear-resistant. In addition, example Bear Smart bylaws that have been implemented in other cities or communities have been provided with the intent that they may be used as a template for a similar bylaw(s) in Prince George. Fulfillment of steps 3, 5 and 6 will require partnership and interagency cooperation between the City of Prince George, the Regional District of Fraser-Fort George (hereafter RDFFG or District) the Conservation Officer Service, the Ministry of Environment, and the Northern Bear Awareness Society.

1.2 Report Goals and Objectives

Two primary objectives underlay the foundation of the Bear Smart recommendations contained within this human-bear conflict management:

- (1) To reduce the likelihood of human-bear **conflicts** within the City and District thereby increasing public safety; and,
- (2) To reduce the number of bears destroyed or **translocated** each year within the City and District.

The following principals underlay the stated objectives of this Plan:

- (1) Eliminate or significantly minimize **food conditioning** of bears;
- (2) Minimize the **habituation** of bears to humans;
- (3) Reduce the number of bears entering chronic problem neighbourhoods;

- (4) Maintain a viable population of bears in their natural habitats; and,
- (5) Encourage active, public involvement in the management of bears within the City and District.

Success of this Plan may be measured by a:

- (1) Reduction in the number of bears reported within the City;
- (2) Reduction in the number of bears destroyed or translocated each year;
- (3) Reduction in property damage caused by bears;
- (4) Reduction in COS time spent reacting to bear 'problems'; and,
- (5) Increase in resident and visitor education of bears and bear behaviour.

This Plan was developed in accordance with the goals of the Omineca Bear Human Conflict Committee (OBHCC) and the Northern Bear Awareness Society (NBA). The primary goal of the NBA is to reduce conflict in neighbourhoods between people and bears through education, innovation and cooperation as outlined in their constitution⁵:

- A) To address issues relating to human-bear conflicts and the high number of bears destroyed in the City of Prince George and Regional District Fraser-Fort George;
- B) To increase public awareness of the potential for human-bear conflict by promoting conservation with a focus on preventative education and community involvement;
- C) To recognize that Prince George is located within bear habitat and as such to examine ways to allow bears to move around the City without becoming 'problem' animals;
- D) To foster a pragmatic understanding, appreciation and tolerance of bears;
- E) To make the City of Prince George and Regional District Fraser-Fort George bear resistant by minimizing unnatural attractants;
- F) To conduct research on bear habitat and behaviour in a community environment; and
- G) To achieve provincial Bear Smart status for the City of Prince George.

This Plan begins by restricting the availability of non-natural attractants to bears thereby promoting non-problem behaviours of bears. The plan also encourages the spatial separation of bears and humans as much as is feasible for a City placed within prime bear habitat and movement areas. Recommendations are aimed at discouraging bears from being within heavily populated areas of the City, for example by removing the non-natural attractants that tend to attract and hold bears around neighbourhoods and constructing barrier fences and visual breaks for new developments that back onto continuous bear habitat. Direct management techniques,

⁵ The Northern Bear Awareness Program under the direction of the Omineca Bear Human Conflict Committee was incorporated as the Northern Bear Awareness Society on July 11, 2008.

such as Bylaws for garbage storage and removal, the intentional feeding of wildlife, and enforcement of Problem Wildlife Protection Orders are recommended for residents or visitors that are unwilling to voluntarily comply with the removal of non-natural attractants. The aim of this Plan is to minimize and when need be to mitigate conflicts that may result from learned associations of bears towards people. Management options are best implemented before they encourage bears to develop "problem" behaviours but must also be implemented retroactively in areas currently experiencing bear 'problems'. The Plan is structured in order of priority with major recommendations being obligatory to the overall success of the plan in reducing humanbear conflicts. The reader is encouraged to refer to the Executive Summary for a summary of recommendations and implementation stages.

2.0 ISSUE ONE: REMOVING THE NON-NATURAL ATTRACTANTS

A variety of residential, commercial and City sources of non-natural attractants were documented within the human-bear hazard assessment for Prince George (Ciarniello 2008). The first step in becoming a Bear Smart community is to manage and restrict bear access to nonnatural attractants, particularly by restricting access by bears to garbage and discouraging the planting of fruit trees, while encouraging proper management of gardens, bird feeders, pet food composts, livestock claving areas, and livestock carcass removal.

2.1 Residential Garbage Storage: Securing bear access to garbage

First Step: Develop and maintain a bear-proof municipal solid waste system This is a required Bear Smart step with a First Stage of Implementation

It is recommended that the City and District begin with Step 5 of the required steps to achieve Provincial Bear Smart Status: "Develop and maintain a **bear-proof municipal solid waste** management system." To achieve this step the recommendations contained within the *2008 Regional Solid Waste Management Plan* (Section 6.13, pg. 25 of Gartner Ltd. 2008 report)⁶ that relate to bears must be implemented in combination with the additional recommendations contained within this section (Securing Garbage from Bears).

The 2008 Regional Solid Waste Management Plan for the Regional District of Fraser Fort George was released in September 2008 and approved by the Minister on July 7, 2009 (Gartner Lee Ltd. 2008). The Solid Waste Management Plan recognizes that the Regional District of Fraser Fort George "is home to a large population of bears that are integral to the local ecosystem. Developing and maintaining a solid waste management system that minimizes the potential for human-bear conflict will enhance public safety and prevent the unnecessary destruction of bears" (Gartner Lee 2008:25). Some key features of the plan as it relates to bears in the City and District are as follows:

⁶Available from: <u>http://www.rdffg.bc.ca/Report_Library/RSWMP08.pdf</u> (pg. 25; accessed August 4, 2009).

- RDFFG will work with local Bear Aware groups and the Province to establish and fund ongoing awareness and education campaign for waste generators that addresses "bear awareness" (pg. 25).
- Municipalities and the RDFFG will ensure that their **waste collection bylaws require containerization** of garbage and **enforced set out times** for curbside collection to minimize wildlife access opportunities (pg. 25).
- Backyard **composting education** materials will address how to compost in a manner that does not attract wildlife into residential areas (pg. 25).

Paragraph was bulleted and emphasis was added by author of this report (quoted from Gartner Lee Ltd. 2008:25).

Minister Barry Penner approved the RSFFG Solid Waste Management Plan subject to the submission of an annual Plan Implementation Progress Report to be submitted by March 31 of each year. Therefore, the recommendations contained within the Solid Waste Management Plan will require implementation within a timely period.

2.1- I Residential Automated Garbage Program

 Table 2. Summary of recommendations pertaining to restricting bear access to residential garbage.

Section	Summary of Recommendations Pertaining to this Step	Responsibility
2.1 – I	Residential automated garbage system	City
	Purchasing new bins and/or installing bear-resistant latches on existing	
	polycarts.	&
	 Newly purchased receptacles should be of the bear-resistant variety: Preferred Option: brands that remain locked at curbside and open only with compatible automated system, Secondary option: brands that require the user to unlock when placed at curbside. 	Remuneration possible in residential taxes or user fees.
	• Old receptacles must be fitted with a bear-resistant approved locking mechanism.	
	• If bears remain able to violate old polycarts with new latches installed, carts in that neigbourhood must be replaced with new bear-resistant varieties.	
	• Priority of purchasing & replacing cans should follow: high to extreme areas, high areas, moderate areas, and low rated areas.	
	• Priority within areas should start with periphery and households that back onto green-spaces and trails and work inwards towards neighbourhood core.	
	• City: consider renting bear-resistant bins for a monthly user fee.	
	• City: include bear smart educational material that contains the Northern Bear Awareness Society's contact information each resident's garbage collection schedule.	
	• Consider having bear smart tips displayed on garbage cans or on a	

	leaflet attached to each garbage can.	
	• Ensure a statement is contained within the <i>Municipal Waste</i> <i>Collection Agreement</i> regarding the required emptying of bear resistant bins by chosen contractor.	
	City to provide sheds for garbage storage through the distribution of:	
	• Provide lockable storage sheds for garbage totes that could be rented or purchased from the City for a fee. Sheds must remain locked unless in use and until the day of pick up, or	
	• Provide building plans for lockable storage sheds for garbage totes, or	
	• Contract local building centres to provide lockable storage shed building kits for garbage totes at a possible reduced rate with a voucher from the City.	
	• Garbage bylaw must be instituted and enforced.	
3.1	Bylaws - required for non-compliance.	City & District

Bear' feeding on garbage was the highest recorded non-natural attractant category as reported by the COS in Prince George (Ciarniello 2008). The current residential polycart bins are not bear resistant.

The most effective bear resistant measure would be to purchase new, bear-resistant bins for households in neighbourhoods with chronic bear problems; however, this recommendation is costly as it requires replacing the existing non-bear-resistant totes.

The preferred option is to purchase bear-resistant bins that remain locked/bear-resistant at all times and are opened only when emptied by a compatible automated system. If a garbage can must be unlatched by the user at curbside then it is not bear-resistant during the time it remains unlatched. It is recommended that the City purchase containers that have the ability to remain latched at all times. These containers would be opened by the automated system at the time the container is emptied. A less desirable option is to purchase bear-resistant bins that require the user to unlatch the tote once it is placed curbside. Bins that require the user to unlatch the locking mechanism at curbside must be coupled with a strictly enforced bylaw regarding the times totes are allowed to be placed at curbside.

A potential problem that must be addressed in the *municipal waste collection agreement* is the emptying of a bear resistant bin(s) by the chosen contractor. It has been noted in other communities that contractors have refused to pick-up bear-resistant bins especially if the bins are not the standard company bins and emptying of these bin types is not noted in their contract with the municipality. This may occur even if the truck is compatible with the automated bin design. The Municipal waste collection agreement must contain a statement(s) that addresses the required emptying of bear-resistant bins. This statement(s) also should occur in any contracts or agreements between the disposal company and the City.

A less expensive starting point may be to retro-fit the existing polycarts with latches that are *approved bear-resistant*. In areas or situations where new bins need to be purchased, or if bears remain to access garbage from bins that have been retrofitted with a latching system, then the City must at that time replace the current polycarts with an approved bear resistant bin.

Fit receptacles provided for the automated residential garbage collection program with bearresistant approved securing latches. Be prepared to replace retrofitted bins with an approved bear-resistant variety if bears are able to continue to access garbage from the retrofitted bin.

It is possible that even once retrofitted with a bear-resistant latch the existing polycarts may not be structurally strong enough to withstand the pressure exerted by a bear(s) that is attempting to obtain garbage. Existing polycarts used by the City would likely require a significant amount of reinforcing to make them bear resistant during such attempts and it is also likely that the existing cans would not be useable after such attempts. Several companies listed in Appendix 1 have stated that they would welcome working with the City on ways to replace the existing polycarts with bear resistant ones in an economically feasible manner.

If retrofitted polycarts are not able to withstand the forces of a bear(s) it is recommended that bins in be replaced with bear-resistant varieties. To be economically feasible this may be phased in by problem neighbourhood.

All new bins purchased, particularly for developments that protrude into bear habitat must be approved bear-resistant and not retrofitted bins.

The City to purchase approved bear-resistant bins as replacement for old bins when necessary (i.e., as new stock needs to be purchased) or as funding permits. (This may be partially compensated for in residential taxes).

Implement and enforce a bylaw for non-compliance (refer to Bylaw Section).

For a receptacle to be termed "**bear-resistant**" it must pass a number of approval tests put forth by the Interagency Grizzly Bear Committee (IGBC) Bear Resistant Container Testing Program and Living with Wildlife Foundation⁷. Containers used for garbage storage must pass a visual inspection, impact test (conditional on type of container), penetrometer test (conditional on type of container), and a captive grizzly bear test. Once products are tested they receive a rating "based upon the length of time the products are able to withstand the forces exerted by the test bears" (IGBC 2008:13). Ratings are provided from 1 to 5; containers rated 1 withstand forces ranging from 30-45 minutes, 2 from 45-60 minutes, and 3-5 being \geq 60 minutes. Containers with an approval rating of 4 are also "user friendly" and "low maintenance" as defined by the US Forest Service. Containers rated 5 also meet the definition of handicapped accessible as put forth by Americans with Disabilities. In the United States products "used on USFS, BLM and State Lands with food storage regulations must have a 4 or 5 star rating" (IGBC 2008:13).

It is recommended that only products approved by the IGBC be used in the City and District.

These products should have a minimum 4 star rating

⁷ http://www.lwwf.org/Final%20Bear%20Resistant%20Container%20Testing%20Protocol%20May%202008.pdf

A 4 star rating means the product is "user friendly" where the system must "open easily and to seal upon release of the latch mechanism without the need for tools or additional latching mechanisms such as bolts, knobs or pins" even under sever weather conditions.

Appendix 1 lists some of the manufactures that provide approved bear resistant residential garbage bins, storage areas for bins, compost bins, commercial bins, and similar bear-resistant products. A number of the bins state that they are or can be made to be compatible with automated systems. Note that the TyeDee Bin was tested by bears at the Northwood Zoo in Seagrave, Ontario and it is unclear whether it the criteria for testing was similar to the rigorous testing of products approved by the IGBC.

At the time of writing this Plan I was unable to locate a bear-resistant latch for the residential polycarts that would also be compatible with the automated garbage program. Some of the companies listed in Appendix 1 provide bins that may be compatible with the City's automated garbage collection system but at this time none sold the latches separately. Bear-resistant latches for the types of polycarts used in the City are available for purchase but at this time they require the user to open the latch for emptying by the automated system; if the resident forgets to open the latch the driver would be required to exit the vehicle or the resident's garbage would not be emptied. Therefore, if these latches are selected the responsibility is on the resident to unlatch the bin as close to pick-up as possible (would require a statement in the bylaw) and the bin would remain unlatched until it was empted thereby not being bear-resistant. However, *Lock Systems Inc. states that they have developed a latching system that will be compatible with Prince George's automated garbage system. The system developed by Lock Systems Inc. will have obtained IGBC bear resistant testing approval before being available for purchase which is anticipated to be by the end of summer 2009 (pers. comm., Appendix 1).*

Another possibility for the development of a latching system that is compatible with the automated garbage collection program is for the City to collaborate with organizations or individuals in Prince George to promote and/or sponsor a contest to design a locking mechanism for the automated garbage collection system. For example the development of a latch may be a course offered through the University of Northern BC or a City wide contest where a prize is offered to the winner. It is suggested that the prize be sponsored by individuals or businesses in the City and District, such as a trip or monetary reward, and be reported on from time to time in the media. The caveat is that the latch must pass the definition of a Bear Resistant Container as defined by the Interagency Grizzly Bear Committee and Living with Wildlife Foundation. The IGBC and Living with Wildlife Foundation offers product testing procedures and fees for private and commercially developed products. Product testing fees range from \$150-250 per product dependent upon whether a machine or bolting pad is required for testing (IGBC 2008:10) (for more on product testing see section on evaluating Sybertech bins for bear-resistance). This option would keep bear-smart initiatives in the public eye and could be used to promote educational information on bears and proper garbage storage methods. A delay in the implementation of installation of the latches is a potential negative of this option due to the time required to develop and test the product. Also, there is no guarantee that a bear-resistant product would be developed. If this suggestion is considered a time-line is required beginning with the finished product required before bears emerge from their dens in spring 2010. Development of a

product owned by the City should allow for production of the product at a significantly reduced cost.

(A) Phase In Plan for Bear-Resistant Changing of Residential Garbage Bins (if required economically)

The City and District have been shown to be within prime interior bear habitat containing denning, foraging and movement areas (Ciarniello 2008). This means that bears have the probability of being located anywhere in the City and therefore the most effective bear-resistant measure would be to replace all residential polycarts with bear-resistant varieties; however, since this may not be economically feasible a phase-in plan for replacing or retrofitting the bins may be required. The City is recommended to begin by focusing on those neighbourhoods that received the highest bear destructions and occurrence reports:

- 1. College Heights
- 2. Charella Gardens/Peden Hill
- 3. Hart Highlands upper and lower, particularly Hoferkamp road and Inverness Trailer Park
- 4. Foothills west and east of the Nechako River bridge

It is also possible that the economic situation may require this recommendation to be phased-in within a neighbourhood; if this is required it is recommended that the City begin with houses on the edge/periphery of the neighbourhood as well as those that back onto connected green-belts and trails and work inwards to the neighbourhood core (that is, those houses farthest from connected green-spaces and trails would be fitted last).

After bear resistant containers or latches have been installed in the 4 chronic problem humanbear areas listed above the City should focus on phasing-in bear-resistant latches or containers for the remainder of the City beginning with dwellings that occur on the remaining periphery of the City, those backing onto green-spaces, Parks and trails and then continue moving inwards towards the City core as funding permits. It is recommended to begin with any remaining areas rated as 'high' followed by moderate and then low rated areas. The City also should include bear smart educational material that contains the Northern Bear Awareness Society's contact information with the garbage collection schedule (Botten pers. comm.).

The phase- in plan to retrofit or replace residential garbage receptacles to bear resistant varieties should not take longer than 3-5 years and should begin in the winter/denning season 2009/10. By 2013-2014 the vast majority of residential bins in the City should be bear resistant.

As sanitization of the City occurs <u>consistent and continuous monitoring</u> of bear complaints in the City and District is critical to reducing the potential for human-bear conflicts. As access to nonnatural attractants are restricted the spatial distribution of complaints are expected to shift. The Conservation Officer Service must work with the City and Northern Bear Awareness to keep the City and District updated as these shifts occur. Shifts would be determined by calls recorded in the Problem Wildlife Occurrence Database. Management priority areas must be adaptive to these shifts as they are occurring so bear-resistant measures may be <u>immediately</u> implemented in the new 'problem' area. In chronic problem neighbourhoods curbside pick-up may need to be halted and replaced with centralized, communal waste system (refer to suggested Pilot Programs Section 2.2). In 1999 in Canmore, Alberta curbside pick-up was banned and switched to communal transfer station type collection system. This option is further addressed under Section 2.2.

<u> 2.1 - II Trailer Parks</u>

Table 3.	Summary of recommendations pertaining to restricting bear access to residential
	garbage at trailer parks.

Section	Summary of Recommendations Pertaining to this Step	Responsibility
2.1 – II	 Summary of Recommendations restanting to this step Trailer parks Require bear-resistant garbage bins for residential storage. Bins must be kept in a bear-resistant enclosure: I. Provide a central, communal area with large transfer station bins where residents can take their garbage. The area would be enclosed within a chain-link or high fenced structure; or II. Provide a central bear-resistant garbage storage area such as a chain-link fenced enclosure for individual bins. Newly purchased receptacles should be of the bear-resistant variety 	Trailer Park & City or District
3.1	Bylaws - required for non-compliance.	City & District

The problem of bears being attracted to trailer parks occurred regardless of neighbourhood because trailers tend to be smaller dwellings that typically lack enclosed car garages and the majority of residential garbage bins were kept outside the trailer. Each year a significant number of bear complaints and destructions occurred at trailer parks in College Heights and the Hart Highlands/Inverness. Trailer parks provide a consistent and predictable bear attractant for bears in the City and District due in large part to a lack of space for bear-resistant storage of residential garbage containers. Trailer parks represent a unique problem in that residents typically do not have a garage or similar structures to store their garbage until collection.

Residents of trailer parks should be provided with a central bear-resistant area to store garbage until pick-up.

Recommendations for all Trailer Parks:

- Option 1 Provide a centrally located communal area containing large bear-resistant transfer station type bins where residents take their garbage. The area should be fully enclosed within a chain-link or high fenced structure.
- Option 2 Provide a building, such as a garage or small building fitted with a self-closing metal door where residents could store their polycarts until collection. Doors should always open outward (that is, the user must pull open) rather than pushing inwards.

Both options require residents to take their garbage to the central, communal bear-resistant location.

Storage of garbage in locations that are not bear-resistant must be prohibited.

Garbage bylaws must be implemented and enforced.

Trailer Parks mentioned in the Hazard Assessment:

In addition to the above recommendations, site specific recommendations by visited trailer parks were as follows:

The Caledonia Trailer Park provides a central area for garbage collection but the bin did not have a lid and was allowed to overflow:

- Provide a metal lid for the bin at the Caledonia Trailer Park
- Ensure the lid has a secure locking mechanism and remains closed at all times
- Do not allow garbage to overflow
- Enclose the area in a high fence with self-latching gate

The Inverness and College Heights Trailer Parks both had consistent and continual bear reports and destructions:

- Require central bear-resistant areas
- The area selected should not back onto green-spaces
- Requires immediate implementation due to the large number of bears destroyed each year

The Miworth Trailer Park reported fewer bear problems since supplying a small bear-resistant bin resistant for residents but users mentioned that the lid often remained unlatched and the bin was not large enough for waste generated:

- Provide a larger bear-resistant bin
- Assure and enforce proper use and maintenance of the bin

Following compliance with a Dangerous Wildlife Protection Order from the COS, the Sintich Trailer Park, which now locks its bulk waste container every night, has reduced the number of bears destroyed from an average of 10 bears annually to no bears destroyed since 2001 (G. Van Spengen pers. comm.).

2.1 - III CURBSIDE PICK-UP FOR RURAL AREAS WITHIN THE CITY

Table 4. Summary of recommendations pertaining to garbage collection services for households & acreages on the periphery of the City.

Section	Summary of Recommendations Pertaining to this Step	Responsibility
2.1 – III	Curbside Pickup Rural Areas	City
	• Discontinue curbside pick-up in rural acreage areas on the periphery of the City.	
	• Require residents to take their waste to transfer station or landfill.	
	• Require residential garbage to be stored in a bear-resistant structure.	
	• If curbside pick-up remains for rural areas it is strongly recommended garbage totes be bear-resistant at all times.	
3.1	Bylaws - required for non-compliance.	City & District

It is strongly recommended to stop curbside collection in largely rural areas on the periphery of the City and require residents to take their garbage to transfer station.

Garbage totes for rural areas should be bear-resistant.

Residents that lived on larger rural acreages that fell on the periphery of the City (e.g., Haldi) reported bears targeting polycarts when they had been placed out on the road for collection. This was again reported in the Haldi area during spring 2009. Curbside pick-up should not occur in outlying areas of the City that are surrounded and/or connected by large tracts of green-space. It is believed that easy access to garage in these areas contribute to the food conditioning of a number of bears that might otherwise not encounter these non-natural attractants and develop 'problem' behaviours. Some bears may become conditioned in these areas to such an extent that they eventually move closer to the City core. It is recommended that curbside garbage service not be provided in:

- Haldi/Blackwater
- Inglewood Road in Chief Lake
- West portion of the North Nechako Road

It is strongly suggested that garbage totes for rural areas within City limits be bear-resistant at all times. Residential waste must be stored in a bear-resistant manner at the household and if curbside pick-up remains then in a latched polycart at curbside. Preferably the garbage would be brought to the nearest transfer station or landfill by the resident.

2.1 - IV COMMERCIAL GARBAGE STORAGE

Table 5.	Summary of recommendations pertaining to the storage of commercial garbage and
	restaurant wastes.

Section	Summary of Recommendations Pertaining to this Step	Responsibility
2.1 – IV	Commercial establishments	
	• Require food waste garbage be stored <u>at all times</u> in bear-resistant bins.	Establishment &
	• Prohibit the storage of grease and other food waste byproducts in non-bear resistant locations and barrels.	City
	• Replace plastic lids on metal bins with metal lids with a locking mechanism.	
	• Require new bins for those that cannot be made bear-resistant.	
	• Enforce that lids on bins remain closed at all times.	
	 Implement times when bins are allowed to remain unlocked and require that although unlocked lids must remain closed (e.g., 9 am – 5 pm or during open hours). 	
	• Do not allow garbage to overflow or be strewn about the area.	
	 Reduce odours - Bins should be regularly hosed down during bear active season. 	
	• Place bear smart and user compliance signs on containers and storage areas.	
	<u>Additional Recommendations for Commercial Establishments that also</u> <u>back onto green-spaces</u> :	
	• Keep bear-resistant food waste refuse containers within an area that is enclosed by a high fence.	
	• The area should not back on to a green-space.	
	• The door of the enclosure must be self-closing and locking. Doors should open outward (that is, the user must pull open from outside) rather than pushing inwards.	
	• Doors must be kept closed at all times.	
3.1	Bylaws - required for non-compliance. Enforce with fines.	City & District

Commercial operations must store food wastes, garbage contaminated with food wastes and/or restaurant grease in a bear-resistant bin(s). These bins should be contained within a bear-resistant area/structure for establishments that back onto green-spaces. Bins containing food waste and garbage with food residuals must be bear-resistant, contain metal lids, and remain closed at all times. Lids must remain closed at all times and be locked during the evening and when the establishment is closed. The site should remain clean and garbage must not be allowed to overflow or be strewn on the ground. Effort should be made to reduce the smell by frequent hosing/cleaning of the bins.

The College Heights Pub, The Pump House Pub, and any other establishments that frequently report or are known to have consistent bear problems should be the priority, particularly if they occur in neighbourhoods rated as high and/or extreme.

A few commercial establishments consistently noted problems with bears. The majority of these were pubs and restaurants that backed onto green-spaces, such as the College Heights pub. Issues with improper user compliance were noted for a number of these establishments and bears were reported to have accessed garbage even within enclosed containment areas. Garbage was noted strewn on the ground at a number of establishments and some bins contained foul odours. For establishments in neighbourhoods rated as high to extreme and that also have a record of bear problems strict user compliance rules must be enforced for employees. At all times, garbage must be placed in bear-resistant bins and the bin lids must remain closed. These bins would benefit from having self-latching mechanisms. For establishments that back onto green-spaces these bins should be contained within a high fence structure. If the enclosure is solid but with an open roof there should a way to view the inside before entering to assure a bear is not within the structure. The door of this structure should open outwards (have to be pulled open by the user from the outside) and should be self locking (that is, spring to close automatically and immediately).

Most large commercial bins were metal and some contained metal lids. Bins with metal lids simply require the lid to remain closed at all times and also be locked down each evening, during all times when the establishment is closed, and as often as possible during daylight hours.

Most commonly the large metal bins had plastic lids. Bins with plastic lids must be retrofitted with metal lids to make them bear-resistant. Examples and manufacturer information for retrofits used successfully in Fernie, BC, are provided in Appendix 2. Bins were either retrofitted with metal lids that were locked down with a simple carabineer or had a "bear lock bar" installed. Retrofitting the lids of existing containers appears to be the most cost effective way of making the existing metal containers bear-resistant. If bins can not be retrofitted a number of the companies listed in Appendix 1 also provide bear-resistant commercial containers for purchase.

2.1 - V TRANSFER STATIONS

The 2008 Regional Solid Waste Management Plan for the Regional District of Fraser Fort George recognizes a problem with transfer stations as they relate to human-bear conflicts:

• Transfer station users frequently leave the garbage bin doors open, resulting in an increased risk of bear-human conflict (Gartner Lee Ltd.:37)

1 able 6. Summary of recommendations for restricting bear access to refuse at 1 ransfer Statio	of recommendations for restricting bear access to refuse at	I ransfer Stations
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Section	Summary of Recommendations Pertaining to this Step	Responsibility
2.1 – V	Transfer Stations	District
	Restrict access to garbage by bears:	(& City)
	• Complete high perimeter fencing around transfer stations (if not completed).	
	• Increase schedule to empty bins for transfer stations, particularly those that are not manned.	
	• Place bins a minimum of 100 m away from trees and shrubs	
	• Ensure bin lids remain properly latched (requires education, user compliance, and enforcement).	
	 Consider having an attendant check transfer stations that are not manned during the active bear season. 	
	• Sign all bins with bear smart signs located close to the bin handle latching mechanism.	
	 Provide a large sign at the transfer station entrance with bear smart information and facts, specifically requesting user compliance. Request that all lids remain closed to deter bears. 	
	 Manage transfer stations with interagency cooperation between municipality and District. 	
3.1	Bylaws - required for non-compliance.	City & District

The main problems with transfer stations as noted by users and during assessments were the overflow of garbage and improper latching of lid containers. The overflow of garbage prior to pick-up enforces and causes misuse by the public. Solving these problems requires more frequent emptying of bins as well as education of users.

In Whistler, BC, it was recommended that transfer station bins be positioned 100 m wide from any adjacent tree or shrub cover (McCrory 2004).

(A) Prioritizing Transfer Stations and Additional Site Specific Recommendations:

Begin with those stations rated as high to extreme followed by moderate to high, specifically Shelley and West Lake Transfer Stations followed by Cumming Road.

- Complete perimeter fencing (West Lake, Shelley, Cumming Road/Pine View, Buckhorn).
- Empty stations more frequently. Bins must not be allowed to overflow. This was noted as a particular problem at West Lake and Miworth.

• Implement an additional education campaign for the residents of Shelley (required for increased user compliance). Focus on the times the transfer station is closed, what to do with garbage when closed. This may also be considered for West Lake residents.

2.1 – VI FOOTHILLS BOULEVARD REGIONAL LANDFILL

The Foothills boulevard regional landfill receives waste from City sources as well as District operated transfer stations. Twenty-five percent of the waste received by the Foothills landfill is categorized as organic matter (Gartner Lee Ltd 2008). Bears have been noted at the landfill and a few have been destroyed. 'Problem' behaviours developed and/or enforced by bears using the landfill likely contribute to the high number of 'problem' bears reported and destroyed in the Hart Highlands. The 2008 Regional Solid Waste Management Plan for the Regional District of Fraser Fort George acknowledges bear use of the landfill and offers the following recommendation:

• Foothills Boulevard Regional Landfill - Uses alternative daily cover (tarps), with weekly soil cover applied. If bears are noticed in the area, daily soil cover is applied. The site is three-quarters fenced (Gartner Lee Ltd. 2008:19).

Covering of waste materials will help reduce smells associated with the landfill but is not considered proactive management because it does not restrict access to the non-natural food source.

Section	Summary of Recommendations Pertaining to this Step	Responsibility
2.1 – VI	Foothills landfill	District & City
2.1 – VI	 Foothills landfill Complete the perimeter fencing. Assure perimeter fencing is at a sufficient height as to deter bears, particularly in the gully area. Suggested height for perimeter fence is a minimum of 2 meters at all points and may need to be higher on sloped ground. Consider using an electric fence in any breech areas. Monitor the fence perimeter on a regular basis by a reliable individual. Immediately deal with any attempted breeches in a site-specific manner. Apply daily soil cover when the main dumping area is close to the perimeter fence to reduce smell and deter breeches. 	District & City Although the Foothills Landfill is operated by the RDFFG it receives waste from the City of Prince George and bear management should be jointly shared between the City and District.
	• Consider cleaning garbage strewn in the forest surrounding the landfill.	
3.1	Bylaws - required for non-compliance.	City & District

Table 7. Summary of recommendations pertaining to the Foothills Boulevard Landfill

The portion of the Foothills landfill that backs onto largely undeveloped lands behind the Nechako bench must be fenced with an enclosed perimeter fence (Pictures 1 & 2). Fencing

should either be similar to the high chain link currently surrounding $\sim 1/2$ of the landfill or a bear-resistant electric fence. For Whistler, McCrory (2004) recommended a minimum height of 2 meters for perimeter fences surrounding schools. Once fully enclosed, the perimeter of the landfill should be regularly monitored by a reliable individual to determine if there are areas where bears may attempt to breech the fence. Any attempt at breeching the fence must be immediately dealt with according to the site/area and type of breech attempted (e.g., digging versus climbing). If the main disposal area occurs close to the perimeter fence daily soil cover should be applied to reduce the smell and deter breeches. Grizzly and black bear tracks have been noted at the landfill and garbage has been dragged by bears into the surrounding bushes.



Picture 1. View of the area requiring fencing to northwest. It is believed that the gully is used as the main access route by bears when accessing the landfill. A perimeter fence of sufficient height to deter bears is recommended (July 16, 2008).



Picture 2. Close-up of the portion of gully that is believed to provide the main access route used by bears to access the landfill (July 16, 2008).

2.1 – VII CITY MAINTAINED OPEN GARBAGE BINS

Section	Summary of Recommendations Pertaining to this Step	Responsibility
2.1 – VII	City managed bins (City and Parks)	City
	• Remove bins that are unnecessary.	Parks
	• Replace non-bear resistant bins with bear resistant bins.	& District
	• Begin with extreme and high neighbourhoods and areas that back onto parks and green-spaces. Move inwards towards the City core.	This is a joint
	• Empty bins regularly and before they overflow.	responsibility
	• Clean bins with foul odours.	depending on where the bin is
	• Consider cementing/securing bins to ground.	located. It will
	• Sign bins for increased user compliance.	require
	• Assure all highway rest area bins are bear-resistant (District)	interagency cooperation.
	Sybertech Bins (City and Parks)	
	• Secure lids to base of bins.	
	• Install latches where garbage is deposited.	
	• Increase frequency bins are emptied, particularly in higher use areas.	
	• Place lime or other smell reducing agent down bin if odours persist.	
	Sign receptacles for user compliance.	
	Submit bins for bear-resistant testing.	
3.1	Bylaws - required for non-compliance.	City & District

Table 8. Summary of recommendations pertaining to City maintained open garbage bins.

During the hazard assessment a list of 100 non-bear resistant bins located throughout the City was developed. Most notably a number of bus stops and light posts had plastic bins with or without lids chained to the stop or post. These bins also were noted in neighbourhoods that were rated as high to extreme bear hazard. Some non-bear resistant bins were placed immediately outside of schools that also were rated as high to extreme human-bear conflict hazard, such as Heather Park Middle School and Kelly Road Secondary. The bin pictured in the hazard assessment in College Heights at the end of Bernard Street contained garbage, was in a chronic bear problem neighbourhood, and was near a greenbelt.

It is strongly recommended that the City and District remove unnecessary bins. Bins deemed as necessary should be replaced with bear resistant varieties. Some bins may simply require proper and secure lids. Other bins will require complete replacement. Consider cementing bins to the ground, particularly in neighbourhoods with chronic bear problems.

The Conservation Officer Service notes that human-bear conflict has been significantly reduced in the parks with bear resistant containers (G. Van Spengen pers. comm.). The majority of bins had been replaced within Parks with bear resistant varieties; however, a few bins remain and require immediate changing. Change all remaining non-bear resistant bins in Parks to bear resistant varieties. Non-bear resistant bins noted include but are not limited to Fort George Park, particularly surrounding all Children's play areas and along the Fraser River bench, Cottonwood Park along Heritage Trail and Moore's Meadow.

All City, Park and District maintained bins require regular maintenance and frequent emptying. Hosing bins down will help to reduce the odour associated with the garbage. User compliance must be requested using signs on bins and education; however, Park employees or contractors should regularly clean up litter, empty and inspect all waste containers. Garbage must not be allowed to overflow from bins and regular checks and maintenance is required to assure bin lids remain secure and undamaged. Park layout and design are discussed further under the Park's section.

(A) Sybertech garbage bins:

The Sybertech garbage containment system has not been tested for its bear-resistant status by the Interagency Grizzly Bear Committee (Sowka pers comm.). During the time of the hazard assessment it appeared that this type of garbage collection system was fairly effective at restricting access to garbage by bears. The COS states that they have not received complaints of bears accessing garbage within the Sybertechs (G. Van Spengen). However, 3 main problems were noted with the sybertech garbage can system which would require alterations to make them bear-resistant: (1) the lids of the garbage container are easily removed and need to be secured to the base of the can otherwise bears can remove the lid and possibly access garbage (depending upon the depth of the garbage at the time of the incident); (2) the round hole where garbage is deposited does not have a secure latching mechanism and bears can reach into the can; and (3) improper use by the public, typically a result of the can being too full, resulted in garbage being deposited outside of the can (Refer to picture 13 in Hazard Assessment taken at Moore's Meadow Park).

Sybertech design bins should be submitted for bear resistant testing by the City or manufacturer. Testing and rating with allow the Sybertech system to be evaluated according to the determined criteria set out by IGBC and the testing procedure is reasonably priced:

For products that do not require placement by tractor and products that do not require bolting to a concrete pad will be \$150.00. The fee for products that must be hauled into the habitat by forklift, tractor, or other equipment, and products that must be mounted or bolted to a concrete pad inside of the habitat will be \$250.00. Products that do not last the minimum amount of time and are resubmitted will be assessed a reduced testing fee of \$100 or \$150 depending upon the type of product (IGBC 2008:10).

Sybertech canisters require regular visits by a reliable maintenance person to note bear sign and immediately correct potential issues with the can (e.g., more frequent emptying, cleaning to reduce smell), particularly because this design is not currently bear-resistant.
2.1 – VIII NEW DEVELOPMENTS ON THE PERIPHERY OF THE CITY (REFUSE STORAGE AND COLLECTION ONLY)

The following section deals only with the containment of waste for new developments. For recommendations on planning, layout and landscaping of shrubs and trees please refer to Issue Three, Section 4.4. Please note that the following are broad recommendations that may also apply to existing developments that are experiencing bear problems (e.g., Westgate).

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Section	Summary of Recommendations Pertaining to this Step	Responsibility
2.1 -	New developments:	Developer
VIII	• Pre-plan bear-resistant residential garbage containment areas prior to development of the site.	& City
	• Developer to hire a Registered Professional Biologist to aid in planning strategy (garbage containment methods and areas, general design layout) for new developments.	(Plans need to be in place before residents arrive)
	• *City to require proper garbage containment areas and structures in development plans prior to approval of those plans.	
	• All waste receptacles (residential and otherwise) must be approved bear-resistant.	
	Implement one or more of the following options in order of priority:	
	I. Provide a central, communal area with large transfer station bins where residents deposit their garbage. Consider enclosing the area within a minimum 2 meter high chain-link or similarly fenced perimeter enclosed structure; or	
	 II. Provide a central bear-resistant garbage storage building for individual bins; and/or 	
	III. Mandate that all waste bins be contained within an individuals' self-owned bear resistant structure, such as their garage or privately purchased residential enclosure until the stated time allowed for curbside placement (examples of residential enclosure structures are provided in Appendix 1).	
	New Developments in the Regional District of Fraser-Fort George:	
	• Continue to require households in the RDFFG to use transfer stations.	
	• Implement a campaign regarding proper household garbage storage.	
	• Consider implementing bear-resistant tote restrictions for households with the RDFFG that use private collection services.	
3.1	Bylaws - required for non-compliance.	City & District

 Table 9. Summary of recommendations pertaining to the storage of residential garbage for new developments on the periphery of the City or District.

It is strongly recommended that all outlying areas, and new developments on the periphery of the City or the District, have proper garbage management strategies, such as transfer station type bins or locking garbage receptacles coupled with a bylaw(s) that requires household wastes remain in a bear-resistant location until the stated time the morning of collection.

Central, communal transfer station type areas should be considered for all neighbourhoods regardless of whether or not they are new developments if they are experiencing bear problems.

Residents of Canmore, Alberta have been required to bring their refuse to communal, bearresistant bins since 1999. This effort has greatly reduced problems with bears, people and residential garbage. This recommendation is further discussed under Section 2.2 - 1 Pilot Projects).

2.1 – IX UNAUTHORIZED GARBAGE DISPOSAL SITES

Table 10.	Summary of	f recommendations	pertaining to	o unauthorized	garbage	disposal	sites.
	2				0 0		

Section	Summary of Recommendations Pertaining to this Step	Responsibility
2.1 – IX	Unauthorized garbage disposal sites	City
	• Clean up refuse at existing sites.	
	• Implement stricter enforcement and more frequent monitoring of known dumping sites.	
	• Issue fines for violations.	
	• Consider Problem Wildlife Protection Orders in addition to other fines for violations.	
	• Provide barriers that would make it difficult to lift large household items over.	
	• Involve the public in clean-up.	
	• Post signs with fines for violations at known dumping sites.	
	• Post signs warning of the environmental hazard of illegal dumping.	
	• Consider media messages on the effects of unauthorized sites on the environment.	
3.1	Bylaws - required for non-compliance.	City & District

Unauthorized sites where garbage and household appliances are thrown over embankments may contribute to the habituation and food conditioning of bears that use those areas. The current management of placing signs and a low barrier for the Hoferkamp Road site appeared to be largely ineffective. The enforcement of bylaws and implementation of fines for violations are strongly recommended.

2.2 POTENTIAL PILOT PROJECTS AND TESTING OF NEW, INNOVATIVE BEAR-RESISTANT MEASURES AS THEY RELATE TO REFUSE STORAGE & COLLECTION IN THE CITY AND DISTRICT

2.2 – I. POTENTIAL PILOT PROJECTS IN PROBLEM NEIGHBOURHOODS: SEPARATING FOOD WASTE FROM OTHER WASTES

(A) Communal Waste Collection Sites

Implementation of this Pilot Project is strongly recommended

Pilot projects using bear-resistant communal waste sites are recommended for new developments as well for neighbourhoods and trailer parks that are experiencing chronic problem bear behaviour.

Table 11. Pilot Project: Summary of recommendations pertaining to potential pilot projects, communal waste collection sites, separating food wastes, garborating food wastes.

Section	Summary of Recommendations Pertaining to this Step	Responsibility
2.2 – IA	Communal Waste Collection Sites	City
	Things to consider when selecting areas for bin placement:	& Developer
	• Selected areas for bin placement must be centrally located to increase user compliance;	(Plans need to be in place
	• Selected areas should be separated from green-spaces, trees and shrubs. The greater the distance between these features and the bin area the better;	before residents arrive)
	• Suggest enclosed perimeter fencing of bin areas (minimum 2-feet) with chain link or similar fencing (aesthetic designs can be accommodated as long as they also meet a few bear-resistant features, such as fully enclosed, height of at least 2 meters, & gates that pull outwards);	
	• Bin areas should be self-locking or use automatic gates;	
	• Gates should open outwards and not be able to be pushed inwards.	
2.2 – IB	Separating Food Waste from other Wastes <u>Things to consider:</u>	City
	• Bear resistant boxes/containers for proper storage of food waste are required.	
	• Strict user compliance is required. The public must be diligent enough to separate food scrapes and place them in bins.	
	• Bears are also attracted to packaging and other byproducts that contain the smell of food and non-food wastes, such as diapers and grease. These items would also need to be secured in bear-resistant containers to dissuade 'problem' bear behaviour.	
	 Option: combine this pilot project with the Communal Waste Collection Sites. 	

Section	Summary of Recommendations Pertaining to this Step	Responsibility
2.2 – IC	Garburators for Food Waste	City &
	<u>Things to consider:</u>	Engineer
	• Strict user compliance is required.	
	• Bear resistant polycarts and proper storage are still required. Some food scrapes are unlikely to be able to be garbarated, for example, large bones.	
	• Bears are not only attracted to food wastes but also packaging and other byproducts that contained and smell of food. These would need to be secured in containers to dissuade 'problem' bear behaviour.	
	• An engineer is required to evaluate the ability of the waste treatments facilities and the environmental effects of this pilot project.	
2.2 –IA-	Bylaws - required for non-compliance.	City & District
С		

Similar to Canmore, AB which instituted communal bear-resistant garbage deposit areas in 1999, in 2008 Ucluelet, BC, was "preparing to become the first municipality in the province to have bear-resistant communal garbage collection after council recently approved the pilot program" (Stewart 2008). The developer was proposing a 75 household (includes 3 guesthouse lots, and 15 Vacation Rental lots), 2 subdivision development that protruded into high quality bear habitat. At the urging of the Bear Smart BC Society (formerly Pacific Rim Bear Smart Society, McMillan pers. comm.) the developer agreed to provide 2 communal garbage collection areas with four-cubic-yard containers that would service approximately 40 single-family households (20 per area). The developer worked closely with the Bear Smart BC Society on communal bin placement, design and layout and each of the 2 cul-de-sac subdivisions has their own communal container (McMillan pers. comm.). In a report to council Director of Planning wrote:

"new developments are easier to implement this method because the residents are not present yet and will move into the neighbourhood knowing that communal garbage collection is the chosen method" (F. Mazzoni in Stewart 2008, Appendix 3).

The Ucluelet communal garbage program is set to run for three years, to allow time for the subdivision to be built and data collected on public use and support. For further details and recommendations regarding this pilot project refer to Section 4.3 New Development Plans for Developments on the Periphery of the City. Appendix 3 contains the District of Ucluelet's report to Council as presented by F. Mazzoni, Director of Planning (courtesy of C. McMillan pers. comm.).

It is strongly recommended that this Pilot program be implemented in Prince George for all new developments on the periphery of the City as well as in neighbourhoods and trailer parks that are experiencing chronic bear problems. First phase suggested Pilot project areas include but are not limited to:

- (1) College Heights Trailer Park
- (2) Inverness Trailer Park
- (3) Current development for Malaspina Ridge to Cowart Road:

**highly recommended Cowart River's Edge development **highly recommended Malaspina ridge new development (4) Moore's meadow off Ospika Blvd. north and Otway Road

Things to consider when selecting areas for bin placement:

- (1) Selected areas for bin placement must be *centrally located* to increase user compliance;
- (2) Selected areas should be *separated from green-spaces, trees and shrubs*. The greater the distance between these features and the bin area the better;
- (3) Suggest enclosed perimeter fencing of bin areas (minimum 2-feet) with chain link or similar fencing (aesthetic designs can be accommodated as long as they also meet a few bearresistant features, such as fully enclosed, height of at least 2 meters, & gates that pull outwards);
- (4) Bin areas should be self-locking or use automatic gates;
- (5) Gates should open outwards and not be able to be pushed inwards.

2.2 - I(B) Separate Lockable Containers for Food Wastes

In an effort to reduce the amount of food wastes at the landfill City staff has suggested examining the potential to remove garbage attractants by the introduction of a food waste only bin collection (B. Radloff pers. comm.). In this pilot project the food wastes would be separated from other wastes and placed in a separate bear-resistant lockable container. B. Radloff (pers. comm.) states that "the benefits would be using the collected food waste in waste to energy or composting efforts" with an additional benefit being the reduction or elimination of food waste at curbside for both wild and domestic animals.

This potential pilot project requires thought be given to the following factors as they relate to reducing bear problems and the development of problem bear behaviour:

- (1) Bear resistant boxes/containers for proper storage of food waste are required by household potentially making this option costly (See Appendix 1 for example manufacturers and containers).
- (2) Strict user compliance is required. The public must be diligent enough to separate food scrapes and place them in bins. The system would be compromised as far as reducing and dissuading the development of problem bear behaviour if a household(s) does not participate or improperly uses the bin.
- (3) Bears are not only attracted to food wastes but also packaging and other byproducts that contain the smell of food and non-food wastes, such as diapers and grease. These items would also need to be secured in bear-resistant containers to dissuade 'problem' bear behaviour.
- (4) The storage of these bear-resistant containers would likely be outside and although bears could not access food scrapes if properly placed within the bear resistant bins it is possible that the smell associated with the bins could continue to attract bears to the area in an attempt to access the wastes.

An option that could alleviate the cost associated with separate lockable containers at the household level would be to combine this pilot project with the Communal Waste Collection Sites. The communal site would contain recycling bins for paper, cans, and the like with bear resistant transfer stations bins containing a compartment for separated food wastes as well as a separate bear-resistant compartment for products that contain food waste residue but are not compostable food wastes. Strict user compliance is required for people to properly use the containers. The containers will be required to be frequently sprayed to keep smells at a minimum.

2.2 - I(C) Garbarator for Food Wastes

Another option the City was considering as a means of reducing the amount food wastes deposited at the landfill was the installation of garborators in households (B. Radloff pers. comm.). The garborator would shred food waste into small enough pieces to pass through the plumbing into the sewer system. The goal of this option would be to eliminate or significantly reduce the food waste present at curbside thereby reducing food wastes at the landfill; this also would result in a reduction or elimination of curbside bear attractants. The food waste would pass into the large digesters at the wastewater treatment plant which is set up to convert this food waste to energy (B. Radloff, pers. comm.).

In this pilot program the City would utilize the existing advanced infrastructure to process food wastes and capture methane for energy production. Before this pilot program is initiated the City likely with the aid of an engineer must determine whether the infrastructure can handle the amount and potentially the type of wastes deposited by users. For example, waste water treatment must be adequate to assure the extra waste is not detrimental to the environment and that chemicals are not present.

If this pilot project is initiated, the City will need to contract an Engineer to further explore this option from an environmental perspective as well as to determine the effectiveness of the Prince George plant at processing organic solids. The author of this report is commenting from a development of problem bear behaviour perspective only.

In relationship to reducing bear problems in neighbourhoods this option requires thought be given to the following potential factors:

- (1) Strict user compliance is required. The public must be diligent enough to separate and garbarate their food scrapes. All households in the neighbourhood must adhere to strict user compliance to reduce and dissuade the development of problem bear behaviour. If a few households do not participate and leave their garage curbside in non-bear resistant containers their actions could negate the positive results of the rest of the neighbourhood as far as the development of 'problem' bear behaviour.
- (2) Bear resistant polycarts and proper storage are still required. Some food scrapes are unlikely to be able to be garbarated, for example, large bones. Therefore, this option should remain to be coupled with bear-resistant carts and storage bylaws should non-compliance occur and also for food scrapes (e.g., bones) not be able to be garborated.

(3) Bears are not only attracted to food wastes but also packaging and other byproducts that contained and smell of food. These would need to be secured in containers to dissuade 'problem' bear behaviour.

2.2 - II. CURBSIDE RECYCLING - BEAR SMART CONSIDERATIONS

Table 12. Things to consider regarding curbside recycling and the development of problem bear behaviour.

Section	Summary of Recommendations Pertaining to this Step	Responsibility
2.2 – II	Curbside Recycling	City
	Recyclable materials that contained food, grease and/or oil based	& Household
	residues are potential bear attractants if they are not handled	
	properly:	
	• Educational materials.	
	• Mandatory cleaning/rinsing of recyclables and totes if odorous.	
	 Purchase bear-resistant recycling boxes for chronic problem neighbourhoods. 	
	• Provide information on the City of Prince George and the Regional	
	District of Fraser Fort George's web pages	
	Bylaw - required for non-compliance.	

The 2008 Regional Solid Waste Management Plan for the Regional District of Fraser Fort George recommends curbside recycling for the City:

"In Prince George, curbside recycling services will be provided to all homes currently receiving curbside garbage collection" (Gartner Lee Ltd. 2008:15)

Recyclable materials that contained food, grease and/or oil based residues are potential bear attractants if they are not handled properly. The following recommendations should be instituted when curbside recycling is initiated in Prince George:

- (1)Educational materials. Implement a strong educational component that focuses on bears and proper ways to recycle in bear country. The information should include pamphlets with the recycle totes coupled with media (newspaper and TV) at the onset of the program, each spring as bears emerge from their dens and during times when user compliance is an issue. The information contained within educational packages should be reviewed for its accuracy by a Registered Professional Biologist specializing in wildlife, particularly large carnivores.
- (2)Mandatory cleaning/rinsing of recyclables. Disallow any recyclable materials that contain food byproducts to reduce smell at curbside. Issue warnings and then fines for households that do not comply. Implement and enforce mandatory rinsing or washing of all containers that held food (e.g., rinsing soup cans, milk jugs, yogurt containers, etc.). Stress why reducing food residue is recommended in the bear smart educational material.

- (3)Purchase bear-resistant recycling boxes for chronic problem neighbourhoods. These could be additionally purchased bear-resistant polycarts and do not have to be specifically manufactured for recyclables.
- (4) Implement and enforce bylaws for times totes are allowed to be placed curbside and properly secured from curbside. In Kamloops, the "bear bylaw is in effect from April 1st to November 30th" and recyclable containers are not allowed to be placed curbside before 4 am. Residents are reminded not to put garbage on the curb before 4 am on collection day and to not accumulate or improperly store bear attractants. Violators are subject to a \$100 fine."⁸

Squamish, BC, also has a curbside recycling program and is in the process of purchasing bearresistant carts to dissuade the development of problem bear behaviour as it relates to curbside recycling: "Squamish is bear country and part of the mandate for the new bi-weekly pick up is to have all grey lid garbage totes bear-proofed by April 2009. Carney's will be bear-proofing the totes between now and April 2009 at the curbside on garbage day. Once your bin has been bearproofed, residents are required to undo the latches on the bear-proof tote on collection day."⁹

- (5) Totes should be properly rinsed if they are odorous. Cleaning agents may periodically be required.
- (6)Information and bear smart messages should be available on the City of Prince George and the Regional District of Fraser Fort George's web pages.

Combining bear-resistant recycling facilities with the suggested communal garbage collection pilot programs for chronic neighbourhoods remains the preferred option over curbside collection in chronic neighbourhoods. However, if smells can be eliminated and recyclables are properly managed at the household level, curbside recycling is believed to be able to be instituted in bear country without developing or reinforcing problem bear behaviour.

⁸Refer to: http://www.kamloops.ca/garbage/recyclingprogram.shtml

⁹ http://www.businesssquamish.com/node/230

2.3 FRUIT TREES, BIRD FEEDERS, & COMPOSTS

2.3 – I. FRUIT TREES

The management and removal of fruit bearing trees in the City and District is a major recommendation with a first stage of implementation. Fruit trees and garbage waste attractants are believed to significantly contribute to the number of 'problem' bears destroyed each fall and the development of problem bear behaviour.

Fruit trees planted within the City and in residential yards act to attract bears into these areas during the critical fall hyperphagia period and are therefore a public safety concern.

Table 13.	Summary of	f recommendations	pertaining to the	management of frui	t trees
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Section	Summary of Recommendations Pertaining to this Step	Responsibility
2.3 – I	Fruit trees	City
	 Prohibit planting of any new fruit trees by City or Regional District City: should not plant fruit trees, especially in high to moderate identified areas 	District
	II. City: should remove fruit trees.	& Homeowner
	III. City: ensure all fruit trees are properly managed.IV. City: promote awareness on proper fruit tree management.V. City: replace fruit trees with a non-fruit bearing tree or sterile tree.	Fruit exchange program - NBA
	VI. City: ensure all fruit is picked before it is ripe.VII. City: to endorse a list of trees and shrubs attractive to bears and assure new employees are aware of the list.	
	 Encourage through active media messages (TV, radio, signs) for residents to pick their fruit early Discourage rotting fruit Discourage attracting bears Support the fruit exchange program 	
	• Discourage the planting of fruit bearing trees by all residents.	
	 Encourage planting of non-fruiting varieties (residential, City & Region). 	
	• Provide bear smart educational material at all outlet stores that sell fruit trees. Develop a list of alternate varieties for planting and have it available at all stores that sell fruit trees.	
	• Suggest or mandate removal of fruiting trees in areas with chronic bear problems.	
	• Provide guidelines for developers mandating that they are not to plant fruit trees or low lying berry bushes.	
	• Enforce the removal of trees from those residences and/or neighbourhoods that are not managing trees/fruit(s).	
	• Enforce and issue DWPO or other fines for non-compliance.	
	• Support the NBA Fruit Exchange Program.	

Section	Summary of Recommendations Pertaining to this Step	Responsibility
	• Promote the use of electric fencing for fruit trees on orchards where management of fruit may be difficult or where residents want are willing to manage their trees.	
	• Enforce Problem Wildlife Protection Orders in addition to other fines for violations.	
2.3 - IA	• Consider a pilot project of enhancing the availability of native fruit bearing trees (mountain ash or cherries) in largely inaccessible parks or crown land that backs onto large tracks of green-spaces as a potential diversionary feeding for fall.	City District Parks Volunteers
	 Requires monitoring and research to assess effectiveness. 	
3.1	Bylaws - required for non-compliance.	City & COS

Bear occurrence reports and destructions are highest in the fall in the City and District when fruit on trees is ripe and the production of wild berries slows. The management of fruit trees is paramount to the sanitization of the City and District as it relates to reducing problem bear behaviour and the number of bears destroyed.

Fruit Trees include but are not limited to any of the following trees:

- Apple and Crab Apple Trees. (Genus: Malus)
- Plum Trees (Genus: Prunus)
- Pear
- Apricot
- Peach
- Cherry (Genus: Prunus)
- Mountain ash

Mountain ash trees are abundant around the City and frequently occur on residential lots as well as within some school yards. Cherry and mountain ash trees are known to be natural food sources used by northern bears (Ciarniello et al. 2003). Appendix 4 provides a list of trees and shrubs that have a medium to high potential of attracting bears into the city/neighbourhood as well as a list representing those trees and shrubs that have a low potential for attracting bears. It is recommended that the City and District only promote use of those species contained on the "low potential of attracting bears" list. The hazard assessment for the City provides a list of bear foods that commonly occur throughout the City and District and was used to develop Appendix 4 (refer to Ciarniello 2008, pg. 9, Table 1). The list provided in Appendix 4 is meant to be a starting point and should be modified and updated by a qualified individual(s). The list should be officially endorsed by the City and District and brought to the attention of new employees (Botten pers. comm.). In addition to those trees and shrubs listed in Appendix 4 bears also feed on a variety of gramminoids and forbs (e.g., dandelion and cow parsnip are major spring bear foods). Regular lawn mowing will help to reduce the attractiveness of gramminoids and forbs to bears.

Since 1999 Northern Bear Awareness has been encouraging the City to cease the planting fruit trees on City and Crown land and to remove unnecessary fruit trees as well as those in chronic

'problem' bear neighbourhoods. At the encouragement of NBA in July 2003, the city of Prince George proposed that they will no longer plant fruit bearing trees in the city when looking for decorative trees. However, in 2004 fruit bearing trees were still being planted and again the NBA approached the City requesting the implementation of a bylaw regarding the planting of fruit bearing trees. In an email dated November 25, 2004 the City stated that "some smaller fruit bearing ornamentals" should remain to be planted and their removal is against the City's Integrated Pest Management mandate:

"The exclusion of all fruiting trees from our planting inventory is contrary to our Integrated Pest Management mandate. We require habitat for birds and insects alike to help control undesirable species in our urban forest. Berries provide food for these species and keep them in the urban forest year round. Through summer and winter they feed on insect larva, eggs and adult insects while feeding on the fruit. While I agree that we should look hard at eliminating the use of large fruit species, the smaller dry fruits from ornamental crab apples, pin cherries, mountain ash, hawthorn and various shrub species need to be used. I would like to keep the following species in our inventory" (Email from Slade to M. Fercho cc: NBA Nov 25, 2004).

On February 21, 2005 The City's Environmental Services Division re-evaluated the planting of fruit trees on City property again at the urging of NBA. The City was proposing to adopt the use of trees and shrub varieties that produce small to no fruits.

It is highly recommended that <u>all fruit bearing</u> trees be removed from City property, parks that fall within the core of the city and all residential lots, particularly in neighbouhoods rated as moderate to extreme bear hazard. Allowing these trees to remain is felt to compromise the safety of the public, contribute to the development of problem bear behaviour, and contribute to the number of bears destroyed each year.

If fruit bearing trees remain they need to be properly managed by a responsible individual(s). If the City aims to reduce the development of problem bear behaviour, reduce the number of bears destroyed and increase public safety, fruit trees should be removed and replaced with non-fruiting options.

Residents who are considering planting a fruit bearing tree for their aesthetic qualities should consider a non-fruit bearing tree such as Lilacs, Magnolias, Spireas, Maples, or other non-fruit bearing tree alternatives. *Some non-fruiting varieties of apple trees still produce an abundance of small fruits that are difficult to manage and are not recommended for planting*. Those residents who already have a fruit bearing tree should pick the ripe fruit as soon as it is ready and remove all fallen fruit from the ground. Residents who continue to mismanage fruit on their trees despite a warning should be issued fines to promote user compliance. For residents that manage their fruit trees and would like them to remain in their yards electric fencing has proved effective to deter bears from fruit bearing trees.¹⁰

The City should support and advertise the Northern Bear Awareness Society's fruit exchange program¹¹. Residents who do not use their fruit should be encouraged to phone the Northern

¹⁰ Electric fencing information may be obtained from: http://margosupplies.com/public/

¹¹ http://www.northernbearawareness.com/index_files/Page878.htm

Bear Aware Fruit Exchange program, which connects people who want to receive fruit with people who want to give fruit. The program runs from April through to October and each years matches up people wanting fruit with people unable to manage their fruit trees.

<u>2.3 – I(A)</u> Diversionary Fruit & Berry Pilot Project: An option to consider that would address the City's concern regarding integrated pest management:

Once the anthropogenic attractants have been removed and the City is sanitized a pilot program may be considered that would leave or enhancing the availability of fruit bearing trees on the outskirts of parks or crown land that backs onto large tracks of largely inaccessible green-spaces. The premise of this pilot project would be similar to the carcass redistribution program used in Montana to keep bears away from livestock during critical calving/spring season but rather than using carcasses it would use native fruit bearing trees. Selected green-spaces should not be connected to trails, power-lines, rite-of-ways, and similar structures that lead into the City and that may be used by people for various recreational activities allowing for bears and humans to more easily come into increased conflict; the more remote the chosen areas, the better. The idea is to distribute native (mountain ash or cherries) fruit bearing trees in a random fashion throughout the landscape. Bears will eventually learn where the trees are located and are expected to frequent those areas in fall therefore it is important that the trees be dispersed and not concentrated. The central idea of this pilot project is that the trees act to hold bears in those chosen areas rather than bears being attracted into the City during the 'problem' fall period when natural foods become more scarce and bears enter hyperphagia. This option would also allow for the fruits to be present for pest management as identified as a concern for the City and combined with the other sanitization recommendations should keep some bears from entering the City, residential yards and neighbourhoods. The areas where these trees remain or are enhanced must be adequately and appropriately signed so the public would be aware that these areas are acting as "bear, birds and insects" attractant areas. A similar pilot program is happening in Whistler, BC, (June 2009) where the Get Bear Smart Society is planting 63 mountain ash trees in order to enhance the natural fall food supply for bears and in an attempt to keep bears out of residential areas. They are also removing trees and shrubs attractive to bears from residential areas (Dolson pers. comm.). If implemented in Prince George, this project would require monitoring to aid in determining if trees have been planted at the appropriate density and also distributed appropriately throughout the landscape. The use of native fruit bearing trees attractive to bears is recommended over non-native fruit trees.

2.3 – II. BIRD FEEDERS

The management and removal of bird feeders in the City and District is a major recommendation with a first stage of implementation. Bird feeders are a problem throughout all seasons and contribute to the development of problem bear behaviour..

Table 14. Summary of recommendations pertaining to the use and placement of bird feeders.

Section	Summary of Recommendations Pertaining to this Step	Responsibility
2.3 – I	Bird Feeders	City
	 Discourage the use of bird feeders in bear active season (April 1 – Nov. 30). 	District
	• Encourage alternate forms of bird feeders, such as hanging baskets for humming bird feeders.	& Homeowner
	If bird feeders are used:	
	• Bird feeders must be at least 3 meters (10 feet), and preferably 5.5 m (18 ft), above the ground <u>and</u> 1.5 m (5 ft) from the supporting structure.	
	• Enforce the use of larger catch pans that extend past the feeder itself.	
	• Clean spilled bird feed daily.	
	• Consider bringing bird feeders in at night.	
	• Limit the amount of seed placed in the feeder.	
	• Store replacement bird seed in a bear-resistant structure (e.g., house).	
	• Consider wrapping a smooth metal band around the girth of the supporting structure that is of sufficient width (1-2 meters wide) so that bears are unable to climb past the banding.	
	• Enforce Problem Wildlife Protection Orders in addition to other fines for violations.	
3.1	Bylaws - required for non-compliance.	City & COS

Improperly placed and maintained bird feeders provide an easily accessible meal for bears particularly during spring when natural forage is limiting. Bears are known to frequently acquire bird seed in the College Heights area throughout all seasons and particularly from households in trailer parks. It is likely that available bird seed is the beginning of the development of problem bear behaviour for some bears.

Use of bird feeders should be avoided during the active bear season which runs from April 1 through to November 30.

In Canmore, Alberta, bylaws are used making it unlawful to place or store birdfeed out of doors between April 1 and October 31 (Bylaw 09-2001, Section 9.1.25, Comeau 2003).

2.3-III. COMPOSTS

The management of backyard composters in the City and District is a major recommendation with a second stage of implementation.

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I able	15.	Summary	of recom	imendations	pertaining to	the use	and	placement (or com	posters.

Section	Summary of Recommendations Pertaining to this Step	Responsibility
2.3 –	Composts	City
III	• Accept non-cooked food waste compost at landfill and select transfer stations (could be pilot project).	District
	• Encourage indoor composting in neighbourhoods with chronic bear problems.	REAPS
	• Discourage outdoor composting of food scrapes in chronic problem bear neighbourhoods.	& Homeowner
	• Consider purchasing bear-resistant composts for neighbourhoods with chronic bear problems (e.g., Hart Highlands, Charella, College Heights).	
	If outdoor composting is promoted educational material should address:	
	 Placement of composts – avoid placing composts backing up to greenspaces or trails. Place in open with breaks around bin. 	
	• Encourage regular turning of composts.	
	• Discourage meats, fish, eggs, dairy or similar foods in composts.	
	• Promote the use of lime to reduce odour.	
	 Educational material should accompany each compost and be reviewed by a qualified individual. 	

The 2008 Regional Solid Waste Management Plan for the Regional District of Fraser Fort George recommends a backyard composting promotion program:

"RDFFG will maintain a backyard composting promotion program to encourage residents to compost at home. **Educational materials** will now include how to compost in a manner that is "Bear Aware." (Gartner Lee Ltd. 2008:15).

The Solid Waste Plan states that the RDFFG has subsidized and distributed ~5,000 backyard composters with an estimated future distribution of ~1,000 backyard composters every other year (Gartner Lee Ltd. 2008). Ideally, backyard composting of food wastes should not occur in bear country unless it is only for non-food waste compostable materials (e.g., grass clippings). In bear country composting of food wastes should instead focus on promoting indoor composting or the use of a bear-resistant communal compost facility, for example in combination with a perimeter fenced landfill or transfer station. Currently, transfer stations do not accept kitchen wastes into their composting program. The additional collection of food wastes in a central, bear-resistant facility such as select transfer stations should be considered. If outdoor composting of food wastes is promoted in the City and RDFFG then bear smart educational materials must be present with the distribution or purchase of composters. The bear

smart information should be reviewed by a qualified wildlife biologist prior to distribution. Placement of the compost away from green-spaces, trails and bushes should be encouraged. Ways to reduce odours, such as the use of lime and frequent turning, must be promoted.

2.4 Domestic Carcass Removal & Agricultural Attractants

Second Step	
Domestic Carcass Removal & Agricultural Attractants	

Table 16.	Summary of recommendations pertaining to '	'bear smart'	ranching practices,	and the
	management of apiaries and livestock carcase	ses.		

Section	Summary of Recommendations Pertaining to this Step	Responsibility
2.4 - I	Ranching Practices (general):	City
	• Create a central area for calving/birthing and neonatal care that is located well away from green-spaces or retention patches.	District
	• Assure grain and other attractants fed to domestic animals are secured within a bear-resistant structure (closed and latched barn, shed, old walk-in freezers, etc.)	COS
	Description of anomaly trained managined have do of hear door	BCCA
	• Promote the use of property trained recognized breeds of bear dogs (e.g., Great Pyrenees, Akbash or Anatolian Shepherd) for protection of livestock.	IAF
	• Investigate the use of a number of alternate deterrent techniques to dissuade bears from entering ranchlands, such as acoustic devices or visual/light deterrents.	& Homeowner
	• Encourage a rural network of bear watch – communicate and let your neighbour know when a bear is in the area.	
	• Bears that chronically kill domestic livestock on farms will likely need to be removed; however, the farmer should also implement bear smart ranching practices to assure another bear is not attracted to the operation.	
	• Bears capitalizing on the production of grain crops (e.g., wheat) are not considered to pose the same threat as those killing livestock. Management of these animals should begin with the proper use of deterrents and farm planning.	
	• Issue and enforce DWPO for improperly managed operations that will not voluntarily comply with Bear Smart practices.	
2.4 – II	Domestic Livestock Carcasses:	City
	• The disposal of animal carcasses is governed under the <i>Codes of Agricultural Practice for Waste Management</i> .	District
	• Suggest that a registered biologist specializing in large carnivores review the large animal disposal requirements under the various Acts	COS
	(e.g., <i>Environmental Management Act</i>) with the intention of developing recommendations that dissuade dangerous wildlife from	BCCA
	the carcasses.	IAF

Section	Summary of Recommendations Pertaining to this Step	Responsibility
	• Support the development of a local rendering plant for domestic carcass removal, particularly cows & sheep.	& Homeowner
	• Reduce the fees for domestic carcasses at the Foothills landfill.	of the Acts
	• Provide fines and DWPOs for non-compliance, such as carcass buried at insufficient depth and other violations of standards outlined in the <i>Agricultural Practices Code</i> .	would likely have to be made at the
	• If on-site burial of carcasses is allowed, encourage carcasses are covered with lime or other agents to reduce the smell.	Federal level.
	• If on-site burial of carcasses is allowed ensure they are buried to sufficient depth to reduce odours associated with decomposition.	
	• Discourage throwing carcasses into retention patches and forested areas that surround or are on ranch property.	
	• Educate farmers on the potential problems associated with attracting bears to their farm, particularly the placement of carcasses close to their establishments.	
2.4 - III	Honeybee Colonies:	City
	Locate apiaries in the open away from green-spaces and brush.Consider the use of electric fences, particularly for mobile operations.	District
	• Consider raising the hives well above the reach of a bear on posts that are metal or wrapped with sheet metal to deter climbing.	& Homeowner
2.4 – IV	Potential Pilot Projects & Workshops:	
	• Establish workshops for farmers that address farm layout and planning to deter predators, electric fencing for protection of wildlife, domestic animals for the protection of wildlife, and the like.	
	 Consider a "carcass redistribution program" where carcasses could be distributed in remote areas during 'problem' seasons/times, particularly spring and fall. 	

Farming practices in British Columbia are governed under a number of federally regulated Acts, such as the *Canada Agricultural Products Act, Canadian Environmental Assessment Act,* and the *Health of Animals Act.* The author of this management plan does not specialize in agricultural practices or Federal Acts. The following recommendations are from the development of 'problem' bear behaviour as it relates to general ranching practices and best management practices of livestock carcasses as it relates to attracting bears.

Livestock grazing/ranging and the production of grain often occur in highly rated foraging and movement habitat for bears. The comparatively low density of human settlements in agricultural areas and the availability of green-spaces/forested and retention patches are believed to contribute to increased conflicts between agricultural operations and bears. The spatial layout of farms and the production of grains (e.g., wheat), the disposal of livestock carcasses, and the

placement of smaller livestock, birthing and neonatal areas are the major attractants for bears to agricultural operations.

Defenders of Wildlife implements fully-developed programs in the United States to compensate ranchers for losses to wild predators and to assist ranchers to reduce the risk of predation¹². In Canada, Defenders of Wildlife has been an active contributor to the Oldman River Basin Carnivore Advisory Group, advising the Province of Alberta on carnivore-livestock issues (Pissot pers. comm.). To date the efforts of Defenders of Wildlife focus on wolves, however they also address livestock predation by grizzly bears. The organization has provided telemetry gear to ranchers and gathered information regarding operator efforts to protect cattle. Currently, Defenders is paying for the removal of carcasses to reduce attractants that can draw bears and wolves into areas where they are unwelcome. Defenders of Wildlife do not currently operate in BC and instead refers one to the BC Cattlemen's Association for livestock compensation (Pissot pers. comm.).

In August 2009, the Ministry of Agriculture and Lands announced \$1.55 million in funding to be distributed over three years by the Investment Agriculture Foundation of B.C. (IAF) to address livestock-predator issues and ranching practices. The funds will be used by the B.C. Wild Predator Loss Prevention Mitigation Pilot Program in order to protect B.C.'s commercial livestock from wildlife predators while also preserving natural predator-prey relationships. The pilot project address prevention, mitigation, and compensation for livestock losses and will be delivered through the B.C. Agriculture Research and Development Corporation with implementation being the responsibility of Ministry staff and a program advisory committee.¹³ The RDFFG should remain in contact with the IAF as this pilot project develops and to determine the applicability or contribution by the City of Prince George and District.

2.3 – I. General Ranching Practices

Farm design and layout can contribute to reducing problems with bears and predation by bears on livestock. One of the most prudent recommendations that ranchers can adopt is the placement of livestock birthing and neonatal areas. These areas should be well away from green-spaces and forested edges. Retention patches occurring in birthing and neonatal areas should be removed and replaced instead with built loafing shelters. To dissuade bears from approaching birthing and neonatal areas, they should be placed closer to dwellings and/or areas with active human-use on the ranch. Another example of planning/layout suggestion for farms that produce hay as well as contain livestock operations would be to place the having operation as a lining on the outskirts of the farm and in areas that back onto green-spaces/forests. This would be followed by the placement of larger animals in groups that are better able to protect themselves. The most vulnerable animals, such as smaller livestock (e.g., sheep, pigs) and neonates should be contained the closest to the human-use core. The addition of a properly trained recognized breed(s) of bear dogs, such as the Great Pyrenees, Akbash or Anatolian Shepherd should be used for the additional protection of livestock. Llamas and donkeys have also been reported to protect livestock and may be an easy option to accompany livestock herds.

¹² See:

http://www.defenders.org/resources/publications/programs and policy/wildlife conservation/solutions/li st_of_proactive_carnivore_compensation_projects.pdf ¹³ The Ranching Taskforce: www.ranchingtaskforce.gov.bc.ca

Grain and other non-natural attractants fed to livestock should be secured in a bear-resistant structure at all times.

The Get Bear Smart Society (Dolson pers. comm.) offers a number of non-lethal deterrent products on their web site¹⁴ as does Margo Supplies Ltd. (see Product Contact Information). The author of this report recommends proper husbandry practices and farm layout combined with electric fencing and properly trained livestock protection dogs, llamas or donkeys as proactive management techniques for farms as well as for operations that are experiencing chronic bear problems. Additional acoustic, visual and spray release deterrents should also be assessed during on-site evaluations for farms experiencing or anticipating increased bear problems. If an operation is experiencing chronic bear problems it is recommended for the COS to work with a registered wildlife biologist that specializes in large carnivores to assess the site and develop site-specific recommendations for that operation as it relates to the types of bear problem(s) it is experiencing.

2.3 - II Domestic Carcass Removal

The improper disposal of domestic carcasses can attract and hold bears on ranchland areas. During the hazard assessment and from field sites assessed on the Parsnip Grizzly Bear Project it was revealed that a number of ranches/operations disposed of domestic animal carcasses in pits or carcass disposal areas on their property. The odour associated with decomposing carcasses can attract bears from large distances and bear sign was noted at a number of these disposal areas. The disposal of animal carcasses is governed under a number of Acts (e.g., *Codes of Agricultural Practice for Waste Management*). It would be prudent if these Acts were reviewed by a registered professional biologist that specializes in the ecology and biology of dangerous wildlife in combination with a litigator to assess best agricultural practices as they relate to the burial of carcasses and the attraction of dangerous wildlife in the District.

In Prince George and District there are no rendering plants to aid in the disposal of carcasses and moving livestock carcasses to the Foothills landfill requires lifts and truck for heavy carcasses (e.g., cows, horses) as well as a disposal fee. The City and District should investigate the development of a rendering plant for central BC. Another option is lowering the fees for such carcasses at the Foothills Landfill. In addition, if the on-site burial of carcasses is allowed there are management actions that can be taken to reduce the potential of the carcass to become a bear attractant, such as the depth at which the carcass is buried, the puncturing of the stomach for ruminants to aid in decomposition and avoid possible explosion, and the covering of the carcass with odour reducing agents such as lime. The placement of carcass disposal areas can also aid in or dissuade their attraction for wildlife. The majority of bears and other potentially dangerous predators tend to be wary to enter close to human use areas and across large, cleared breaks. Farmers should also be educated as to the potential problems associated with attracting bears to their farm. Once bears are attracted to an area and have been rewarded they likely return to that area to search for carcasses in the future. Farmers must be discouraged from improperly disposing of domestic animal carcasses.

¹⁴ http://www.bearsmart.com/bearSmartCommunities/ProtectingLivestock&Crops/Livestock&Crops.html

2.3 – III. Honeybee Colonies

Apiaries also would benefit from proper planning and placement of operations to dissuade bear problems. Apiary operations should be located away from forested edges and green-spaces. Portable electric fences are recommended for apiary operations occurring in bear country. Additionally apiaries could be placed on a platform raised off the ground. The rods supporting the platform structure could be made from metal or steel making it difficult for bears to climb. Alternatively if wood is used as the supporting structure it should be lined with a band of metal or steel that would deter bears from climbing. Bears can climb ladders so access to a raised platform design may need to be a structure that can be raised and lowered by the apiary operator.

<u>2.3 – IV Potential Pilot Projects & Workshops for the Regional District of Fraser</u> <u>Fort George & Ranching</u>

(A) Workshops

It is recommended that the District (in combination with the City) host a series of workshops on the best practices for ranching operations and avoiding attracting predators in bear country. The workshop should include sessions on:

- Farm design and layout placement of birthing and neonatal areas, placement of grain production versus livestock versus hay, and the like to avoid predation on livestock;
- Options for dealing with livestock carcasses the pros and cons of different disposal methods;
- Predator deterrent devices what is available, how do they work, what is practical for what type of operation;
 - Electric fencing what is required to deter predators, installation, maintenance, costs, risks and benefits;
 - Acoustic deterrent devices
 - Spray deterrent devices (pepper spray, water spray, etcetera)
- Current problems & recommended solutions experienced by farms in RDFFG;
- Current conflict mitigations techniques what is working, what isn't working;
- Funding options for aid in becoming a 'predator deterrent' farming operation;
- Review of the B.C. Wild Predator Loss Prevention Mitigation Pilot Program.

(B) Carcass Redistribution Pilot Project

Supplementary feeding through the random placement of livestock carcasses has been used in the United States and Alberta to keep bears away from humans and their settlements by redistributing how bears use habitats in spring and in some areas also in fall. In Montana, farmers are encouraged to place their livestock carcasses in pre-selected isolated areas (e.g., in the backcountry in areas closed to human use). Bears are reported to search these areas in spring which keeps those bears away from livestock during calving and neonatal development (M. Madel *in* Ciarniello 1997). A spring and potentially fall carcass redistribution pilot program in the District should help to redistribute bear movements and habitat use for these seasons which has the potential to aid in dissuading bear problems and holding bears away from farm areas. It would also offer a way for ranchers to properly dispose of livestock and domestic animal carcasses. This pilot project should be discussed between the RDFFG, the IAF and the B.C. Wild Predator Loss Prevention Mitigation Pilot Program.

3.0 ISSUE TWO: MANAGING HUMANS

3.1 BEAR SMART BYLAW DEVELOPMENT AND IMPLEMENTATION FOR PRINCE GEORGE & DISTRICT

Table 17. Summary of recommendations pertaining to bylaw implementation and enforcement.

Section	Summary of Recommendations Pertaining to this Step	Responsibility
General	General Recommendations to Consider in Bylaw Development:	City (bylaw
oonorar	Drahihit the "intentional" feeding of boars in bylows	enforcement
	• Frombit the intentional feeding of bears in bylaws.	officer) & COS
	• Prohibit the unintentional feeding of bears in bylaws (may be	,
	Charles and the section 5.1 bytaws).	
	• Clearly outline the responsibilities of all agencies/organizations in the	
21 I	Dylaw documentation.	City (hylaw)
5.1-1	Implement a hylaw pertaining to garbage storage:	enforcement
	Store household waste & reculing in hour resistant container or	officer) & COS
	• Store household waste & recycling in bear-resistant container or enclosure at all times.	possibly RCMP
	• Implement time allotments for curbside tote curbside placement.	
	• Provide a communal bear-resistant, locked bulk waste container area	
	for new multi-family dwelling development projects.	
	• Issue and enforce fines for violations.	
3.1 – II	Commercial, Industrial & Institutional	City & COS
	Implement a bylaw pertaining to commercial, industrial and	
	institutional garbage storage:	
	• Secure wastes within an enclosure or a metal bin equipped with a metal lid that locks/latches closed.	
	• Enforce that lids remain closed/down at all times.	
	• Enforce that lids are locked down when establishment is not in operation.	
	 Institute additional measures for establishments that remain to experience bear problems. 	
	• Prohibit waste from overflowing or being placed outside of bear- resistant bins	
3.1 – III	Fruit trees	City & COS
	<i>Implement a bylaw for the management of fruit trees:</i>	
	• Enforce the maintenance of fruit as it pertains to bears (picking.	
	disposal, maintenance).	
	• Enforce that fallen fruit must be immediately removed from ground.	
3.1 - IV	Bird Feeders	City & COS
	• Implement a bylaw pertaining to dates when outside bird feeders are acceptable (preferred recommendation).	
	• Implement a bylaw requiring bird feeders be properly secured from	
	bears (alternate recommendation).	

¹Garbage and recycling containers for temporary special events (e.g., weddings) may be exempt from the bylaw as long as they are removed and secured at the end of the event (for example refer to Whistler #3, Storage & Disposal, Appendix 5-I).

This human-bear conflict management plan as well as the 2008 Solid Waste Management Plan for RDFFG (Gartner Lee Ltd. 2008) recommend implementation of a bylaw addressing storage and set out times for curbside garbage collection as it relates to human-bear conflict.

Develop and Enforce a 'Bear Smart' Garbage Storage and Placement Bylaw

This is a Major Recommendation with a First Stage of Implementation.

The sixth step necessary to achieve Provincial Bear Smart Status requires the implementation of **''Bear Smart'' bylaws** prohibiting the provision of food to bears as a result of intent, neglect, or irresponsible management of attractants" (Davis et al. 2002). Cities attempting to obtain Bear Smart status must implement bylaws pertaining to all sources (residential, industrial, commercial, City & District) garbage storage and removal. Recommendations for the implementation of garbage storage bylaws are also present in the 2008 Regional Solid Waste Management Plan for the Regional District of Fraser Fort George (Gartner Lee Ltd. 2008). The Solid Waste Management Plan states that "developing and maintaining a solid waste management system that minimizes the potential for human-bear conflict will enhance public safety and prevent the unnecessary destruction of bears" (Gartner Lee Ltd. 2008:25)." The Solid Waste Plan further emphasizes that Municipalities and the RDFFG will ensure that their **waste collection bylaws require containerization** of garbage and **enforced set out times** for curbside collection to minimize wildlife access opportunities (Gartner Lee Ltd. 2008:25).

The Northern Bear Awareness Society has been urging the City to implement a bear smart garbage and attractant bylaws since 2002. In June 2004, NBA sent the City a letter stating that:

The Omineca Bear Human Conflict Committee (OBHCC) is requesting an opportunity to appear at a City Council meeting. The OBHCC is interested in implementing a garbage by-law in Prince George as a result of the extensive human-bear conflict with garbage in our city....The OBHCC is requesting a by-law that prohibits garbage to be left out overnight. Specifically, no garbage by the curb before 5:00 am the morning of pick up and back in from the curb by 8:00 pm the day of garbage collection. The purposed by-law should require that garbage bins must be secured in a shed or garage at all times when in from the curb.... It is OBHCC's expectation that a garbage by-law applied and enforced in the City of Prince George will create a safer and cleaner community due to the reduction of bear-human conflicts....(written by Amber O'Neill, NBA Coordinator/Media relations. Submitted to the City by S. Nahornoff, OBHCC Chair).

The main opposition from City Council was anticipated problems with accommodating shift workers and the fear of opposition from residents. *The City and District must take the lead in implementing bear smart measures regardless of public opposition if they aim to increase protection of the public and reduce the chance of a human-bear conflict.* For example, there are a number of successful and highly publicized campaigns against drinking and driving, yet some people continue to drive under the influence of alcohol; because of the danger to oneself and others these campaigns are coupled with strict enforcement and penalties for violations. Residents that continue to allow bears access to non-natural attractants are posing a risk not only to themselves but to the public at large. A number of other cities/communities throughout BC have implemented bear smart bylaws including but not limited to Whistler, Port Coquitlam,

Kamloops, Kaslo, Lions Bay, Squamish, Tofino, Ucluelet, Revelstoke, and Fernie. An excellent reference for how to develop bylaws (Canada) and ordinances (US) as well as a resource for downloading some of the current bylaws by city/community or town/county is located at:

http://www.bearsmart.com/bearSmartCommunities/Bylaws/bylaws.html

(Dolson pers. comm.)

This web page also contains the Ontario Ministry of Environment's toolkit for developing and enforcing municipal bylaws. The Bear Smart bylaws for Whistler (appendix 5-I) and Kamloops BC (appendix 5-II), and Canmore, Alberta (appendix 5-III), as well as an example amendment to the Waste Regulation Bylaw for Fernie, BC (appendix 5-IV) have been provided in Appendix 5. Whistler and Canmore have adopted excellent Bear Smart bylaws and there inclusion in this report is to aid the City to develop an effective Bear Smart bylaw specific to the problems and hazards present within Prince George¹⁵. The author of this report does not have a legal background nor specialize in bylaw development or wording. The following recommendations for the required Bear Smart Prince George bylaw are from the perspective of reducing the development of 'problem' bear behaviour.

This general bylaw statement quoted from the Whistler, BC, Garbage Disposal and Wildlife Attractants Bylaw No. 1861, is recommended to be included in Prince George's bylaw:

"No person shall dispose of or store domestic garbage, waste, or recyclable material except into a container that is a wildlife resistant container or is located in a wildlife proof enclosure."

Additional recommendations for inclusion in the Prince George bylaw include but are not limited to:

3.1-I RESIDENTIAL GARBAGE & RECYCLING STORAGE BYLAW:

1. That all potentially bear attracting household waste & recycling that contained bear-attracting waste (food byproducts, grease, oil) be stored in a bear resistant container or a place that is inaccessible to animals at all times except curbside collection days. Bear-resistant structures include but are not limited to an enclosed garage or carport, basement, bear-resistant outbuilding, purchased bear-resistant tote container and the like.

Reducing bear access to garbage reduces their loitering around neighbourhoods. By keeping garbage stored in a location that is inaccessible to bears and other animals, residents will reduce the litter spread about by scavenging animals as well as reduce the risk of bears becoming food conditioned, problem bears.

2. That garbage & recycling must be contained within an approved bear-resistant tote. That no person shall leave garbage & recycling that contained bear-attracting waste outside a container.

¹⁵ A number of the mentioned cities/towns have adopted excellent bear smart bylaws. The majority of those bylaws may be obtained from the author at the request of the City or District.

- 3. That no household shall put out the bear-resistant garbage totes the night before curbside collection, or before ¹⁶5am on the day of collection.
- 4. That bear-resistant garbage totes must be secured back within their bear-resistant structure by 7 pm the evening of collection.
- 5. That bear-resistant totes and enclosures be maintained in a bear-resistant condition at all times.

The majority of bears prefer to use the cover of darkness to move around humans and their activities, such as crossing roads or foraging in human dominated landscapes. Restricting the length of time garbage totes remain curbside reduces the opportunities that bears will have to access garbage.

- 6. That all multiple family dwellings (trailer parks, apartment buildings) be switched to communal waste container collection.
- 7. That all new multi-family dwelling development projects be required to provide a communal bear-resistant, locked bulk waste container area.

Following compliance with a Dangerous Wildlife Protection Order from the COS, the Sintich Trailer Park, which now locks its bulk waste container every night, has reduced the number of bears destroyed from an average of 10 bears annually to no bears destroyed since 2001 (G. Van Spengen pers. comm.).

<u>3.1 – II Implementing a bylaw for commercial, Industrial and Institutional garbage</u> <u>& Recycling storage and removal</u>

Implement and enforce a bylaw for commercial garbage storage.

This is a Major Recommendation with a First Stage of Implementation.

Bear-resistant bulk waste containers are only effective if the lids are securely closed and latched. Industrial bulk waste containers used on work sites specifically for non-bear attracting waste, often end up having bear attracting waste deposited in them by third parties (employees, neighboring businesses). It is important to ensure that alternate, secure means of disposal are available to third parties using the industrial bulk waste containers. Industrial bulk waste containers will attract and create problem bears if there is food waste deposited in them.

1. That all commercial, institutional and industrial waste containers that contain potentially bear attracting waste & recyclable material are secured within an enclosure or a metal bin equipped with a metal lid that locks/latches closed.

¹⁶ In the Kamloops bylaw totes are not allowed curbside until 6 am. The earlier hour for Prince George accounts for the schedule for shift workers.

- 2. That the metal lids of all commercial, institutional and industrial waste containers that contain potentially bear attracting waste remain closed/down at all times.
- 3. That metal lids of all commercial, institutional and industrial waste containers that contain potentially bear attracting waste remain locked during all hours when the business is not operating (lids must be secured at the end of each business day).
- 4. That establishments that are experiencing bear problems further place their waste containers within a fully enclosed perimeter fenced enclosure that remains closed at all times. The door of these enclosures should open outward and not be pushed inwards.
- 5. That waste is not permitted to overflow and/or accumulate outside of commercial, industrial or institutional receptacles.

Best Management Practices to Prevent Access to Cooking Grease by Bears:

No person will store clean or used cooking grease except in a bear resistant container:

- 6. That bulk waste containers and grease drums be fitted with a steel lid that remains locked or latched closed at all times.
- 7. That bulk waste containers and grease drums be further contained within a bearresistant structure at all times (e.g., shed or building).
- 8. That spills of cooking grease are immediately cleaned.
- 9. That cooking grease is emptied at regular intervals.

3.1 – III. IMPLEMENTING A BYLAW FOR THE MANAGEMENT OF FRUIT TREES

The Kamloops bylaw includes fruit under the definition for "Bear Attractant" which is "any and all food wastes and accumulations of discarded fruit on public or private land, and includes offal". The Kamloops bylaw uses a broad statement to refer to the dangers associated with bears feeding on human "bear attractants"

"No person or persons may accumulate, store or collect any bear attractants as defined in this bylaw in such a manner as to promote an increase in bear activity, thereby creating a risk to the safety of the public in the neighbourhood or vicinity." (refer to section 40-40 of Kamloops bylaw, Appendix 5-II):

It is recommended that Prince George implement a bylaw focused on the maintenance of fruit trees:

- 1. No person shall permit or allow fruit from a tree to accumulate on the tree or ground. A person shall prevent the attraction of bears into a neighbourhood by:
 - (a) Picking fruit from the tree before or immediately as the fruit ripens;
 - (b) Disposing of unwanted fruit in a bear-resistant fashion; and,
 - (c) Preventing access to the fruit tree by bears.

2. No person will allow fruit from fruit trees to accumulate on the ground.

3.1 – IV. IMPLEMENTING A BYLAW FOR THE MANAGEMENT OF BIRDFEEDERS

Canmore, AB, Lion's Bay, Squamish, Tofino and Whistler have bylaws in place addressing the use and placement of bird feeders. The preferred recommendation is to prohibit bird feeders during the bear active season (April – Nov), which is in place in Canmore, AB. Other cities/towns (e.g., Lion's Bay, Whistler) allow bird feeders but they must be suspended in such a manner that they are inaccessible to "dangerous wildlife". Wildlife Attractant Bylaws, such as those used in Squamish make it easier to capture bird feeders and other attractants that may not be considered waste (McMillan pers. comm.).

Preferred Bylaw:

1. No person shall place or store birdfeeders outdoors between April 1 and November 15.

Alternate Bylaw:

- 2. No person shall allow a bird feeder to be placed in such a manner as to allow access by bears.
- **3.** Bird feeders must be equipped with a catchment basin that is larger than the feeder itself.
- 4. No person shall allow birdfeed to accumulate under or around the bird feeder.
- 5. No person shall store bird seed in a non-bear resistant manner.

3.2 MANAGING HUMAN ACTIVITIES WITH ENFORCEMENT

 Table 18.
 Summary of Recommendations Pertaining to Bylaw Enforcement and Fines, Hiring a Bear Conflict Specialist, and the Wildlife Act.

Section	Summary of Recommendations Pertaining to this Step	Responsibility
3.2 - I	Bylaw Enforcement & Fines	City, COS
	• Recommended to be a shared responsibility between the City, District and the Conservation Officer Service.	with aid from District
	• Clearly state the agencies with power to enforce bylaws the wildlife attractant bylaw document.	
	• Enforce bylaws with fines for violations:	
	 * Suggest \$100.00 fine, or * \$50 for first offence increasing by \$50 for each subsequent offence. 	
	• Use funds from bylaw infractions to further sanitize the City as well as education, outreach and research on Bear Smart initiatives.	
	• Allow the COS the power to enforce bylaws that relate to wildlife.	
	• Consider giving the problem wildlife specialist the power to enforce bear smart bylaws.	
3.2 – 1A	Hire a Bear Conflict Specialist	MOE
	• Hire a person responsible for the proactive management of bears to aid the COS, NBA and bylaw officers.	City COS
	• This position should be within the MOE or City as an employee.	NBA
	• Responsibilities include dissuading the development of problem bear behaviour & the management of 'problem' bears:	District
	 * Education of public regarding bears, 	
	 Canvassing neighbourhoods with bear reports immediately as reports are received, 	
	 Providing door-to-door solutions to bear attractant problems for neighbourhoods receiving complaints, 	
	* Gathering information on infractions to bear smart bylaws,	
	 Managing 'problem' wildlife, 	
	* Conducting or supporting research,	
	* Database management, and	
	* Wildlife related media releases.	
	 Consider giving the problem wildlife specialist the power to enforce bear smart bylaws. 	
3.2 – II.	Implement a bylaw dissuading the intentional feeding of bears	City & COS
	• Prohibit the "intentional" feeding of bears in bylaws.	
	• Prohibit the "unintentional" feeding of bears in bylaws (may be largely covered in Section 3.1 bylaws).	
3.2 – II	Dangerous Wildlife Protection Orders	COS only
	Enforce more Dangerous Wildlife Protection Orders.	
	• Consider removing the word "intentional" from the Wildlife Act.	
	• Issue more fines for violations.	

	Initiate legal actions for chronic offenders.	
3.2 – I.	The Wildlife Act and Dangerous Wildlife Protection Orders:	City & COS
	• Issue and enforce fines for violations whether the feeding of bear(s) was intentional or unintentional.	
	• Address the issue of "intentional" and "unintentional" attractants in the bear smart bylaws because the word "intentional" currently appears in the <i>Wildlife Act</i> .	
	• Remove the word "intentional" from Section 33.1 of the <i>Wildlife Act</i> .	
	• Support and encourage the COS to enforce bear smart management practices through the issuing of DWPOs.	
	• Support and encourage the COS to be able to issue infractions to the bear smart bylaws.	
	• Support and encourage the COS to enforce more Problem Wildlife Protection Orders.	
	Initiate legal actions for chronic offenders.	

3.2 – I. ENFORCEMENT & SUGGESTED FINES FOR BYLAWS

The enforcement and related duties to assure compliance with bylaws should be a joint responsibility between the City, District and Conservation Officer Service. *Bylaws must be enforced with fines that are of sufficient amounts so as to act as a deterrent for future violations.*

<u>Fines:</u>

1. That there be a penalty of \$100 for attracting dangerous wildlife to any residential neighborhood, including for placing garbage totes out the night before pick up.

An alternative to this fine is to initiate a \$50 fine for first time offenders and increase the fine by \$50 for each subsequent offence. The bylaw for Port Coquitlam (effective August 4, 2009) fines \$150 for households that do not secure their garbage or if the tote is placed curbside before 5:30 am and not re-secured by 7 pm. To be of sufficient deterrent commercial, industrial and institutional establishments could receive higher fines than households.

The funds from bylaw infractions should be used to further sanitize the City as well as education, outreach and research on Bear Smart initiatives. The Get Bear Smart Society recommends funds generated be used to "address human-bear conflicts, such as the purchase of additional bear-proof waste containers or education." (Dolson pers. comm.). The funds could also be used to create the recommended problem wildlife specialist position.

It is recommended that the COS have enforcement powers for bylaws relating to bears because they are the agency most likely to respond to bear occurrences. It is recommended that the agencies with power to enforce bylaws be clearly stated within the wildlife attractant bylaw document.

Enforcement should be a joint responsibility between the Conservation Officer Service and bylaw enforcement officers.

(A) Hiring a Problem Wildlife Specialist

The City, COS and MOE with support from NBA should consider creating or supporting the hiring an individual dedicated to aid in wildlife bylaw enforcement, deliver educational programs related to wildlife, manage problem wildlife, databases, and wildlife related media releases. In Montana, the Montana Fish Wildlife and Parks hires Grizzly *Bear Management Specialists* that are dedicated to the management as well as aiding in and conducting research on grizzly bears. Currently, the CO Service does not appear to have enough time or person-power to deal proactively with 'problem' bears and as result a number of bears are destroyed. Further, the majority of the time the underlying attractant was not addressed at the time of the bears destruction thereby being available for the next bear to become conditioned to human food; this is how chronic problem neighbourhoods persist throughout the years, because bears are destroyed but some or all of the attractants remain in the neighbourhood to be available to the next bear.

A dedicated problem wildlife specialist would aid in tracking and monitoring 'problem' bears, be responsible for managing the problem wildlife database (Section 7.0), and also be responsible for enhancing public safety. Their primary purpose would be to deter the development of problem bear behaviour rather then simply not reacting until the bear has become a problem. *By being actively involved in the day-to-day issues regarding the development of problem bear behaviour in the City and District this person would also aid in identifying chronic 'problem' areas and applying the best adaptive management recommendations to this plan. It is recommended that this position be a trained wildlife biologist specialist that specifically manages problem bear complaints hired through MOE or a dedicated officer within the COS. It is not recommended to be a 'student' filled position (as is the case with the NBA education specialist) but rather a dedicated government or City employee. The City should consider giving the problem wildlife specialist the power to enforce wildlife bylaws.*

3.2-II. THE WILDLIFE ACT AND DANGEROUS WILDLIFE PROTECTION ORDERS

The Wildlife Act [RSBC 1996] chapter 488, Amendments Bill 63 – 1999 appears to largely focus on the "intentional" feeding of wildlife. In the majority of cases in Prince George the feeding of wildlife may be argued to be "unintentional" with garbage left unsecured at the curb, beside a household, and/or mismanagement of fallen fruit (G. Van Spengen pers. comm.). The inclusion of the word "intentional" within the Wildlife Act (Section 33.1) may limit the ability of the COS to issue and enforce the *Act* (G. Van Spengen pers. comm.). Food conditioning and/or habituation to humans results from bears feeding on human food regardless of whether the act of feeding the bear was intentional. Therefore, *bylaws addressing residential, commercial, industrial and institutional establishments are recommended to specifically address both the intentional and unintentional feeding of bears.*

Issue and enforce fines for violations whether the feeding of bear(s) was intentional or unintentional.

Address the "intentional" and "unintentional" feeding of wildlife in the bear smart bylaws.

Consider suggesting to the appropriate government agencies removing the word "intentional" from Section 33.1 of the Wildlife Act.

Allow COS the most power possible to enforce bear smart management practices and support their issuing of DWPOs.

COS to issue DWPOs for persistent offenders.

Dangerous Wildlife Protection Orders: Dangerous Wildlife Protection Orders (DWPO; under section 88.1 of the *Wildlife Act*) are limited in their scope because of the process and time required to properly issue an order (G. Van Spengen pers. comm.) and this appears to be limiting their use around the City and District. A Conservation Officer must issue the DWPO and then return to the resident/establishment on the date specified to ensure compliance with the order. If the attractant has not been removed by the date specified then the order has not been complied with and the CO may at that point issue a fine for failing to comply with the order (G. Van Spengen pers. comm.). If the order has been complied with then no additional steps are taken. A new DWPO must be issued for each violation; if the original DWPO was complied with but another attractant is found on the premises the process must begin over again and therefore does not stop the violator from starting a new non-natural attractant (G. Van Spengen pers. comm.).

DWPOs should consider addressing repeat offences and reducing the process required to issue an order. The time commitment currently required limits the COS time available for other duties and is limiting the issuing of these orders in the City and District. Although DWPOs are a reactive management technique if consistently issued and enforced then they can aid in stopping future violations for chronic offenders that refuse to voluntarily comply. The consistent issuing of DWPOs, particularly to establishments with repeat bear destructions and complaints, is strongly recommended. *One solution is to remove the word "intentional" from section 33.1* (G Van Spengen pers. comm.). COs should also have the ability to raise the fine with each subsequent offence. Bears do not respect political boundaries, back yards or other defined areas and a bear problem in one yard often becomes a bear problem for the neighbourhood. People who leave their garbage in a non-bear resistant manner or do not manage fruit on their tree should be subject to a fine regardless of their intentions because their actions affect the safety of the public as a whole.

3.3 BEAR SMART EDUCATION

Section	Summary of Recommendations Pertaining to this Step	Responsibility
3.3 – I.	Delivering Bear Smart Educational Messages	NBA
	 Promote participation in delivering bear smart education messages by participation between the City, District, Solid Waste Management, MOE, COS & MOF: Provide funding for hiring NBA education specialists Provide booths at events free of charge or pay for booths Provide volunteers 	Strongly recommended aid from: City
	• City & District: contribute to funding for the education program.	District Solid Waste Mngt
	• Solid Waste Management: Provide funding directed at proper use and compliance for transfer stations & issues with bears in the District.	COS MOE MOF
	• Evaluate interagency cooperation in supporting additional student trainees to further promote the educational program.	
	• City, District & Solid Waste: Contribute to the funding for NBA to update and print their bear smart brochure.	
	• City: provide bear smart educational material that contains NBA bear smart and contact information with the garbage collection schedule.	
	 Consider including bear smart information with posted utility bills during April-November bills. 	
	• City & District: Provide free message space in City and District guides, such as the Leisure services guide.	
	• All agencies: Support the Door-to-Door campaign for areas that are experiencing bear problems as identified by continual communication between the COS and NBA.	
	• City: Support NBA in conducting their garbage patrols, on the night before garbage collection. Note that these patrols also would aid the bylaw enforcement officers.	
	• City to partner with Regional District to educate the public in rural areas with respect to garbage.	
	 Nurseries (e.g., Art Knapps) to provide bear smart information to buyers of fruit bearing trees and non-fruiting alternatives. 	
	• City: Broadcast garbage bylaws (when in effect) on the radio similar to city watering regulations.	
	• Continue the NBA school programs and booths and public events.	
	• Examine additional ways to reach adults, for example, Prince George recreation club meetings, clean-air meetings, and the like.	
	• Continue radio ads as a means of an effective way of reaching people during the active bear season.	
	• Broadcast a TV commercial each spring (den emergence, bear out bear smart messages) and fall (fruit trees, garbage messages). City and District should help with funding these commercials.	

Table 19. Summary of recommendations pertaining to Bear Smart education

Section	Summary of Recommendations Pertaining to this Step	Responsibility
	• City & District: Provide NBA information and a link to the NBA website on the City (and RDFFG) website.	
	• Promote biological presentations regarding bears to teach people why bears are attracted to human-use areas by sponsoring and organizing public presentations regarding bears.	
	 Place large public information signs on the highways leading into Prince George as well as within the City itself. 	
	 Post bear warning signs at all trail heads in neighbourhoods with moderate and high bear activity. 	
	• Provide a 'bear facts' article in visitor information pamphlets.	
	• All bear smart educational material developed and disseminated by NBA, the City or otherwise should be reviewed for its accuracy by a registered professional biologist specializing in bear behaviour.	
	• Support & continue the current Bear Complaints Map.	
	Media Releases:	
	• Provide 'bear facts' article in the newspaper during bear active season focusing identified bear problems specific to spring, summer and fall seasons.	
	• Provide a public information release when bear occurrence reports and/or destruction begin to escalate.	
	• Air TV commercials during bear active season on PG TV.	

3.1 – I. Delivering Bear Smart Educational Messages

Bear Smart Step #4 requires the implementation of "a continuing education program directed at all sectors of the community". Bear Smart states that the primary objectives of the education program are to:

- 1. "develop a greater understanding of bear ecology and behaviour,
- 2. facilitate support from local residents for bear-proofing the community. This can include identifying methods and options for eliminating bears' access to non-natural foods and attractants.
- 3. develop guidelines for human activities in bear habitat to reduce the likelihood of human-bear conflict,
- 4. recommend actions to take during a bear encounter, and
- 5. encourage tolerance towards the presence and natural behaviours of bears in reasonable numbers in or near the community" (Davis et al. 2002:39-40)

'Problem' bears are not born 'problem' animals; they are created by the carelessness of people and the availability of anthropogenic attractants. 'Problem' bears are the result of a management problem of people and their attractants. Therefore effective, proactive management requires changing those human behaviours. Education of residents is extremely important to obtain increased voluntary user compliance. The more people understand that they live in bear country, what it means to live in country, and the behaviour of bears, the more likely that user compliance will follow and the need for enforcement will be reduced. Education throughout the City and District should take various forms such as 'bear smart' signs, pamphlets contained within new garbage totes or mailed out with utility bills (O'Neill pers. comm.), TV commercials, media releases, radio interviews, public events, school and public presentations.

Since 1998, the education component of the Provincial Bear Smart Program has been fulfilled by Northern Bear Awareness (NBA). NBA is a group of committed volunteer members that each year submits various funding applications to organizations such as the BC Conservation Corp. Habitat Conservation Trust Fund and similar potential funding agencies to obtain funding for an education delivery specialist(s). In 2009, NBA did not receive any funding from the BC Conservation Corporation's Bear Aware Program, the current primary granting agency for funding the Bear Smart education component throughout the Province. As such, NBA was required to raise all of their own funding to assure booths were present at large public events such as Fort George Park at Canada Day and the PG Exhibition. In order for the education component to properly address the objectives as outlined in the Bear Smart report (Davis et al. 2002) NBA would benefit from receiving additional support for the education component by the City, the District, and the local branch of the Ministry of Environment and Ministry of **Forests.** All of these agencies have mandates for bears and as such should be supporting the efforts of the NBA to reduce the creation of problem bears, reduce the number of problem bears destroyed each year, and increase protection of the public in the City and District as it relates to bears. Support should be in the form of supplying funding, providing bear smart signs for trails, parks and neighbourhoods, providing free of charge venues for presentations, printing and disseminating educational material such as the NBA bear smart brochure and the like. Additional employees or volunteers to disseminate information as wide-ranging as possible are required, particularly for the door-to-door and garbage control campaigns.

The solid waste management plan recommended under the Solid Waste management System Costs (Regional District and Municipal Expenditures) a \$2,000 operating cost each year from 2009 through 2019 (total \$22,000.⁰⁰; Gartner Lee Ltd. 2008) *specifically earmarked for the education of the public regarding waste management as it relates to bears*. These funds may be put to use by increasing media releases regarding proper storage and use of residential wastes and/or aiding NBA to hire staff to disseminate bear smart educational messages. It is recommended that the Solid Waste Management Branch work closely with NBA and the COS to determine how best to deliver bear smart messages as they relate to garbage and proper use of bear-resistant transfer stations.

City, Solid Waste Management Section, District, MOE and MOF to support and contribute to the continued & consistent bear smart educational messages for delivery to residents of all ages.

This is a Major Recommendation with a First Stage Implementation

It is strongly recommended that the door-to-door campaign be fully supported and reinstated because it offers a proactive management technique that is not currently possible by the COS.

It is strongly recommended that the door-to-door campaign be fully supported and reinstated. In the door-to-door campaign NBA employees or volunteers canvas areas that are currently

experiencing bear problems as determined by frequent contact between the COS and NBA education specialist. The COS provides NBA with daily (preferred) updates on where bear sightings are occurring within the City and District. The NBA employees go to that neighbourhood, determine the bear hazards, and then door-to-door canvas, particularly those households with obvious bear attractions. Continuation of this program is extremely important because it is a proactive management technique and if the attractants are subsequently managed by the resident the program could act to deter the development of problem bear behaviour rather then simply reacting only once the bear has become a problem. Currently the COS only responds to bear calls where the bear is deemed food conditioned and likely will be destroyed. Door-to door canvassing of current problem bear neighbourhoods offers residents ways to reduce the problem by, for example, locking away their garbage receptacles, providing bear smart information on bird feeders and proper placement and maintenance of feeders, fruit trees and similar problem bear causes. The door-to-door campaign and the nightly garbage patrols can also aid in identifying which residents have been repeatedly warned about their attracting bears and therefore could aid in issuing Problem Wildlife Protection Orders and enforcing bylaw fines. For protection, a minimum of 2 people should be present during door-to-door canvassing and garbage patrols.

Due to a lack of funding for a full-time education specialist in 2009 NBA had to focus the bear smart educational outreach largely on classroom presentations, although they also were present at a number of large public events. In the past when funding was available the NBA education specialist gave a number (in some cases weekly) radio interviews and one year even aired a TV commercial. The TV commercial and radio interviews are an excellent way to further inform the public regarding bears, living in bear country and bear smart management practices. It is strongly recommended that the City and District support a spring aired TV commercial regarding bears emerging from their den sites (time to lock up garbage and secure bird feeders) as well as a commercial that airs in the fall season (August onwards).

The educational messages provided by NBA are geared towards children and there is a need for more support and funding to add a number of adult-oriented presentations, for example at the outdoors clubs or in a neighborhood hall. The City should also post bear smart information with links and contacts to NBA in their leisure guide, at the tourist information stop, and similar venues. It is also recommended that the City support Bear Smart presentations in chronic neighbourhoods each spring as bears emerge from their dens and late August beginning of September (fall) when bear problems are known to peak in the City. For example, the City could supply the venue for the presentation free of charge and/or pay the presenter fees.

4.0 <u>ISSUE THREE: GREENSPACE CONFIGERATION, CITY PLANS & DESIGN,</u> <u>PARKS & PROTECTED AREAS, NEW DEVELOPMENTS</u>

Table 20. Summary of Recommendations pertaining to the management of green-spaces, parks and new developments

Section	Summary of Recommendations Pertaining to this Step	Responsibility
4.1 – I	General City Design & Layout	City
	Configuration of Green-Spaces	(& residents)
	• Consider the layout and the amount of green space surrounding the City.	
	• Avoid placing schools and children's play area in areas that back onto the periphery of the green-space.	
	• Remove the majority of vegetation and clear out underbrush	
4 1 II	surrounding children play areas.	Citra
4.1 – 11		City
	• Remove, manage or reconfigure those that lead into chronic problem neighbourhoods.	
	 Sever green-spaces from travel corridors, especially off the 2 major rivers. 	
	• Remove and thin the majority of vegetation, particularly surrounding green-space trails heads & on trail switch-backs.	
	• Trim vegetation along trails to increase lines of sight.	
	• Assure bear warning signs are placed at all trail heads.	
	• Hire and/or consult with a biologist that specializes in bears and bear behaviour for city trails and networks.	
4.2	Parks & Protected Areas	Parks, City &
	 Sever green spaces that lead into City, particularly those along corridors. 	District
	 Consider closing portions of trails or areas of Parks if bears are noted. 	
	• Remove the majority of vegetation and clear out underbrush surrounding children play areas.	
	• Consider fencing with high perimeter fence children's play areas in parks where green spaces back onto the play area.	
	 Assure all garbage receptacles are approved bear-resistant, are properly maintained and managed. 	
	 Evaluate sybertech garbage cans for bear-resistant status. 	
4.3	New Developments on the periphery of the City	Developer
	Pre-plan the layout!!	City
	 Bear-resistant measures should be required in development plans prior to approval. 	COS NBA
	• Implement and establish garbage storage rules and regulations at the onset:	KP Biologist
	 inform potential buyers of the bear smart management rules and regulations prior to purchase. 	(refer to Section 2.2 – I A).
	• Provide a central communal bear resistant garbage collection system	

Section	Summary of Recommendations Pertaining to this Step	Responsibility
	• Enforce the use of communal garbage collection sites.	
	• Prohibit the planting of fruit bearing trees (use the non-fruit flowering variety instead).	
	• Prohibit the planting fruit bearing shrubs attractive to bears.	
	• Remove existing fruiting trees or shrubs attractive to bears.	
	• Provide pamphlets regarding bear smart education and messages left on the counter in the kitchen for new residents.	
	• Require mandatory fencing of backyards that back onto undeveloped green-spaces or land with a high (minimum 2 m) fence.	
	• Clear a minimum of 50-100 m from houses and yard/play areas.	
	 Plan any contained parks and greens paces so they do not link to larger undeveloped areas. 	
	• Do not place walking trails in riparian areas.	
	• Avoid splicing riparian areas into 2 or more parts.	
	• Account and allow for wildlife movement corridors to pass well around any developments that occur adjacent to the River or a creek/stream bed (e.g., Cowart Road development).	
	• Avoid retaining any heavy brush or treed areas within the development core. Remove the majority of underbrush and provide an open, park-like setting.	
	• Plan children's playgrounds separated from green spaces.	
	• Fence children's play areas with a 2 m high chain link fence.	
	• If a trail links to a larger system (which is not recommended) heavily brush the shrub layer and increase all lines of sight.	
	• Sign trails that may be used by bears with 'bear warning' signs.	
	• Advertise being a bear-friendly community in brochures or websites.	
	• Consider a bylaw to prohibit the planting of fruit bearing trees and shrubs attractive to bears.	

4.1 GENERAL CITY DESIGN AND LAYOUT

4.1-I. CONFIGURATION OF GREEN-SPACES

Prince George is within habitat rated as high interior BC bear habitat. Bears will be attracted to the City simply because movement corridors filter them into the City and there is a high availability of naturally occurring seasonal bear foods. Cities can be planned/designed to dissuade bears from entering or alternatively to encourage bears to enter. Currently, the configuration and retention of a number of green-spaces that connect to large tracks of forested and largely undeveloped habitat have been maintained and lead from RDFFG agricultural and farmlands into the City. These bands of green-spaces and trail networks act to filter wildlife into current chronic problem bear neighbourhoods. *A noticeable attribute of the identified chronic bear neighbourhoods is the maintenance of bands of forested areas that follow creek beds; most*

of which serve as biking or walking trails for people. For example, Varsity trail in College Heights connects to the Fraser River and one can travel from Westgate using the connected green-space trails to the Fraser River having to cross only a few open areas or roads; Otway and Forests for the World link to both Charella Gardens to the south and Moore's meadow to the East; and the Hart Highlands at Hoeferkamp Road contains very large tracks of forested land with the concentration of main housing units not occurring until one reaches the upper Hart Highlands. *Currently, bears are not being dissuaded to enter the City and high hazards exist where these types of City development complexes join productive foraging areas and seasonal food concentrations*. This situation appears to be similar to Whistler where McCrory states:

Subdivision planning and development appears to have not taken into account the degree to which the community design has created a "bear friendly" environment throughout RMOW by leaving native forest, cover and native bear foods in peopled areas. (McCrory 2004:17).

Bear habitat values need to be accounted for in management decisions (Ciarniello 1997) and the City and District should consult with a Registered Professional Wildlife Biologist regarding best placement for trail designs and best bear smart management practices for future developments.

The primary recommendation is to avoid further development in areas that protrude into high quality bear foraging and critical linkage habitat. Instead, focus on developing those areas that would make the City less attractive to bears. For example, place future developments in less desirable bear habitat, remove tree and shrub cover, and develop from the core of the City outwards being careful to minimize the amount of connected green-space that leads into neighbourhoods thereby further dissuading bears to enter.

Further development should focus on moving from the core of the City outwards. For example, in this strategy one would develop the land that currently exits between Hoferkamp road and the upper Hart Highlands rather than further expanding or blocking prime bear travel corridors along the Rivers. Developing the area between the lower and upper Hart Highlands would remove the connecting forested lands from the larger surrounding matrix and concentrate development rather than dispersing it throughout the landbase and interspersing it with retained forested patches that bears favour. The idea of planning towns to dissuade bears from entering is occurring in Banff, Canmore and Whistler:

In the Canmore and Banff areas, town planners are now avoiding creating cul-desacs that jut out into bear habitat. They are creating a more uniformly defined circular edge where subdivisions border on bear habitats (McCrory 2004:18).

4.1 – II. TRAILS AND CORRIDORS

The placement and connectivity of trails and corridors to the larger surrounding matrix needs to be reconsidered and evaluated from the perspective of facilitating or dissuading animal movements for all City neighbourhoods. Currently, the trail network acts to filter bears into the City and it is believed that some bears may simply get caught in chronic problem neighbourhoods after following the trail network (e.g., College Heights and Upper Hart Highlands). Once in these neighbourhoods the availability of non-natural, anthropogenic attractants acts to hold bears and 'problem' bear behaviour tends to develop.
It is strongly recommended that the City focus on identifying critical linkages for bear movement and based on those results reconfigure trail networks to either allow for movement between identified critical habitat patches by maintaining or enhancing connectivity or dissuade movement by making the trail networks less attractive to bears.

Maintaining connectivity, underbrush and forested landscapes is believed to promote the use of trails and corridors by bears while severing trail networks from attached green-spaces and clearing out underbrush to remove bear foods, minimize securing cover, and increase the line of sight are recommended ways to dissuade bears from using these trails. *Dissuading bear movement should only be done in areas where movement is not critical to their accessing important seasonal habitat types.* If movement between habitat patches is critical then it is likely that bears will continue to attempt to use these areas despite best bear smart management practices. Therefore, it is prudent to identify the critical linkages and work to maintain them for bear movement while removing or restructuring around the City or community those trails, corridors and areas that are not identified as critical. Properly identifying critical linkages requires research on bear movements and habitat use and the City should support such research efforts (refer to Section 7.2); it will be more difficult to manipulate bear movements and habitat use if management goes against biology rather than working with the species biology.

Trails that lead into chronic problem bear neighbourhoods should be removed, managed or reconfigured. All non-critical trails should be severed from adjoining green spaces by an open, non-forested gap that is as large as possible, especially off the 2 major rivers. Increasing the line of sight by removing the underbrush that bears can use for security cover as well as removing forage items should aid in dissuading bears from entering trails that lead into neighbourhoods. Focus should be placed on the trail heads as well as switch backs which tend to limit visibility. Bear warning signs should occur at both trail heads and along the trail. It is recommended that research and field reconnaissance be used to identify green-spaces and trails that have the potential to be brushed throughout the city, especially those in College Heights, Charella Gardens, and Hart Highlands. Priority areas should focus on the following:

- Schools connected to trails and green-spaces as identified in the hazard assessment,
- Walking/biking trails accessing chronic problem residential areas,
- Greenbelt trails within the city,
- Park trails and recreation areas.

4.2 PARKS AND PROTECTED AREAS

City parks and protected areas should be managed according to their placement in the City or District. Parks can be used to aid in filtering bears around the City (e.g., Cottonwood Park) or to hold bears away from the City core (e.g., implementing a fruit tree redistribution program in an outlying park/wilderness area). Improperly managed Parks and Protected areas currently act to attract bears into the City (e.g., Hudson Bay Slough). Regardless of the type of park, all parks and wilderness areas should have bear-resistant garbage receptacles that are regularly maintained by a responsible contractor or Park employee. Garbage must not be allowed to overflow for the receptacle, receptacles should be maintained to minimize odours and frequent checks of latches and other potential deficiencies should occur. Further, the majority of the vegetation and underbrush should be removed from all areas surrounding children play areas. In parks where

green spaces back onto the play area it is recommended that the play area be fenced with a high $(\sim 2 \text{ m})$ perimeter fence.

Parks and protected areas that fall on the periphery of the City should have different mandates than residential dwellings and inner City parks. It is recommended that inner City parks and parks in busy populated neighbourhoods (e.g. Hart Highlands and College Heights) should be further severed from green spaces; there should be no connectivity between the park and larger green-spaces. The following management techniques may be used to dissuade bears from entering inner city parks: assure they are not connected to larger green-spaces by a forested trail network; clear out the underbrush to increase line of sight and decrease security cover for hiding; and maintain these parks in a "park like setting" with open grass areas, dispersed large trees, little underbrush and no fruit or berry producing shrubs.

Bear use of wilderness parks and protected/wilderness areas such as Forest for the World should be accepted in bear country. These parks should occur on the outskirts/boundaries of the City and/or follow the major Rivers to allow for and encourage the use of these areas for movement between critical habitat patches. These Parks should be maintained in a more natural setting where the undergrowth is not consistently managed and bear foods are encouraged in an attempt to hold bears out of residential areas. Forested walking and biking trails that lead off these Parks should be encouraged in those areas that connect to larger green spaces but discouraged in areas that lead towards the City core. Bears require large connected landscapes in order to fulfill their life requisites and to remain out of trouble with people; the large spatial requirement of bears means management and preservation of habitat will be required on both publicly and privately owned lands.

For wilderness parks it is recommended that portions of trails or areas of the Park be closed if bears are noted, particularly females with offspring.

4.3 NEW DEVELOPMENTS ON THE PERIPHERY OF PRINCE GEORGE

Pre-plan new developments that occur on the periphery of the City in consultation with a Registered Professional Biologist that specializes in bear behaviour and representative(s) from the Northern Bear Awareness Society.

The idea of 'Bear Friendly' guidelines and policies for new subdivisions and municipal developments is occurring in Banff and Canmore, AB, and Ucluelet and Squamish, BC. *The purpose is for the developer to work closely with the local Bear Smart organization and as recommended here, a Registered Professional large carnivore biologist, to determine ways to dissuade bears from entering new developments. This should be done during the development of the plans and prior to the construction phase.* Example mitigation techniques include such measures as pre-planning the placement of the development to avoid or completely develop (i.e., remove) critical habitat patches, prohibit the planting of trees and shrubs attractive to bears, fence dwellings that back onto green-spaces with a 'no climb' high fence, provide bear smart education to homeowners of newly purchased dwellings, and provide bear smart mitigation techniques such as a communal garbage collection program.

There is a need in Prince George for municipal planning to require bear-resistant measures in development plans prior to their approval. These development plans should be in place for all new subdivisions, housing units, road building and expansion, commercial developments, and biking, hiking and walking trails. If bear smart rules and regulations are included during the construction and initial implementation phases they have the added advantage of being in place prior to use by the resident/public. The Director of Planning for Ucluelet, BC (Felice Mazzo), states that user compliance is more readily accepted when bear smart guidelines are implemented prior to purchase or use because potential users are aware in advance of the rules and regulations.

The first step should be to pre-plan the layout of a development as it occurs on the landbase.

Properly planned green-spaces, trails, avoidance or inclusion of critical habitats and similar measures allow for planners to attempt to filter the movement of bears around the development and exclude bears from areas within the development. General efforts for encouraging or dissuading use by bears are discussed under Section 4.1; however, *it strongly recommended that the City require further site specific recommendations for each development in question at the time of the application.* For example, to dissuade use by bears developments should avoid fragmenting critical habitats, such as riparian areas into two or more pieces. On-site evaluations should focus on mapping critical habitats and developing site-specific recommendations regarding the management of critical habitats.

The second step should be to plan and regulate those bear smart measures that require user compliance, focusing on removing anthropogenic attractants.

For all developments it is paramount that garbage storage rules and regulations be implemented and established at the onset. It is strongly recommended that bear-resistant communal garbage storage areas accompany all new subdivisions and that potential buyers be informed of the rules and regulations regarding garbage storage and removal prior to purchase (McMillan pers. comm.). In Ucluelet, BC, the developer worked closely with the Bear Smart BC Society on communal bin placement, design and layout (formerly Pacific Rim Bear Smart Society, McMillan pers. comm.). The Bear Smart BC Society secured a portion of the funding for the communal garbage bin pilot project. The project was designed to be in place when residents moved into the new subdivisions and continue as a pilot project for a minimum of 3 years. The City's Planning Department "will measure community support for the communal garbage collection methods…" during the pilot project (Appendix 3). The District of Ucluelet report to Mayor and Council as presented by F. Mazzoni, Director of Planning, is provided in Appendix 3 courtesy of C. McMillan, Bear Smart BC Society. Use of bear-resistant communal garbage collection sites for new developments is strongly recommended for Prince George.

In subdivisions where communal garbage collection is not deemed the most appropriate bearresistant method then other bear resistant methods garbage collection and storage methods must be implemented. In Squamish, BC, the Squamish District's local Bear Aware program cocoordinator worked with the developer for the upscale University Heights development in Squamish to retrofit garbage bins: "Mr. Day [the developer] has agreed to retrofit each home's garbage tote with a lock, practice Bear Smart landscaping by using plant species that won't attract bears, and ensure that each resident gets an information package on living in bear country. As well, all parks and green spaces will have bearproof garbage receptacles installed" (Atkinson 2007).

Bear-resistant measures are required in development plans for developments that occur on the periphery of the City or anywhere in critical bear habitat such as movement corridors, prior to approval of the development.

Other recommendations used to dissuade bears from entering areas include removing the security cover (shrubs) and fencing those establishments or yards that back onto green-spaces with a 2 m high, no climb fence. In areas where persistent problems occur (such as the College Heights pub) the use of a top strand of electric fence strung around the perimeter should be strongly considered. In addition, McCrory (2004:17) "suggest[s] clearing to at least 50-100 m from houses and yard/play areas" as well as erecting fences for children's play areas that are adjacent to green spaces such as riparian zones or abundant berry patches.

It is strongly recommended that backyards adjacent to green-spaces require mandatory fencing preferably with a 2 m, no-climb fence. Bear foods listed in Appendix 4 should be removed.

Educational efforts include providing NBA bear smart brochure on each resident's kitchen counter (Botten pers. comm.). Bylaws for garbage storage and removal, prohibiting the planting of fruit bearing trees and shrubs attractive to bears, and bird feeders should be in place prior to household purchase or rental and for all commercial operations.

5.0 ISSUE FOUR: SCHOOLS

5.1 Elementary & High Schools Assessed

Dissuading Bears from Entering School Grounds is a Major Recommendation with a First Stage of Implementation.

First Step for Schools Rated Moderate to Extreme. Second step for schools rated low.

Table 21. Summary of recommendations for managing school grounds with bears reported on or near the property and the University of Northern British Columbia

Section	Summary of Recommendations Pertaining to this Step	Responsibility
5.1 - I	Managing Existing Schools:	School & City &
	Children's Play Areas	District
	• Remove vegetation that has overgrown the fence-line on school property as well as adjacent property.	
	• Clear a buffer strip free of all vegetation surrounding green- spaces & play areas of ≥100 m for schools rated as moderate to extreme.	
	• Focus attention on treed/shrub play areas then on the remainder of school perimeter.	
	• Remove all bear forage items from school grounds. This includes mountain ash trees!	
	• Consider clearing bear forage items from adjacent green-spaces.	
5.1 - II	Line of Sight	
	• Clear vegetation obstructing the line of sight between school and play area(s).	
	• If play area still remains obscured consider relocating play area in open in an area away from green-spaces.	
5.1 – III	 Relocate all play areas where the vegetation is not being managed and if line of sight is obscured. Garbage containment 	
	Remove unnecessary cans.	
5.1 – IV	• Replace all remaining cans with bear-resistant varieties. <i>Fencing</i>	
	• Raise the fence line on schools rated as high to extreme to ~2 meters.	
	• Assure the fencing covers the entire perimeter with no breaks.	
	 Consider "double fencing" in problem areas that back onto green-spaces (McCrory). 	
5.1 - V	Education:	School & NBA
	• Encourage children to play in groups.	(possibly COS)

Section	Summary of Recommendations Pertaining to this Step	Responsibility
	• Invite education presentation by NBA and request they focus on how to dissuade bears and what to do it a bear is sighted on school property.	
5.1 - VI	Additional General Recommendations:	School, City or
	• Remove fruit trees & berry bushes from school property.	District and residents
	• Remove fruit trees from residential properties & crown land surrounding schools.	
	• Clean odours from a number of garbage cans (particularly Carnie Hill Elementary and Kelly Roads Secondary).	
	 Place bear smart warning signs along fence lines and in areas that back onto green-spaces. 	
	• Remove non-bear resistant garbage cans from areas surrounding the school (e.g., Heather Park Middle School has a municipal can attached to the bus stop in front of the school).	
	 Implement 'bear smart' education campaigns and neighbourhood clean up waste campaigns surrounding schools. 	
	 Consider having a biologist visit schools with repeat bear occurrences to further develop site-specific recommendations. 	
5.1 - VII	New Schools	
	• Place new schools well away from connected green-spaces, undeveloped land and trails.	
	• Avoid locating new schools on the periphery of the community, rather centrally locate them away from undeveloped land.	
5.2	The University of Northern BC	University,
	Remove all unnecessary garbage cans.	NBA education
	• Remove garbage bins located directly outside the daycare.	component,
	• Replace all remaining cans with bear-resistant varieties.	Visit by COS to
	• Do not allow garbage to overflow or be placed outside of bins.	dorm orientation
	• Replace all large, commercial garbage containers with metal lids that are closed and latched at all times.	sessions recommended.
	• Provide 'bear smart' education to students in residents at orientation sessions.	
	• Enforce punishments including fines for students that promote problem bear behaviour.	
	• Provide 'bear smart' education material at student services centre.	
	• Provide a presentation on bears, the campus, the dangers and bears in the area open to all students.	
	• Post warning signs regarding bears, particularly those backing onto green-space trails.	
	• Electric fence or relocate the compost facility.	

<u>Managing Existing Schools</u> 5.5 – I. & II. Children's Play Areas & Line of Sight

The top priority for the schools assessed is to begin by managing the surrounding vegetation that has overgrown the fence-line with particular attention to any treed/shrub play areas. Overgrown vegetation along fence lines should be removed to limit the security/hiding cover that could enable a bear to approach a child at a dangerously close distance as well as to increase the line of sight for attendants. Schools rated as moderate through to extreme bear hazard should have the vegetation on both the school property as well as that surrounding the fence on the adjacent property cleared. The objective is to provide a break between green-spaces and the school's fence to deter bears from having to come out into the open to cross the break. In Whistler, breaks surrounding children's play areas for schools and parks were recommended to be 50 m wide (McCrory 2004). The break should be at least 50 and preferably 100 m wide and should surround all green-spaces.

Attendants should be able to view all areas of the school grounds without obstruction from patches of trees or shrubs. Vegetation obstructing the line of sight from the school to play areas should be cleared and if portions of the play area remain obscured then the play area should be relocated to an area where attendants are able to view the play area in its entirety. Any bear forage items (see Appendix 4) should be removed from the property as well as the immediately surrounding vegetation.

<u>5.5 – III. Garbage Containment</u>

All schools assessed had open garbage bins associated with the school as well as large commercial bins with non-bear resistant lids. Some schools had 9 non-bear resistant bins on school property. Begin by removing all unnecessary garbage cans and then replace the remaining cans with bear-resistant bins. The large commercial dumpsters associated with each school must also be fitted with metal lids that lock/latch down. Large commercial bins should be locked down each evening and the lids on bins should remain down at all times. Children should be educated on issues associated with wildlife and garbage and general 'do not litter' campaigns.

5.5 – IV. Fencing

I was unable to locate a peer-reviewed reference for how tall a fence should be to deter bear(s) from climbing. Bears are very agile climbers and are known to climb ladders and other structures. In the human-bear management plan for Whistler, BC, it was recommended that:

"As a top priority, based on the risk of a possible predaceous attack, bear-proof the higher risk children's play areas, including play sets in 7 municipal parks and playgrounds at 2 schools, by installing bear-proof fencing or relocating some play set areas away from close proximity to bear habitats/dense cover....playgrounds be bear-proofed with fencing or moved to the middle of large open areas that are 50+ metres from the nearest green space bear habitat... chain-link fences 2 m high are now being installed at Canmore school playing fields...."(McCrory 2004:15 & 19).

It is recommended that fencing surrounding schools rated as high or extreme be raised to ~ 2 meters. In schools with chronic bear problems they may consider "double fencing" in problem

areas that back onto green-spaces (McCrory). The fence should fully enclose the perimeter of the area and should not have any breaks.

<u>5.5 – V. Education Campaign</u>

The 17 schools listed in the hazard assessment (see Ciarniello 2008, Table 12, pg. 58-59) should contact the Northern Bear Awareness Society each spring and fall to present bear smart education messages to students. These presentations should also include a component of what to do if a bear is sighted, proper garbage management both at home and on the school grounds, and the advantage of playing in groups. The COS also may be an effective means of delivering educational messages to school children.

5.5 – VI. Additional General Recommendations for Existing Schools

After implementation of the above broad recommendations, additional site-specific recommendations by school may be required for those schools, particularly those rated as high or extreme bear hazard. Table 12 (pg. 56) of the bear hazard assessment provides comments specific to each school assessed. For example, the residential area surrounding Heather Park Middle School and Kelly Roads Secondary School requires a campaign to clean up garbage strewn throughout the neighbourhood as well as within the green-spaces surrounding the schools. Kelly Roads Secondary school should have a garbage campaign clean up day where students clean up garbage strewn around school property as well as in the gully that leads to the school. A residential "bear smart" campaign is required for this neighbourhood.

5.5 – VII. New Schools

Where schools are located in relationship to the surrounding matrix of forests, undeveloped land, trails and green-spaces should be considered when planning a new school. The likelihood of a bear entering school grounds would be reduced if schools were placed towards the core of the neighbourhood and did not back onto undeveloped land/green-spaces or connected trails. The greater the separation between connected green-spaces and schools the less likely a bear(s) is to enter school grounds.

5.2 UNIVERSITY OF NORTHERN BRITISH COLUMBIA

The University of BC represents a unique situation because it backs onto large tracks of greenspaces and trails with abundant bear foods. Bears are going to be a part of the University setting simply because of the surrounding habitat matrix. To dissuade the development of problem bear behaviour and discourage human-bear conflicts the University must remove all sources of nonnatural attractants, particularly accessible garbage as well as educate dorm residents and the student body in general. Keeping the campus clean and sanitary requires removing unnecessary bins (parking lots, outside door ways, etc.) as well as replacing the remaining bins with bearresistant varieties. The large commercial bins can be made bear resistant by changing the lids to metal and latching/securing them closed at all times. Bins also require frequent emptying and garbage must not be allowed to overflow the bin.

Once the non-natural attractants have been removed education and enforcement for infractions must be implemented. The NBA along with the COS should be invited to resident orientation sessions and asked to provide information on proper ways to conduct oneself in bear country.

Bear smart pamphlets should be located at student services and inside each residence. Presentations on bear behaviour and what to do if a bear is encountered around the University grounds or trails should be provided to students and staff.

The compost facility at the University was not believed to be what attracted bears to the University; it was the position of the University in relationship to the surrounding matrix and the availability of non-natural attractants, particularly garbage. The compost facility was well managed for odours and non-natural attractants at the time of the site assessment but was placed close to the green-space and residents rather in an area that would further dissuade bears from entering. Effective means of composting in bear country exist and include: (1) relocating the facility towards the inner university core or placing it on a roof top (i.e., placing it in an area that is difficult for a bear to access); (2) Electric fencing the perimeter; (3) High, chain link perimeter fence with consideration of a single top strand of electric fence; or (4) composting yard waste only (no food wastes). Regardless of the option chosen all bear foods, such as raspberries should be removed from within the compost facility.

6.0 ISSUE FIVE: CRITERIA FOR BEARS IN THE CITY

First Step:

First Stage Recommendation:

Implement proactive ways to manage bears in order to deter 'problem' bear behaviour from developing or to keep the 'problem' behaviour minimized thereby not allowing unwanted behaviours to fully develop. This is done by immediately determining the problems in an occurrence neighbourhood as they are reported and using on-site evaluations to manage those problems and behaviours before they develop into the need to destroy the animal.

Second Step:

Reevaluate the current management of problem bears and the terminology used in the Ministry of Environment's Conservation Officer Service, Chapter 6 (Complaints and Occurrences), Section 10 (Problem Wildlife Management), Subsection 03 (Preventing Conflicts with Large Carnivores). Suggest changes and/or clarification to the document "Preventing and responding to conflicts with Large Carnivores (Chapter 6, Section 10, Subsection 03)."

Table 22.	Summary of recommendations pertaining to the management of "	problem"	bears
within the	City and District		

Section	Summary of Recommendations Pertaining to this Step	Responsibility
6.1 - I	Change from reacting to bear problems once bears have become a problem to proactively managing bears. If proactive management is not in the COS mandate then:	COS City District
	 support the hiring of a bear conflict specialist (refer to 3.2 – 1A) 	NBA
	ii. support the hiring of an NBA education specialist	
	• Specialists would keep in continual contact with the COS and would immediately ground visit calls as they are received and where the COS would not respond.	
	• General duties of the Bear Management Specialist are to implement pro-active bear management techniques:	
	i. Ground visit neighbourhoods and conduct bear smart patrols.	
	ii. Canvas door-to-door and request and suggest ways noted attractants be managed.	
	iii. Record violations and report them to COS and/or bylaw enforcement officers if compliance is not voluntary.	
6.1 – II through	• Develop a consistent set of criteria used to manage 'problem' bears that also is consistent with human safety being the primary goal:	Prov. Govt (MOE)
v	i. Preventing and Responding to Conflicts with Large Carnivores does not supply a definition for "food conditioned."	COS
	ii. Reevaluate in City and District whether all food conditioned bears should be destroyed. (e.g., is a bear feeding in a mismanaged apple tree the same as a bear on a porch?).	

iii. Develop a set of behavioural based criteria for problem bear management.	
iv. Develop a set of criteria for the length of time traps remain set in an area.	
v. Evaluate ways to determine if the correct animal has been caught.	
For bears that are not deemed a threat to human safety:	
vi. Consider capturing the bear, placing an identifiable ear tag and then releasing the bear within its likely home range.	
• Education and/or fines (DWPO and/or bylaw infractions) should be issued for all available non-natural attractants every time a bear call is responded to.	COS Bylaw officer

6.1 DETERMINING THE PROBLEM AND DEFINING A PROBLEM BEAR

The procedure that governs the Conservation Officer Service preventing and responding to conflicts with large carnivores is Chapter 6 (Complaints and Occurrences), Section 10 (Problem Wildlife Management), Subsection 03 (Preventing Conflicts with Large Carnivores). The following recommendations are with respect to the limitations of this Procedure as it applies to the COS instituting and maintaining best Bear Smart practices. In order to move from reactive to proactive management as required by Bear Smart it is recommended that further thought be given to the criteria used to define the problem and determine the appropriate management action.

<u>6.1 – I An Opportunity to Move from Reactive to Proactive Management</u>: *The current reactive management of bears does not deter the development of problem behaviour. Rather, it allows the animal to fully developed 'problem' behaviour before actions (other than over the phone advice) are taken:*

The COS does not normally respond to calls that are sightings of bears in neighbourhoods or bears feeding naturally on berry producing shrubs and the like; Prince George is bear country and the COS expect bears in certain parts of the City and District. Further, if the bear is not acting aggressively then the COS may not respond to initial calls of a bear in garbage or a bird feeder; rather they educate the caller over the phone and ask them to remove the non-natural attract(s). Not responding to initial calls regarding the sightings of bears in neighbourhoods misses an opportunity to educate the public, to enforce bear smart management techniques, and to dissuade bears from developing (or further developing) problem behaviours. If these types of calls are responded to as they are received then the non-natural attractants can be immediately and appropriately managed which will dissuade the further development of problem bear behaviour, and break the cycle of creating and destroying 'problem' animals. This is especially important for those animals that are not necessarily 'problem animals' but may simply have followed a retained greenbelt into the heart of a neighbourhood. Preventing and Responding to Conflicts with Large Carnivores states that:

"1.1.1 The emphasis of ministry efforts will be to prevent or reduce conflicts with dangerous wildlife and will include encouraging and promoting agricultural standards of good husbandry, management of non-natural attractants, community planning, and the delivery of public education" (pg. 5). It is recognized that the COS may not have the person-power or mandate to perform the potentially time consuming tasks required for proactive management. If proactive management is not in the COS mandate then the COS, City and MOE should support the hiring of a problem wildlife specialist (refer to Section 3.2 - IA) and potentially an "education specialist." The educations specialist would be employed through NBA and their job would focus primarily on regular contact with the COS in order to canvas neighbourhoods as complaints are reported and follow up to assure the attractants have been removed. Proactive management will increase human safety.

<u>6.1 – II. The Need for a Consistent Set of Criteria:</u> Develop a consistent set of criteria used to manage problem bears:

There appears to be a lack of consistency between the management of bears in different Cities/communities in BC. It appears the management of problem bears is dependent upon the amount of other work responsibilities and duties of the COS at the time of a complaint as well as the types of organizations/societies/charities present in the community. For example, Whistler, BC, strongly supports the non-lethal management of bears (Dolson pers. comm.) and bears are not normally destroyed until they enter a household or similar dwelling and they have an active aversive conditioning program. In Prince George, if bear complaints are responded to by the COS than in the majority of cases the bear(s) is destroyed. In Glacier National Park in the US bears are not destroyed unless they are conditioned to human food and habituated to humans to the extent that their behaviour poses a threat to human safety. It is recommended that bears that purposefully approach humans in a non-defensive situation and/or break into houses and other establishments be removed but should the bear that is in an apple tree or bird feeder hung from a tree also be removed? Human safety is the primary goal of this plan and bears must not be allowed to pose a threat to human safety; however, forethought should also be given to the type of situation a bear has found itself in and its behaviour once in that situation. The scope of these questions are too in-depth for this management plan to adequately address but there appears to be need to develop a consistent set of criteria used between Officers on proactive ways to manage 'problem' bears. Those criteria should be in the form of an official document and remain in the office for each new employee.

It is strongly recommended that a consistent set of criteria be developed and used to manage problem bears. These criteria should present ways to evaluate the level of food conditioning and habituation of humans by individual animal. The Provincial Government in Victoria should develop the criteria and it should be used to guide the COS regarding bear management throughout the Province.

6.1 – III. A Consideration for Food Conditioned Bears:

Preventing and responding to conflicts with large carnivores is Chapter 6 (Complaints and Occurrences), Section 10 (Problem Wildlife Management), Subsection 03 (Preventing Conflicts with Large Carnivores) does not provide a definition for "food conditioned". There is a need to reevaluate whether all "food conditioned" bear as defined by the Prince George COS should be destroyed.

Bear management in Prince George is currently very reactive; if the bear is determined to be a problem through occurrence reports, and if also believed by the COS to be 'food conditioned'

the animal most often is destroyed. Food conditioning is defined by the Prince George COS as bears feeding on garbage, feed left in bird feeders, or fruit on trees and is determined based on the types of complaints in the area and at the discretion of the Conservation Officer (G. Van Spengen pers. comm.). The criteria used to destroy a bear in Prince George as stated by the Conservation Officer Service are:

- the bear must be in an area where previous complaints have been reported; and,
- the bear must be considered food conditioned as defined above (G. Van Spengen pers. comm.).

Preventing Conflicts with Large Carnivores does not provide a definition of food conditioning and does not address levels of habituation to humans or food conditioning behaviour. In regards to 'problem' bears Preventing Conflicts with Large Carnivores states that a large carnivore may be destroyed if "there is reason to conclude that the animal has gone through the foodconditioning process and would attempt to return to human activity areas" (pg. 10). However, there is no definition of what the "food conditioning process" involves and there is no mention of behavioural levels of conditioning or habituation. Certainly, one may expect a bear to return to an area if it has received a food reward because bears are known to be quick learners which is a survival tactic. It is recommended that the reasons to destroy a bear be reevaluated according to the behaviour and level of food conditioning of the animal. For example, if a bear gets caught in a greenbelt where an apple tree hangs over the backyard trail (as was noted in the Hart Highlands and College Heights assessments) and the bear feeds on the apples should that bear be labeled food conditioned and destroyed? Further, neighbourhoods with chronic bear problems also are likely to be used by more than one animal; was the bear in the apple tree the same bear as the one that was feeding on garbage and generating the majority of calls to the COS for that neighbourhood or was it simply in the wrong place when the COS arrived? A suggestion may be to capture the bear, place an identifiable ear tag and then release the bear within its likely home range. With each problem bear responded to there should be corresponding education and/or fines issued for non-compliance. Non-compliant homeowners and all repeat offenders should be issued a DWPO with follow-up to assure compliance. Bear problems are expected to decrease once the City and District are sanitized, greenbelts are managed, and repeat offenders have been removed from the population.

<u>6.1 - IV. A Consideration when Trapping 'Problem' Bears</u>: *There should be a set of criteria used to determine if the bear caught in a trap is indeed the offending bear.* Traps are set in areas with problem bear complaints and if a bear is not caught the trap may remain in the area for >2 weeks. The large range requirements of bears and the fact that bears are not territorial animals means that more than one bear may be use a site and a bear caught weeks after a trap is set may not be the offending bear.

<u>6.1 – V. Within Home Range Relocations:</u> Consider the use of Within Home Range Relocations for animals that are not deemed a threat to humans.

There is a need for criteria to be developed regarding the types of incidents that requires the destruction of the bear versus those that may benefit from other techniques such as "within-home range" relocations. Bears feeding on fruit that have not otherwise been determined to be a problem may benefit from such techniques as within home relocation. For example, if one approaches the bear and it moves further up the tree or attempts to run away, and the public does

not report any threatening behaviour by the bear, then these animals may be candidates for management techniques other than destruction. New proactive management techniques used in the United States examine the type of problem that are occurring with the bear, determine its level of habituation, and then determine whether such things as within home relocations will help to elevate the problem. The premise behind within home relocations is the knowledge that the animal may indeed return but that the time given to do so would be sufficient to remove the root cause of the problem (e.g., removing fruit on a tree). Within home relocations offer one way to begin switching from reactive to proactive management of bears. For example, if a bear is healthy, feeding on fruit in a tree and has otherwise not been determined to be a problem then it is primary candidate for within home relocations. The bear would be captured; ideally it would be tagged for identification, and then moved to an area determined to have good forage quality for the time of year. Corresponding with the relocation of the bear the fruit on the tree or ground would be removed and the property owner educated or fined. If the bear was to return to the site of the incident the fruit would no longer be available and the bear should have no reason to remain (given all other attractants were also managed). Sometimes within home relocations are coupled with aversive conditioning techniques forming what is termed the "hard release" of the animal. This negative conditioning (rubber bullets, chased by bear dogs) attempts to deter this future behaviour in the bear. Hard releases are not recommended until the City reaches an acceptable sanitization level.

Consider using within home range relocations for bears that have not displayed aggressive offensive behaviour towards humans. This management technique may buy the bear the time required to manage or remove the non-natural attractant.

7.0 ISSUE SIX: SCIENTIFIC DATA GATHERING & FUTURE RESEARCH

Major Recommendation with a First Stage of Implementation:

Develop a standardized database that is designed to gather appropriate information on bear occurrence reports!

The database should be able to be updated using a central system so that any actions taken by the COS are recorded in a consistent fashion along the same row of data as the original call taken in Victoria.

Table 23. Recommendations for scientific data gathering and future research: applying an adaptive management approach to this Plan

Section	Summary of Recommendations Pertaining to this Step	Responsibility
7.1	Promote the creation of a standardized, user-friendly database	COS
	(e.g., Microsoft Excel or Access) that is designed to gather	MOE Victoria
	appropriate information for managing bears in the City and	
	District:	
	• Develop a standardized form for recording bear occurrence reports.	
	• Hire a consultant to develop a database that records pertinent information to aid in management decisions regarding bears.	MOE Victoria Consultant
	• Promote the use of the database for all bear reports taken in Victoria clearly identifying those that make it to the local COS.	Administrative Assistant or
	• Input occurrence reports as received into the standardized database.	CO
	Data Recorded should include:	Consultant to
	• Activity of the bear should be recorded into a standardized category beginning with:	determine appropriate data and pull down
	i. Define the behaviour of the bear:	menu categories
	• Natural behaviour, or	
	• Non-natural behaviour.	
	ii. Record the type of natural or non-natural behaviour:	
	 Natural behaviours include: feeding on berries, feeding on vegetation, sighting or travelling. 	
	 Non-natural attractants include: Domestic attractants and Agricultural Attractants: 	
	 Domestic attractant types include: Garbage, BBQ, bird feeder, hunter killed carcass, cookhouse, freezers, and residential or city planted fruit bearing trees. 	
	 Agricultural attractants include: carcasses, crops, apiaries and livestock. 	
	There should be no "unknowns" or blanks in the database! Consistent & accurate recording is essential.	
	• Date and time and location of the bear.	
	• Location (UTM preferred, address okay) as specific as possible.	
	• Name of the neighbourhood.	

Section	Summary of Recommendations Pertaining to this Step	Responsibility
	• Age class and gender (destroyed bears).	
	Human-bear sightings or conflicts:	
	• Determine the validity of each human-bear sighting or conflict.	
	• All human-bear conflicts must be recorded:	
	i. Define the behaviour of the bear:	
	Offensive behaviour, or	
	• Defensive behaviour.	
	Estimate any property damage.	
	• Record the response of the COS:	
	• No response, destruction, trap set bear caught or not caught, translocation, relocation, aversive conditioning, and the like.	
	• Record the advice given (if applicable).	
	• Keep a record of the calls that get passed along to Prince George from Victoria.	
	• Add the gathering and recording of those data into the job description of the person taking the calls at the Call Centre in Victoria.	
	• The database should be able to be updated using a central system so that any actions taken by the COS are recorded in a consistent fashion along the same row of data as the original call.	
7.2	Future Research and Monitoring	
	 Bear Smart Research Project: Support the Urban Bear Smart Research program on radiocollared bears. This should be a joint responsibility between a number of agencies and should also include support from commercial operations and developer as well as the City & District. 	City District Solid Waste COS Victoria COS City MOE Victoria MOE City
	 Develop a GIS bear habitat map at a fine scale (e.g., ~1:5,000 – 1:10,000). Develop a GIS bear corridor & travel route map at a fine scale. Identify critical corridors & travel routes. Identify habitats of seasonal importance. Overlay the habitat map with a human use layer that identifies existing and proposed developments. Use the results of the research project combined with the COS Occurrence Reports to monitor this plan. 	

7.1 CONSERVATION OFFICER SERVICE – BEAR OCCURRENCE REPORTING DATABASE

The Bear Occurrence Reporting database is being used to identify problem neighbourhoods and the source of the problem(s) within the City and District; therefore the information contained within the database is extremely important to the management of problem bears and must be recorded in a consistent and standardized format. The number of bear occurrence reports, the location of reports, the season, the type of human-bear conflict or sighting, and the number of bears destroyed also allow for adaptive management techniques by identifying and prioritizing areas that require immediate attention. In addition, occurrence reports are currently the primary measure of success available to evaluate whether the Northern Bear Awareness's education program is being understood by the public. To date, the NBA society has hired students to sort through paper filing cabinets and enter those data into a database using MS Excel. In the hazard assessment results were used to determine cluster areas of occurrence reports and destructions and have been used in this report to identify chronic bear 'problem' neighbourhoods and formulate and prioritize management recommendations.

In the hazard assessment a number of problems were encountered with information contained within the Bear Occurrence reports. For example, there was a discrepancy between the COS criteria used to destroy a bear and results from summaries of the database, which suggest a problem with the way Bear Occurrence Reports are currently being recorded. The majority of bears destroyed were recorded as 'sightings' in the database whereas the COS states that a bear is not destroyed unless it is determined to be food conditioned or posing an immediate threat to human safety. In 2007, 52% of the calls to the centre did not contain information on an attractant type or if the bear was sighted. A large proportion of the not recorded occurrences as well as those recorded as "sightings" were believed by the COS to be wrongly recorded and may actually have been related t bears being attracted to available garbage (G. Van Spengen pers. comm.).

This database is extremely important to the management of bears by identifying cluster areas of reports and destructions, seasons when bear reports are highest, and directing where management efforts should be focused (e.g., garbage versus fruit trees versus trails). Once properly operational this database should serve as the required Bear Smart Human-Bear Conflict Monitoring System. It is recommended that the monitoring system be developed by a contractor specializing in problem bears and be maintained as a joint venture between the Provincial Call Centre in Victoria, the local COS and NBA.

The MOE in Victoria with support from the COS should provide funding for a contract to standardize the Bear Occurrence Reporting system. This will support the wealth of information that may be gained through consistent and structured use of such a system and aid in the development of a human-bear conflict monitoring system which is required under Bear Smart.

7.2 THE PRINCE GEORGE URBAN BEAR SMART RESEARCH PROJECT

The Prince George Urban Bear Smart Research began its year 1 pilot phase in 2009 and is proposed to run through 2013. In 2009, the Project was supported by a small grant from the Shell Environmental Fund submitted by NBA. The Project is a joint effort between NBA, the BC Ministry of Environment, and the Conservation Officer Service. Results of the research will

be used to further identify ways to reduce the number of bears destroyed and the potential for human-bear conflicts. The project aims to radiocollaring up to 20 bears with Global Postioning Collars (GPS) that have been caught in chronic problem bear neighbourhoods and are not deemed a threat to human safety. In 2009, 2 female black bears were radiocollared. The objectives of the project are to quantify the following factors and their influences on the development of 'problem' bear behaviour by:

- (1) Identifying movement and travel corridors around urban areas with focus on identifying 'critical' linkages;
- (2) Identifying movement in relationship to new developments in bear habitat;
- (3) Quantifying reproductive parameters; and,
- (4) Examining age specific mortality, particularly 'problem' bear mortality.

At this time, mapping bear habitat values is beyond the scope of the hazard assessment and this management Plan. The Urban Research Project will use data gathered on radiocollared bears to identify and map bear habitat and aims to:

- 1. Develop a GIS bear habitat map at a fine scale (e.g., $\sim 1:5,000 1:10,000$)
- 2. Develop a GIS bear corridor & travel route map at a fine scale
- 3. Identify critical corridors & travel routes.
- 4. Identify road crossings.
- 5. Identify habitats of seasonal importance.
- 6. Overlay the habitat map with a human use layer that identifies existing and proposed developments.

Developing an understanding of how bears move around and live adjacent to the City will be crucial to the development of sound land management practices consistent with bear conservation and the BC Bear Smart program. This is of particular importance as new developments expand further into bear habitat and current recommendations contained within this management plan are implemented. Therefore, in addition to the identification of critical habitats this research project also aims to provide an opportunity for adaptive management through the evaluation of implemented management recommendations and examination of the expected shifts in bear use of areas as the City and District become sanitized. For example, if breaks are made at trail heads that lead from larger green-spaces into chronic problem neighbourhoods the monitoring of radiocollared bears in those areas will allow for evaluation of the further development of reasonable, sound recommendations that will reduce the number of bears destroyed.

Continuation of the Prince George Urban Bear Smart Research is dependent upon funding and to date funding has not been secured for 2010 or beyond. If funding can be secured the project aims to deploy up to 20 GPS collars in 5 chronic bear 'problem' neighbourhoods beginning in 2010. The project will not continue if funding cannot be secured. The results of this project will benefit a number of agencies from Solid Waste Management, the Conservation Officer Service, as well establishments experiencing bear problems. As such, support for this project should come from a number of sources including the City and District.

8.0 INTERAGENCY COOPERATION

The management of problem bears requires education of the public to increase voluntary compliance, development and enforcement of bylaws and fines for those that do not voluntarily comply, issues of planning for developments that protrude into habitat with high bear values and also for landscape level planning regarding the maintenance of green-spaces and trail networks, through to research and monitoring. Therefore, a number of different disciplines and expertise are required to successfully carryout the Bear Smart program.

Since 1998, the Bear Smart initiatives in Prince George have been the result of urging by the Northern Bear Awareness Society (NBA). With aid from NBA the City installed bear-resistant garbage containers in 21 parks and green-spaces (38 Haul-Alls and 26 Sybertechs – not yet tested for bear resistant status). NBA also runs a yearly fruit exchange program and continuous extensive public outreach programs. NBA's program is currently run by volunteers most of whom are also members of the Omineca Bear-Human Conflicts Committee (OBHCC). Although representatives from the City sit on the Omineca Bear-Human Conflicts board funding and support from the City and other local government agencies are largely lacking. With the exception of the Conservation Officer Service, Environmental Protection Division, there are no members from the Ministry of Environment (MOE) or Ministry of Forests (MOF) on the NBA Board or committee. Rather, funding for the continuation of the program has been secured since 1998 through grants written by a few of the OBHCC volunteers.

The Ministry of Forests in Prince George currently does not aid in the management of 'problem' bears or education of the public (G. Van Spagen pers. comm.). The Ministry of Environment's Fish and Wildlife Department is only involved in cases where grizzly bears are being relocated primarily pertaining to selecting appropriate areas for realease (G. Van Spengen pers comm.). For the most part, MOE biologists do not play a role in black bear destructions, relocations or education of the public.

The success of the Bear Smart program and this management plan are dependent upon a number of agencies and organizations working together and forming alliances.

The management of problem bears requires specialization in a number of disciplines from City, development and park planning to the ecology and biology of bears; no one person, agency or non-governmental organization can implement all of the required 6 Bear Smart steps.

The following agencies, positions, and non-governmental organizations/individuals are recommended to work together to achieve Bear Smart status:

Bear Ecology and Behaviour:	Specialist and Registered Professional Biologist.
City of Prince George:	Director of Planning.
	Development Services, Representatives from:
	Building Permits
	Current Planning and Developments
	Environmental Manager
	Parks and Solid Waste Services

	Engineer - evaluate select pilot projects in this document.
Education specialists:	\checkmark School presentations and adult oriented messages.
Lawyer:	Bylaw development Issues related to due diligence and public safety Federal or Provincial Acts.
Northern Bear Awareness Society:	√ Board members
Ranching Association:	Representative for agricultural issues.
Regional District FFG:	General Manager of Environmental Services Environmental Leader Sustainable Development Representative.
Ministry of Environment:	Large Carnivore Biologist √ Conservation Officers
Ministry of Forests:	Wildlife biologist

Support may range from increased in-kind support to NBA, monetary support for the implementation of stated Bear Smart initiatives, and Board member or committee support for the NBA program. For example, an agency could lend an employee to aid with the dissemination of bear information, school presentations or to person the display booth at an event.

8.1 ADDITIONAL RESPONSIBILITIES OF THE CITY OF PRINCE GEORGE

On 29 June 2009, Mayor and Council passed a resolution for the City of Prince George to commit to achieving Provincial Bear Smart Status as put forward by B. Gaal, Superintendent of Operations, on behalf of NBA (Appendix 6). The resolution to achieve provincial Bear Smart status requires a commitment on the part of the City of Prince George where the City must lead by example, by taking such initiatives as implementing a bear-resistant municipal waste system, instituting bylaws, and ensuring continuous public education.

The 3rd step required to achieve Provincial Bear Smart Status (see Table 1) requires that the City "**Revise** planning and decision-making **documents** to be consistent with the human-bear conflict management plan."

Only the City can achieve this step and all appropriate documents should be revised. Some of the documents will be required to be revised prior-to the implementation of the bear smart measure while others may occur concurrently with implementation of the management recommendations. For example, the *municipal waste collection agreement* and any other contracts/agreements must state prior to the signed contract that the waste collection contractor is required to empty bear resistant totes regardless of whether or not they are their standard company bins. Future development and planning documents must also be revised to include the recommended bear smart measures. It is recommended that the City consult with "a liability

expert" (McCrory 2004) as these documents are being updated and recommendations are being implemented.

9.0 DISCUSSION

Prince George is situated within habitat rated as high for interior bears. Subdivisions and commercial developments are rapidly expanding into surrounding green-spaces. Green spaces, parks, and undeveloped tracts of land surround the City, provide food and cover for bears, and connect to a number of the human-use trail networks which allows animals that use these 'natural' areas to be filtered into residential neighbourhoods. Once in these neighbourhoods the abundance and variation of easily accessible non-natural anthropogenic food sources can hold bears in residential neighbourhoods, promote bears to return, and encourage the development of "problem" bear behaviour. The goals of this plan are to maintain in as natural a state as possible the natural population dynamics of bears, to promote and encourage 'natural' bear behaviour, and to dissuade non-natural behaviours that result from bears conditioned to human food and habituated to humans.

This human-bear conflict management plan focuses on bear smart steps 5 (Develop and maintain a bear-proof municipal solid waste management system) and 6 (Implement "Bear Smart" bylaws prohibiting the provision of food to bears as a result of intent, neglect, or irresponsible management of attractants). As such, it has been structured around four main themes: (1) restricting the availability of non-natural anthropogenic attractants to bears which requires education and enforcement; (2) managing and where applicable restructuring green-spaces, trail networks and existing developments to dissuade bears from entering; (3) pre-planning new developments; and, (4) monitoring for adaptive management. The most effective starting point for managing human-bear interactions is to restrict bear access to non-natural anthropogenic attractants from all sources (residential, commercial, industrial, institutional, etc.) within the City and RDFFG. Restricting access by bears to non-natural attractants requires people to change the way they manage bear attractants and therefore the City and District should lead by example.

Successful management of bear problems requires the management of people and their activities, particularly in regards to restricting the availability of anthropogenic attractants.

This Plan will be most effective if a number of the major recommendations from more than one section are implemented simultaneously. For example, changing public attitudes towards the management of attractants and ensuring compliance remains at a level to effectively reduce the creation of 'problem' bears requires education while the implementation and enforcement of bylaws are required to effectively deal with issues of non-compliance. The large tracks of green-spaces surrounding the City and the natural movements and dispersal of bears mean that bears will continue to utilize the City and District even when the best Bear Smart management practices are in place. Consistent monitoring is required to determine the most effective management recommendations and to continue to properly prioritize areas as sanitization of the City occurs. It is anticipated to take up to 5 years for the full implementation of this plan.

Reconfiguring green-spaces will encourage the spatial separation of bears and humans as much as is feasible for a City placed within prime bear habitat and movement areas. The NBA

promotes the tolerance of bears in natural areas within Prince George as long as those bears shy away from and avoid human contact and do not act aggressively towards people. The current lack of Bear Smart initiatives within the municipal solid waste system and development plans augment conflicts between humans and bears by promoting problem bear behaviour through the access to food wastes. Current developments, such as the Cowart-Malaspina Ridge developments fragment formerly contiguous habitat and the lack of consideration for bears within development plans means that once operational these subdivisions can anticipate a number of bear 'problems'.

As sanitization of the City occurs some bears heavily conditioned to human food may need to be removed because it is possible that these bears may become bolder in their attempts to obtain non-natural attractants. This may result in a slight peak in the destruction of 'problem' animals which is acceptable as long as sanitization measures continue to occur. If non-natural attractants are not controlled continuing to remove 'problem' bears without addressing the source of the problem will simply continue to perpetuate the cycle of creating and destroying 'problem' animals.

As access to non-natural attractants are restricted and sanitization of the City occurs the spatial distribution of bear reports are expected to shift. <u>Consistent and continuous monitoring</u> of bear reports in the City and District is critical to minimize the potential for a human-bear conflict(s) and to reassess priority areas. The Conservation Officer Service must work with the City and Northern Bear Awareness to keep the City and District updated as these shifts occur. Management priority areas must be adaptive to these shifts so bear-resistant measures may be <u>immediately</u> implemented in the new 'problem' area.

This plan should receive periodic review and update as required.

This human-bear management plan should be viewed as a dynamic management tool that is subject to periodic review and updating as new situations arise. Successful implementation of this management plan requires a commitment by a number of stakeholders. The author of this plan specializes in bear ecology and behaviour; the City and/or Regional District should further consult with an engineer to evaluate recommendations as required. Further, a lawyer should be consulted for bylaw development and in regards to issues of appropriate public knowledge and due diligence. Recommendations within this Plan are aimed at reducing the development of problem bear behaviour, reducing the number of bears destroyed each year, and dissuading human-bear conflict. Proper and consistent implementations of these Bear Smart recommendations should reduce the need for reactive management of bears as well as reduce the amount of funds spent on property damage inflicted by bears, the Conservation Officer Service time in managing bear conflicts, and conflicts between humans and bears.

10.0 LITERATURE CITED

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10.1 PERSONAL COMMUNICATIONS

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- Honeyman, Jay. Karelian Bear Shepherding Institute and UnBearAble Bins Cofounder. Bragg Creek, Alberta. Email: <u>kbsic@telus.net</u>.
- McCrory, Wayne. McCrory Wildlife Services Ltd. New Denver, BC. Email: waynem@vws.org
- McMillan, Crystal. Executive Director, Bear Smart BC Society. Phone: 250-266-(BEAR)-2327. Email: bearsmartbc@telus.net

- Nahornoff, Sandra. Chair. of the Northern Bear Awareness Society, 1998-2009. Email: friend@northernbc.com
- O'Neill, Amber BEd, BSc. Education Delivery Specialist for Northern Bear Awareness 2003-2005. Treasurer for 2009 Northern Bear Awareness Society, 2009.
- Pissot, Jim. Defenders of Wildlife, Canada Field Office Representative. Email: jpissot@defenders.org
- Radloff, Bob. General Manager, Development Services, City of Prince George. Phone: 250-561-7616. Email: <u>BRadloff@city.pg.bc.ca</u>. Personal Communications June 12, 2008.
- Sowka, Patti. Testing program administrator and executive director of the Living with Wildlife Foundation. Interagency Grizzly Bear Committee Bear Resistant Container Testing Program.

10.2 PRODUCT INFORMATION

Bear Resistant Garbage, Compost Storage and Garbage Can Storage Option Containers:

BEAR-RESISTANT TESTING:

Interagency Grizzly Bear Committee. Various contacts are provided in the manual dependent upon area and type of product tested. Refer to: Bear resistant container testing program. USDA Forest Service, Intermountain Region. Ogden, UT. Montana, USA. Available from (December 22, 2008) <u>http://www.igbconline.org/html/container.html</u>

PRODUCTS (IN ALPHABETICAL ORDER):

Bear Necessities Waste and Food Storage Inc. Contact: Lori Hogarth, President. 210 Lady MacDonald Dr. Canmore, Alberta, Canada T1W 1H3. 403-678-6304; 403-451-1465 (fax); Email: info@bearbins.com Web: http://www.bearbins.com/index.htm

Bear Necessities has a polycart that is compatible with automated systems. They also would be "happy to discuss your special waste container needs."

<u>Bear Saver</u>: Bear Saver North American Sales. Phone: 800-851-3877. Fax: 909-605-7780. Web: <u>http://www.bearsaver.com/index.htm</u>

Haul-All Equipment Systems 1(888)428-5255 (USA & Canada); Fax 403-328-9956. Email: solutions@haulall.com; Web: <u>http://www.haulall.com/index.htm</u>

Lock Systems Inc: Critter Guard. Contact: Russ Roy, owner/operator. Email: rrenterprises@shaw.ca

Contact Lock Systems Inc. for up to date information on a latching system compatible with the automated garbage collection program

<u>*Margo Supplies Ltd.*</u> Electric fencing and other bear deterrent supplies. Phone: 403-652-1932. Fax: 403-652-3511. Email: <u>infor@margosupplies.com</u> http://margosupplies.com/public/

<u>Sybertech Waste Reduction Ltd</u>. 13698 Coldicutt Avenue. White Rock, British Columbia, Canada. V4B 3A9. Rob Mitchell, President. Phone: (604) 536-0624. Fax: (604) 536-0614. Cellular: (604) 808-4084. Toll Free: 1-888-888-7975. Email: <u>rmitchell@swrl.com</u>

<u>TyeDee Bin</u> TDB Industries. 126 Pratt Crescent, Gravenhurst, Onatrio P1P 1P5. Phone: 705-687-3835. Toll Free: 866-505-6460. Fax: 705-687-3183. E-mail: info@tyedeebin.com

<u>UnBearAble Bins Inc.</u> Box 1313, Bragg Creek, Alberta, TOL 0K0. Phone: 403-609-2242. Fax: 403-609-2280. Email: <u>ubbins@telus.net</u>

COMMERCIAL DUMPSTERS RETROFITS:

<u>Bear Lock Bars</u>: South East Disposal. Contact: Hal Anderson, owner/operator. Phone: 1-800-662-5744, email: hal@southeastdisposal.com

Signs for bear resistant containers:

Chromato label in Edmonton, Alberta. Contact: for discussions regarding the Fernie, BC, sign template Shawna D'haene <<u>shawnad@chromato-label.com</u>>.

11.0 APPENDICES:

Appendix 1. Example Bear Resistant Waste Containment Products & Latches <u>11-1. Critter Guard by Lock Systems Inc.</u>

CRITTER GUARD

Raccoons BEARS COYOTES DOGS CROWS SEAGULLS

The Critter Guard Lock System has been proven "<u>Bear Resistant"</u> by <u>bears!</u>

When a Bear gets Garbage conditioned they will keep returning leaving a mess each time to clean up and increases the chances of a Human / Bear encounter

FACT: A lot of BEARS are killed each year because of Human Garbage

\$91.43 INSTALLED including tax and at home service

Critter Guard Lock System Keeping garbage IN and wildlife OUT!

APPROVED by the B.C.Conservation Office and The LOCAL Bylaw Services



Automated Latch System

Anticipated to be completed by the end of summer 2009, Lock Systems Inc. has developed a latching system that will be compatible with Prince George's automated garbage system.

The latch system will be adaptable to the current Critter Guard system or can be purchased separately.

<u>Anticipated Cost of Automatic System</u>: The cost is expected to be comparable to the present system at approximately \$90.62

*Prices are flexible for bulk orders.

The automatic latching system will be tested and obtain Bear Resistant approval in Canada and the US prior to being available for purchase.

Critter Guard provides a <u>retrofit</u> to the existing bins and does not provide the bin itself.

Personal Communications, Jan 12 & 15, 2008.

Appendix 1. Example Bear Resistant Waste Containment Products

11-II. Polycarts by BearSaver

BearSaver <u>does not provide retrofits</u> to existing bins. Costs are in <u>US dollars</u> and do not include shipping and handling.



909-605-1697 BEARSAVER.COM

BEAR RESISTANT 32, 65 AND 95 GALLON ROLL-OUT CARTS WITH THREE LEVELS OF PROTECTION!

The Grizzly Model - A fully secured cart offering the maximum level of protection. Bear-resistant latch, steel reinforced side rails, lid, back corners, back stiffener and handle.

The Black Bear Model - A tough bearresistant cart offering a medium level of protection. Bear-Resistant latch, steel reinforced side rails and lid.

The Varmint Model - The economy version of our rolling cart family. Great protection from raccoons, squirrels, coyotes and all other small animals. A bear-resistant latch and steel reinforced lid offers "lock down" protection at an affordable price.



BEARSAVER 1390 S. MILLIKEN AVENUE ONTARIO, CALIFORNIA 91761 PHONE (909) 605-1697 FAX (909) 605-7780 WWW.BEARSAVER.COM SALES@BEARSAVER.COM THE LATEST INNOVATION FROM BEARSAVER

THE NEW 32, 65 AND 95 GALLON REFUSE CARTS FROM BEARGAVER HAVE FINALLY ARRIVED. AS THE LARGEST SUPPLIER OF BEARRESISTANT ENCLOSURES IN NORTH AMERICA, WE HAVE TAKEN THE NEXT STEP TO ADDRESS RESIDENTIAL BEAR ISSUES USING OUR YEARS OF EXPERIENCE DEALING WITH THESE LARGE HUNGRY ANIMALS.

DESIGNED SPECIFICALLY FOR MANUAL AND SEMI-AUTOMATED COLLECTION SYSTEMS, THESE CARTS WILL REEP YOUR REFUSE SAFE AND SECURE IN ANY ENVIRONMENT AND CAN BE EASILY ADAFTED FOR AUTOMATED USE. WITH OUR UNIQUE PUSH-TO-CLOSE LATCHING SYSTEM, A FEATURE FOUND ON ALL BEARSAVER PRODUCTS, WE DON'T LEAVE IT UP TO THE HOMEOWNER TO REMEMBER TO RELATCH THE CONTAINER.

OUR 95 GALLON "GRIZZLY MODEL" PASSED AS "GRIZZLY BEAR RESISTANT" UNDER THE INTERAGENCY GRIZZLY BEAR COMMITTEE TESTING PROGRAM

- AVAILABLE IN 32, 65 AND 95 GALLON SIZES
- AVAILABLE IN THREE LEVELS OF PROTECTION
- SIMPLE UNLATCHING
- SNAP SHUT LID, NO MANUAL RELATCHING
- REINFORCED CART BODY
- DURABLE INJECTION MOLDED CONSTRUCTION
- EQUALLY SUITED FOR TRASH AND RECYCLING



Tested by the Living With Wildlife Foundation at The Grizzly & Wolf Discovery Center, West Yellowstone, Montana

11-III Residential Garbage Can Storage Options by BearSaver



Appendix 1. Example Bear Resistant Waste Containment Products

<u>11-IV. Residential Bear Resistant Garbage Can Storage Options by Bear Necessities Waste &</u> <u>Food Storage Inc</u>

"We have not investigated interfacing with Heil. If the City is interested, and they would like to provide a contact name, we would be happy to either send a test unit to Heil or the City. They would have to either create an attachment that would go onto the arm which would engage our lock release OR send us the arm specs and let us do that work. The fact is, with the exception of a couple systems, we can make anything work to satisfy the customer." (L. Hogarth, president).





2	CONTRACTOR STATUT	1000	6 12	C.PRECINENT.	1000	1.0
Product	Specificat	tions	for	THE	Rin	120
LIUUUUU	opermea	uous.	101	THE	There is a second secon	LAU

HEIGHT	38" / 96.52 cm	LOAD	QUANTITY
CIRCUMFERENCE (TOP) (BOTTOM)	24" / 61 cm 21" / 53 cm	LTL	8 units/ skid
WEIGHT	30 lbs / 14.5 kg		
VOLUME	32 gallons / 120 liters	Full Load	224 units / 28 skids

Appendix 1. Example Bear Resistant Waste Containment Products 11-IV Residential Bear Resistant Garbage Can Storage Options by Unbearable Bins Inc.



Animal Proof,

11-VI Bear Resistant Garbage Can Storage Options by HaulAll

iven the opportunity, bears will eat human food and garbage — "the junk food" of their diet. Not only does this disrupt the bears' natural way of life, it also affects their health and our shared ecology.

At Haul-All, we recognize the importance of using animal proof waste management equipment in shared wilderness locations. We manufacture stand-alone and semi-automated containers that are proven to keep all animals out, thanks to our bear-proof latch and sturdy construction.

Haul-All manufactures the only animal proof containers with over 15 years of proven service in national, state and provincial parks as well as wilderness resorts and remote locations, with residential, commercial and industrial applications.

By managing our food and garbage, everyone benefits, including the bears.



Making communities, parks and wilderness locations safe for people and bears



the

Environmental Solution

Cost Efficient and Wildlife Friendly

Savings ...

· Eliminates costs associated with managing wildlife related issues. · Saves time by eliminating incident investigations and relocations. · Saves money through cost efficient collection and by eliminating property damage.

· Saves lives of people and bears.

Durable...

· All of our animal proof containers are Double Compartment Hid-A-Bag constructed using galvanneal steel panels and stainless steel hinges to provide the most durable, rust resistant container on the market.

Aesthetic...

· Design compliments natural areas and allows placement in high profile locations.

Options...

 Containers range in size from 32 gallons (120 L) to 6 cubic yds (4.5 cu m). Food Storage lockers and recycling containers are also available.





. The self tipping Hyd-A-Way container allows collection of up to 6 cu yds (4.5 cu m) in less than three minutes.

. The container looks new after years of service thanks to a "no contact collection" method using hydraulic power from the collection vehicle.

Grizzly Bear photo by B.M. Wolitski, Courtesy of Friends of Kananaskis Country http://www.kananaskis.org

Distributor

Printed in Canada

-AE reaches you through a n distributors whose integrity and product knowledg quality them to assist you in the selection and pla ning of your solid waste and recycling equipment needs. HAUL-ALL, HID-A-BAG, HID-A-WAY and HID-A-CAN are registered trade-

Fax (403) 328-9956



· Servicing the Hid-A-Bag is easy. The slide-out design eliminates heavy lifting. Hid-A-Bags are securely mounted to a concrete base.



 Service door allows easy handling of bagged material.



Keeps animals out, garbage and odours in

OPERATIONAL FEATURES

 Secure storage of two 36 gallon, (136 L) barrels.
 Service door allows easy handling of bagged material.



Hid-A-Can

he Hid-A-Can is the perfect solution for storing your garbage without the worry of attracting animals. By animal proofing our

> latch eliminate animal access.
> 12 gauge, Galvanneal steel panels for strength and unmatched rust resistance.
> Powder paint provides unbeatable

> • Sturdy construction and bear proof

The finished size of 48 x 23 x 38 inches is perfect even in tight locations.
An optional concrete mounting pad prevents the container from being tipped.

garbage, everyone benefits, including the wildlife.

impact resistance.

or moved.

 Available in a variety of colours to blend with neighbourhcod aesthetics.

Making communities, parks and wilderness locations safe for people and bears.

7411

Haul-All maches you through a network of selected distributors whose integrity and product knowledge qualify them to assist you in the selection and planning of your colid waste and recycling equipment need HAUL-ALL and HID-A CAN are registered trademarks.

Drizzly Beer photo by B.M. Woltaki, Countery of Friends of Kananascis Country http://www.kananascis.org



E-mail: sales@haulall.com www.haulall.com

APPENDIX 2: COMMERCIAL GARBAGE CONTAINMENT

<u>LIDS</u>

The following commercial garbage bins have been <u>retrofitted</u> with metal lids and/or bear lock bars. Retrofitting the lids of existing containers appears to be the most cost effective way of making existing metal containers bear-resistant. BearSaver and Haul-All companies provide new bear-resistant commercial container if required.

I. CHAIN AND CRIMPED CARABINEER

This commercial garbage container is used in Fernie, BC. Bear-resistant features include a <u>closed metal lid</u> that is <u>locked</u> and <u>secured</u> with a carabineer. A "Be Bear Aware" sign also has been placed on the dumpster for increased user compliance (photo courtesy of K. Murray).



II. BEAR LOCK BAR

This commercial garbage container is used in Fernie, BC. The Bear Lock Bar holds the <u>closed</u>, <u>metal lid</u> in place so a bear can not open the container. The Bear Lock Bar is available from South East Disposal (photo courtesy of K. Murray).


APPENDIX 2: COMMERCIAL GARBAGE CONTAINMENT

III. SIGNS - Example Sign for Commercial Garbage Containment

Following is an example sign for bear-resistant garbage containers used in Fernie, BC. Signs were made by Chromato label in Edmonton, Alberta (sign courtesy of K. Murray). Bear AwareTM is the registered trademark of the BC Conservation Foundation. Similar signs could be developed using BC's Bear Smart program logo and/or Northern Bear Awareness logo and modified for Prince George.



<u>APPENDIX 3: District of Ucluelet, Council Report</u> <u>Communal Garbage Pilot Program Partnership</u>

DISTRICT OF UCLUELET

COUNCIL REPORT

File No:

To:	Mayor and Council
-----	-------------------

From: Felice Mazzoni, Director of Planning

Date: January 9th, 2008

Communal Garbage Pilot Program Partnership

Recommendations:

- 1. That Council make a resolution to support the Pilot Program; and
- 2. That Council direct staff to pursue the necessary steps to make the proposed Pilot Program operable within existing municipal regulations.
- Purpose:

To enable a Communal Garbage Collection Pilot Project to take place in Ucluelet.

CAO Comments:

I support the recommendation.

Background:

Throughout 2007 the Pacific Rim Bear Smart Committee (PRBSC), along with the District Planning Department and developer Charles Smith of Weyerhaeuser, have looked at the opportunity of designing new subdivisions to be BearSmart.

The District of Ucluelet is currently working towards achieving BearSmart status from the Province by implementing changes to local bylaws and accepting recommendations presented in a recent Human-Bear Conflict Management Plan. It should be noted that this Pilot Project is greatly supported by the Ministry of Environment and will make Ucluelet the first municipality in BC to implement communal garbage collection to achieve an innovative solution for waste management, wildlife protection and public safety.

Communal garbage collection is currently being operated in the Town of Canmore, Alberta and can act as an excellent source of information as Ucluelet proceeds with exploring this opportunity. The "Canmore Experience" has implemented communal garbage collection into new developments and is currently assessing various neighbourhoods to gauge the possibility of transitioning from curbside collection to communal garbage collection. New developments are easier to implement this new method, because the residents are not present yet and will move into the

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neighbourhood knowing that communal garbage collection is the chosen method. It should be noted that through discussion with Charles Smith and Judy Gray of Remax, several prospective buyers for the OceanWest lots surrounding the two cul-de-sacs (see Schedule "A") have identified that they are very supportive of the idea of communal, bear-proof garbage management.

Details of Pilot Project:

The OceanWest pilot project area, as shown in Schedule "A", consists of two cul-desacs, each having one communal container located on the street as opposed to curbside residential garbage collection. It is planned that each 4 cubic yard communal container will service approximately 20 single-family households. Pacific Rim Bear Smart is pursuing various design features for the bins in order for them to be user friendly; while at the same time, making them aesthetically pleasing in order for them to fit within the surrounding landscape. It is likely that they will be similar in design to the smaller receptacles that District uses on Peninsula Road and at District Parks. The planning department envisions more single-family developments will also want to investigate the opportunity to pursue this innovative alternative and as a result, collectively lower the amount of human-bear conflicts and the number of bears being conditioned to human food waste and ultimately being destroyed.

Much of the work has already been completed to initiate this pilot. Pacific Rim Bear Smart Society, has secured \$10,000 from the Ministry of Environment, of which a portion of this money is to purchase two BearSaver containers for the OceanWest Development (refer to Schedule "B" for further details). Through negotiations between staff and the developer, an area has been designed into Weyerhaeuser's proposed subdivision plan to reserve a space for the container and complete preliminary site preparation for the first cul-de-sac (Road A & Road C on Schedule "A").

It is estimated that the pilot project will continue for a minimum of 3 years, unless specified otherwise. The Planning Department will measure community support for the communal garbage collection method during the OCP review, and therefore will be able to provide further information in the Fall 2008 regarding the level of acceptance from the community, as well as new residents of the subdivision. The PRBSC, in conjunction with District Bylaw Enforcement, will monitor the successes and challenges resulting from the pilot project and will give Council periodical updates. As for now, the Planning Department will continue to work with developers and PRBSC, to assess future subdivisions and identify any further developments that might be eligible to participate in the pilot program.

Felice Mazzoni, M.C.I.P. Director of Planning

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<u>APPENDIX 4: TREES AND SHRUBS THAT HAVE A MODERATE TO HIGH & LOW</u> <u>POTENTIAL OF ATTRACTING BEARS INTO THE CITY/NEIGHBOURHOODS</u>

The following lists were originally compiled by Laurie Bare, NBA Education Assistant, in August 2002, and submitted to the City of Prince George. They have been modified where necessary based on the author's knowledge and in personal communications with D. Wellwood. They are meant to be reviewed and updated as monitoring reveals.

3-I. Trees & Shrubs that have a moderate to high potential of attracting bears into the City, neighbourhood, park or green-space. These species are known to produce fruits or nuts attractive to bears.

Latin Name	Common Names & some Cultivar Names	Comments
		Requires monitoring to determine level of
Aesculus glabra	Ohio Buckeye	attractiveness to bears.
Amelanchier alnifolia	Saskatoon Berry	
Arctostaphylos uva-ursi	Kinnikinnik	
Aronia melanocarpa	Black Chokecherry	
	Autum Magic	
	Viking	
Cornus alba 'sibirica'	Siberian Dogwood	Dogwood is a major food item for northern bears and should not be planted within the City
	Bud's Yellow	or District.
	Elegantissima	
	Gouchaultii	
	Ivory Halo	
	Kesselringii	
	Siberian Pearl	
	Siberica	
	Silver Variegated	
Cornus stolonifera	Red-Osier Dogwood	
	Cardinal	
	Flaviramea	
	Isanti	
	Kelsayi	
	Siver and Gold	
Corylus cornuta	Beaked Hazlenut	
~ · · ·	<i></i>	Requires monitoring to determine level of
Cotoneaster integerrimus	Cotoneaster	attractiveness to bears.
Cotoneaster lucida	Hedge Cotoneaster	attractiveness to bears.
Crataegus douglasii	Black Hawthorne	
		Requires monitoring to determine level of
Crataegus mordensis	Snowbird	attractiveness to bears.

	Toba	
Elaeagnus angustifolia	Russian Olive	
Elaeagnus commutata	Wolf Willow	
Gaultheria procumbens	Wintergreen	Requires monitoring to determine level of attractiveness to bears.
Hippophae rhamnoides	Sea Buckthorn	attractiveness to bears. Requires monitoring to determine level of
Juglans cinerea	Butternut	attractiveness to bears.
Lonicera caerulea edulis	Sweetberry Honeysuckle	
Lonicera involucratea	Black Twinberry	
Lonicera maximowiczi	Sakhalin Honeysuckle Alberta Regal	
Lonicera spinosa	Honeysuckle	
Lonicera tatarica	Tatarian Honeysuckle Arnolds Pink	
I	Classes's Descarf	
Lonicera x xylosteolaes	Clavey's Dwarf	
Mahonia aquifolium	Miniglobe Oregon Grape	Requires monitoring to determine level of attractiveness to bears.
Malus	Siberian Crabapple	Crabapples are major bear attractants. Even the ornamental varieties produce sizable fruits
	Dolgo	and should be avoided.
	Pyramidalis	
	Rosthern	
Malus x hybrid	Ornamental Crabapple	
	Fuchsia Girl	
	Jan Kuperus	
	Makamik	
	Pink Spire	
	Radiant	
	Rosy Glo weeping	
	Royalty	
	Rudolph	
	Selkirk	
	Snowcap	
	Strathmore	
	Thunderchild	
Oploplanax horridus	Devil's club	
-r-or with the round	_ • • • • • • • • • •	Requires monitoring to determine the level of
Physocarpus opulifolius	Nine Bark	attractiveness to bears.
	Diabolo	
	Dart's Gold	

	Snowfall	
Prinsepia sinensis	Cherry prinsepia	
Prunus spp.		All cherries are attractive to bears and it is possible some have been accidentally excluded
Prunus besseyi	Sand Cherry	from this list.
Prunus x cistena	Pruple Leaf Sand Cherry	
Prunus maackii	Amur Cherry	
Prunus nigra	Princess Kay	
Prunus nigrella	Muckle Plum	
Prunus padus commutata	Mayday Tree	
	Bronze	
Prunus pennsylvanica	Pin Cherry	
Prunus tenella	Russian Almond	
Prunus tomentosa	Nanking Cherry	
Prunus triloba 'Multiplex	Double Flowering Plum	
Prunus virginiana	Chokecherry	
	Schubert	
Quercus macrocarpa	Bur Oak	
Ribes alpinun	Alpine Current	
Ribes lacustre	Wild Black Current	
		Bears fed on hips in fall, particularly after first
Rosa acicularis	Prickly rose	frost.
Rubus idaeus	Wild red raspberry	
Rubus parviflorus	Thimbleberry	Elderheum is a maior food item for hears in
Sambucucs caerulea	Blue Elderberry	the area and should not be planted.
Sambucus racemosa	Elderberry	
Shepherdia argentea	Silver Buffalo Berry	Buffalo berry is a major food item for bears in
Shepherdia canadensis	Russet Buffalo Berry	the area and should not be planted.
Sorbus americana	American Mtn Ash	Mountain ash trees are being planted in a
Sorbus aucuparia	European Mtn Ash	diversionary feeding pilot program in Whistler
	Rossica	fruit.
Sorbus decora	Showy Mountain Ash	J
Sorbus reducta	Dwarf Mountain Ash	
Sorbus scupulina	Rocky Mountain Ash	
Sorbus sitchensis	Sitka Mountain Ash	
Symphoricarpus albus	Snowberry	
Symphoricarpus	j	
occidentalis	Buckbrush	
Symphoricarpus orbiculatis	Coralberry	
Vaccinium spp	Coratoerry	All Vacciniums are highly rated hear foods!
Vaccinium alaskonso	Alaska Blueberry	They occur naturally in the City and District
Vaccinium alaskense	Alaska Blueberry	They occur naturally in the City and District.

Human-bear Conflict Management Plan for Prince George, BC

Dwarf blueberry
Black Huckleberry
Canada Blueberry
Oval-leaved blueberry
Bog Blueberry
Descent Lin a such summe
Dwarf Lingonberry
Arrowwood
Wild Cranberry
Wayfaring Tree
Mohican
Nannyberry
Compactum
Nanum
Roseum
Snowball
American Cranberry
Alfredo
Bailey's Compact
Wentworth
Variety
Variety Siberian Crabapple
Variety Siberian Crabapple Columbia
Variety Siberian Crabapple Columbia Dolgo
Variety Siberian Crabapple Columbia Dolgo Florence
Variety Siberian Crabapple Columbia Dolgo Florence Osman
Variety Siberian Crabapple Columbia Dolgo Florence Osman Transcendent
Variety Siberian Crabapple Columbia Dolgo Florence Osman Transcendent Virginia
Variety Siberian Crabapple Columbia Dolgo Florence Osman Transcendent Virginia Kerr
Variety Siberian Crabapple Columbia Dolgo Florence Osman Transcendent Virginia Kerr Renown
Variety Siberian Crabapple Columbia Dolgo Florence Osman Transcendent Virginia Kerr Renown Rescue
Variety Siberian Crabapple Columbia Dolgo Florence Osman Transcendent Virginia Kerr Renown Rescue Robin
Variety Siberian Crabapple Columbia Dolgo Florence Osman Transcendent Virginia Kerr Renown Rescue Robin Rosilda
Variety Siberian Crabapple Columbia Dolgo Florence Osman Transcendent Virginia Kerr Renown Rescue Robin Rosilda Rosybrook
Variety Siberian Crabapple Columbia Dolgo Florence Osman Transcendent Virginia Kerr Renown Rescue Robin Rosilda Rosybrook Trailman
Variety Siberian Crabapple Columbia Dolgo Florence Osman Transcendent Virginia Kerr Renown Rescue Robin Rosilda Rosybrook Trailman Battelford
Variety Siberian Crabapple Columbia Dolgo Florence Osman Transcendent Virginia Kerr Renown Rescue Robin Rosilda Rosybrook Trailman Battelford Goodland
Variety Siberian Crabapple Columbia Dolgo Florence Osman Transcendent Virginia Kerr Renown Rescue Robin Rosilda Rosybrook Trailman Battelford Goodland Haralson

	Heyer #12
	McIntosh
	Norcue
	Norland
	Norlove
	Norson
	Patterson
	September Ruby
	Yellow Transparent
Prunus - Cherry	Evans
	Meteor
	Motmorency
Prunus - Cherry	Nanking
	Sandcherry
Prunus – Plum	Artic
	Assiniboine
	Brooked
	Fiebing
	Pembina
	Tecumseh
	Underwood
Prunus – Cherry-Plum	Dura
	Opata
Prunus – pincherry	P.pennsylvanica
Pyrus – Pear	Fedorovsk
	Golden Spice
	Petrovsk
	Pioneer
	Tate Dropomore
	Ure

3-II. Trees & Shrubs that have a Low Potential of Attracting Bears into the City, neighbourhood, park or green-space.

Trees and shrubs that have a lower potential for attracting bears generally do not bear fruits or nuts. The reader is cautioned that some of the foods on the low list are known bear food. For example, in spring black bears are known to climb aspen trees and feed on the emergent buds; however, these trees are still considered low bear attractants for residential neighbourhoods. This list is meant to be reviewed and updated as monitoring reveals.

Latin Name	Common Names & some Cultivar Names	Comments
Abies balsamea	Balsam Fir	
Abies lasiocarpa	Sub-Alpine Fir	
Acer ginnala	Amur Maple	
Acer glabrum	Douglas Maple	
Acer negundo	Manitoba Maple	
	Sensation	
Acer platanoides	Norway Maple	
Acer tartaricum	Tartarian Maple	
Alnus viridis	Green Alder	
Betula glandulosa	Dwarf Birch	Rears are known to feed on emergent new
Betula nana	Arctic Birch	leaf shoots in spring but overall use should be
Betual papyrifera	Paper Birch	low.
Betula pendula	European White Birch	
	Lacinata (leaf cut)	
	Purple Rain	
	Tristis	
	Trost's Dwarf	
	Youngii	
Caragana arborescens	Common Caragana	
	Fernleaf	
	Pendula	
Caragana frutex	Globe caragana	
Caragana pygmaea	Pygmy Peashrub Western Virgin's Bower	
Clematis ligusticifolia	(vine) Russian Virgin's Bower	
Clematis tangutica	(vine) Virgins' Bower	
Clematis vitalba	(vine) Prairie Travelers Joy	
Clematis x vitalba	(vine)	
Cornus canadensis	Bunchberry	
Elaeagnus umbellata	Autumn Olive	

Euonymus alata	Burninbush	
Euonymus nanus	Turkerstan dwarf	
Fraxinus pennsylvanica	Green Ash	
	Patmore	
Halimodendron		
halodendren	Salt Brush	
Humulus lupulus	Hops (vine)	
	Aureus (vine)	
Hydrangea paniculata	Pink Diamond	
Juniperus communis	Berkshire	Bears have been recorded to eat Juniper
	Compressa	berries but the potential for use is likely low.
	Effusa	
	Hibernica	
	Prostrata	
	Repanda	
	Sentinel	Requires monitoring to determine if bears
Juniperus horizontalis	Andorra	would enter residential areas in spring to
	Bar Harbour	access this food source.
	Blue Chip	
	Blue Rug (Wilton)	
	Douglasii	
	Emerald Spreader	
	Hughes	
	Icee Blue	
	Prince of Wales	
	Yukon Belle	
Juniperus sabina	Savin Juniper	
	Arcadia	
	Blue Danube	
	Broadmoor	
	Buffalo	
	Calgary Carpet	
	Moor-Dense	
	New Blue Tam	
	Skandia	
	Tamarix (Tam)	
	Variegata	
Juniperus scopulorum	Rocky Mountain Juinper	
	Blue Heaven	
	Cologreen	
	Gray Gleam	
	Medora	
Juniperus scopulorum	Moonglow	

	Table Top
	Wichita Blue
Larix deciduas	European Larch
Larix laricina	Tamarack
Larix sibirica	Siberian Larch
Microbiota decussata	Russian Cypress
Myrica gale	Sweet Gale
Paxistima canbyi	Cliff Green
Philadelphus x	Mock Orange
	Galahad
Philadelpus lewisii	Waterton
Philadelphus x	
virginalis	Minnesota Snowflake
Picea abies	Norway Spruce
	Little Jems
	Nidiformis
	Ohlendorffi
Picea engelmannii	Engelman Spruce
Picea glauca	White Spruce
Picea glauca conica	Dwarf Alberta Spruce
Picea glauca densata	Dwarf Blue Spruce
Picea pungens	Colorado Blue Spruce
Picea pungens f. glauca	Colorado Blue Spruce
	Bakersii
	Globosa
	Hoopsii
	Koster
	Moorheimii
	Pendula
	Select Blue
Pinus cembra	Swiss Stone Pine
Pinus contorta latifolia	Lodgepole pine
Pinus mugo	Mugho Pine
Pinus mugo mugus	Dwarf Mugho Pine
	Pumilio
Pinus mugo rostrata	Mountain Pine
Pinus ponderosa	Ponderosa Pine
Pinus pumila	Dwarf Siberian Pine
Pinus sibirica	Siberian Pine
Pinus sylverstris	Scots pine
	Arctic
	Fastigiata

Populus spp.

Bears are known to feed on emergent new

Populus x

Populus x acuminata Populus alba Populus angustifolia Populus balsamifera Populus canescens Populus x canadensis Populus x jackii Populus nigra Populus tremula 'Erecta' Populus tremuloides Populus trichocarpa Potentilla fruticosa

Pseudotsuga menziesii

Northern Lights

Northern Lights Azaleas:

Azaleas:

Assiniboine Brooks No. 6 Griffin Lanceleaf Poplar Raket Narrowleaf Poplar **Balsam** Poplar Tower Prairie Sky Northwest Italica (Lombardy) Swedish Columnar Aspen Trembling Aspen Aspen Abbotswoods **Coronation Triumph** Floppy Disk Gold Drop Goldfinger Gold Star Jackman Katherine Dykes Mango Tango Moonlight Orange Whisper Pink Beauty Red Ace Red Robin Snowbird Yellow Gem Douglas Fir **Rhododendron hybrids** Golden Lights Lemon Lights Mardarin Lights Northern Hi-Lights **Orchid Lights Pink Lights Rosy Lights** Spicy White Lights

leaf shoots in spring but overall use should be low.

Requires monitoring to determine if bears would enter residential areas in spring to access this food source.

Salix spp.		Bears are known to feed on the catkins of
Salix alba vitellina	Golden Willow	willow species but overall their use is
Salix elaeagnos v. ros.	Rosemary Willow	considered low.

<u>APPENDIX 5: BYLAWS FOR ATTRACTING WILDLIFE</u> (EXAMPLES FROM OTHER CITIES)

5-I. Garbage Disposal and Wildlife Attractant Bylaw for Whistler, BC.



WHISTLER

REPORT ADMINISTRATIVE REPORT TO COUNCIL

PRESENTED:	October 20, 2008	REPORT:	08-158
FROM:	Environmental Services	FILE:	627
SUBJECT:	GARBAGE DISPOSAL AND WILDLIFE ATTRACTA	ANTS BYLAV	W NO. 1861, 2008

COMMENT/RECOMMENDATION FROM THE CHIEF ADMINISTRATIVE OFFICER

That the recommendations of the General Manager of Environmental Services be endorsed.

RECOMMENDATION

That Council consider giving third reading to Garbage Disposal and Wildlife Attractants Bylaw No. 1861, 2008; and further

That Council consider giving third reading to the Municipal Ticket Information System Implementation Bylaw No. 1883, 2008 amendment.

PURPOSE OF REPORT

The purpose of the report is to respond to the issues raised at the August 18, 2008 Council meeting regarding Garbage Disposal Bylaw No. 1861, 2008 and identify the changes made to meet Council's requests.

Attachments to the Report:

Appendix 1: Garbage Disposal and Wildlife Attractants Bylaw No. 1861, 2008

Appendix 2: MTI Amendment Bylaw 2008; MTI Schedule A 2008; MTI Schedule B8 2008

DISCUSSION

On August 18, 2008, staff brought forward Garbage Disposal and Wildlife Attractants Bylaw No. 1861, 2008 (Appendix 1). This bylaw replaces Garbage Disposal Bylaw 1445, 1999.

Council identified three issues with the proposed bylaw:

- 1. The definition of wildlife attractants was too broad;
- 2. Ticket and fine information required clarification; and
- 3. Investigate potential of raising the fine for feeding dangerous wildlife.

As a result, Council gave first reading to the proposed bylaw, but withheld second and third reading until the issues were resolved.

The definition of wildlife attractants has been revised as requested by Council. It is less broad than originally written and includes a qualifying phrase regarding reasonable expectations as to what is a wildlife attractant. The definition is as follows: Garbage Disposal and Wildlife Attractants Bylaw No. 1861, 2008 Page 2 ... October 20, 2008

> "wildlife attractant" means any substance that could be reasonably expected to attract dangerous wildlife including but not limited to food products, domestic garbage, pet food, seed, restaurant grease, game meat, or glass or metal ware or other item having contained food."

Additionally, the requirement to have wildlife attractants stored in a wildlife proof enclosure or wildlife resistant container has been removed, thereby eliminating the concern that the bylaw would place many Whistlerites in non-compliance but not be enforced.

Council identified that the bylaw clauses related to ticketing and fines required clarification. The order of the clauses has been changed to reflect the sequence of events that would take place. Clause 24 states that the bylaw may be enforced by means of a municipal ticket. The Municipal Ticket Information System fines range from \$200 to \$500, and can be delivered for every day of non-compliance with the Bylaw. Clause 25 states that each day that a violation continues is a separate offence. Clause 26 contains the provision that if a person continues to violate the Bylaw, Bylaw Services may take the case to a provincial court where, upon summary conviction, the person will be subject to a fine not less than \$2,000 and not more than \$10,000.00, or a term of imprisonment not exceeding three months, or both.

To accommodate this Bylaw, it is necessary to update the Municipal Ticket Information System schedules describing specific bylaw infractions to match the new garbage disposal bylaw regulations. This is done through Municipal Ticket Information System Implementation Bylaw No. 1883, 2008 that is attached to this report and describes the designated enforcement officers, new offences and fines (Appendix 2).

A third point was raised by Council regarding the \$500 fine for feeding dangerous wildlife. Council wondered if this fine was too low and asked staff to investigate the possibility of raising it. This particula: clause is concurrent with the BC Wildlife Act which also specifies a \$500 for the same offence. It is staff's opinion that the RMOW Bylaw fine amount should not be higher than the provincial fine. Additionally, there is some discretion around setting fine amounts, and generally, Bylaw Services strives to set fines that send a strong deterrent message, but will still be paid.

The composter facility will begin operations later this year, and in anticipation of that, the proposed tipping fees for clean wood waste, organics and biosolids are included in the Solid Waste/Recycling Rate table, attached to this report as Schedule B. The tipping fees are based on information contained in the composter business plan. Comparisons were made to Kelowna, Vancouver and Nanaimo to assist in determining appropriate rates for the Whistler composter facility. Note that the organics tipping fee of \$75 per tonne is considerably less than the garbage tipping fee of \$120 per tonne, and acts as an encouragement to dispose of organics at the composter facility. A more detailed tipping fee report will come forward to Council in the future.

Garbage Disposal and Wildlife Attractants Bylaw No. 1861, 2008 Page 3 ... October 20, 2008

WHISTLER 2020 ANALYSIS

W2020 Strategy	TOWARD Descriptions of success that resolution moves us toward	Comments
Materials & Solid Waste	The resort community is clean and well maintained.	The revised Bylaw provides more tools to Bylaw Officers to proactively clean up garbage disposal problems, and to respond to garbage complaints.
Finance	Whistler lives within its financial means.	This initiative does not require capital or operational spending, and will likely reduce maintenance costs as human/bear conflicts at disposal sites decline.

W2020 Strategy	AWAY FROM Descriptions of success that resolution moves away from	Mitigation Strategies and Comments
	Resolution does not move away from any Descriptions of Success.	

OTHER POLICY CONSIDERATIONS

The RMOW is committed to achieving the Ministry of Environment's Bear Smart Community status. One of the program's six criteria is "implement "Bear Smart" bylaws prohibiting the provision of food to bears as a result of intent, neglect, or irresponsible management of attractants." The revised Bylaw 1861, 2008, fulfills this requirement and moves the RMOW one step closer to becoming a Bear Smart community.

ENVIRONMENTAL IMPLICATIONS

The Bylaw will play a role in the overall program to reduce human/bear conflicts delivered in conjunction with the Whistler Bear Working Group. Other components of the program for which the RMOW is responsible include co-funding the Bear Response Officer, funding a Bear Aware Program Delivery Specialist to provide public education and support of the Bear Aversion Research Team.

BUDGET CONSIDERATIONS

There are no budget implications to this bylaw. Bylaw Services will continue its current level of service toward garbage management. The tipping fee schedule contains information that will be presented to Council in more detail before the composter begins operations later this year.

COMMUNITY ENGAGEMENT AND CONSULTATION

The RMOW continues to work with the Whistler Bear Working Group to stay current on human/bear conflict, waste management and other issues related to bears in the Whistler Valley. Since this is an incremental change to an existing bylaw, ads will be placed in the local newspapers articulating the new regulations particularly in regard to wildlife attractants.

Garbage Disposal and Wildlife Attractants Bylaw No. 1861, 2008 Page 4 ... October 20, 2008

SUMMARY

Council raised issues at the August 18, 2008 meeting that staff feel have been addressed in this iteration of the Bylaw in ways that enhance the Bylaw and meet the goal of providing Bylaw Services with a tool that will help reduce human/bear conflict in Whistler.

Respectfully submitted,

HBeresford

Heather Beresford, Environmental Stewardship Manager for Brian Barnett GENERAL MANAGER OF ENVIRONMENTAL SERVICES

RESORT MUNICIPALITY OF WHISTLER

GARBAGE DISPOSAL AND WILDLIFE ATTRACTANTS BYLAW NO. 1861, 2008

A BYLAW TO PROVIDE FOR THE DISPOSAL AND STORAGE OF GARBAGE AND CONTROL OF WILDLIFE ATTRACTANTS

The Council of the Resort Municipality of Whistler, in open meeting assembled, ENACTS AS FOLLOWS:

CITATION

 This Bylaw may be cited as "Garbage Disposal and Wildlife Attractants Bylaw No. 1861, 2008".

DEFINITIONS

In this Bylaw:

"agent" means a person authorized to act on behalf of an owner of a parcel in respect to the parcel;

"commercial garbage container" means a wildlife resistant container that is emptied by a garbage contractor and used to dispose of domestic garbage or waste or both;

"commercial recycling container" means a wildlife resistant container that is emptied by a garbage contractor and used to dispose of recyclable materials;

"dangerous wildlife" means bear, cougar, coyote or wolf, or a species of wildlife that is prescribed as dangerous under the *BC Wildlife Act*;

"domestic garbage" means all discarded matter resulting from residential activity, but does not include hazardous waste or waste from construction, utility, commercial or other non-residential activities;

"dwelling unit" means a self-contained set of habitable rooms in a building, including not more than one set of cooking facilities;

"garbage compactor" means a metal receptacle operated by or on behalf of the Municipality for the depositing and compacting of domestic garbage;

"garbage contractor" means a person that collects and disposes of garbage and carries out related duties;

"hazardous waste" means hazardous waste as defined in the British Columbia Hazardous Waste Regulations, B. C. Reg. 63/88, O.C. 268/88, as amended from time to time;

"highway" means every highway, road, street, lane or right of way designed or intended for or used by the general public for the passage of vehicles; and every private place or passageway to which the public, for the purpose of the parking or servicing of vehicles, has access or is invited;

"occupant" means a tenant or guest of or an invitee to premises in or on a parcel;

"parcel" means any lot, block or other area in which land is held or into which it is subdivided, but does not include a highway;

"recycling facility" means a municipal recycling facility, or a Municipal Waste Transfer Station;

"recyclable material" includes, but is not limited to, glass jars and bottles, tin and aluminium cans, plastic bottles, rigid plastic containers, plastic grocery bags, newsprint, mixed paper, and corrugated cardboard;

"waste" means garbage other than domestic garbage and hazardous waste, including that from utility, commercial, industrial or other non domestic activities, that could or does act as a wildlife attractant;

"wildlife attractant" means any substance that could be reasonably expected to attract dangerous wildlife including but not limited to food products, domestic garbage, pet food, seed, restaurant grease, game meat, or glass or metal ware or other item having contained food;

"wildlife resistant container" means a fully enclosed container with a sealed lid and a self-latching mechanism of sufficient design and strength to prevent access by dangerous wildlife, that is securely affixed to the ground or to an immovable object or fixture, and that is described in Schedule A;

"wildlife proof enclosure" means a structure which has enclosed sides, a roof, doors and a self-latching mechanism of sufficient design and strength to prevent access by dangerous wildlife, that is designed and constructed in accordance with the standards and specifications set out in RMOW Garbage Enclosure Guidelines.

STORAGE AND DISPOSAL

- No person shall dispose of or store domestic garbage, waste, or recyclable material except into a container that is a wildlife resistant container or is located in a wildlife proof enclosure.
- 4. Garbage and recycling containers required for temporary special events, such as weekend ball tournaments, weddings, outdoor conventions, Mayor's Picnic and Canada Day are exempt from the requirement under section 3 if emptied and removed from public access before 10:00 p.m.

- 5. No person shall dispose of domestic garbage or recyclable materials except into:
 - (a) a wildlife resistant container;
 - (b) a container in a wildlife proof enclosure;
 - (c) a garbage compactor; or
 - (d) subject to section 6, a recycling facility.
- 6. No person shall deposit anything but domestic garbage into a garbage compactor.
- 7. No person shall dispose of waste except to the Municipal Waste Transfer Station.
- No person shall throw, place or pile, or cause to be thrown, placed or piled on a highway, or parcel, domestic garbage, waste, hazardous waste, recyclable materials or wildlife attractants.
- No owner or occupier of a parcel shall place or have placed a wildlife resistant container or wildlife proof enclosure on or outside the boundary of their parcel.
- 10. No owner or occupier of a single family or duplex parcel shall place or have placed a commercial garbage container on the parcel unless approved in writing by the Resort Municipality of Whistler. The RMOW will consider such aspects as, but not be limited to, the siting of the bin in relation to parking and snowclearing, and visual effects from street and neighbouring properties.

RECYCLABLE MATERIALS

- 11. No owner, occupant or agent of an owner of a parcel that contains a commercial recycling container shall dispose of recyclable materials except in:
 - (a) the commercial recycling container; or
 - (b) at a recycling facility.
- 12. Every person must dispose of recyclable materials in accordance with this Bylaw and, without limitation, separately from domestic garbage, waste or hazardous waste.
- 13. No person shall deposit recyclable materials in a garbage compactor.

WILDLIFE PROOF CONTAINERS AND ENCLOSURES

14. Every person who owns, uses or possesses a wildlife resistant container or wildlife proof enclosure must keep it closed and secure, except at the time of deposit of permitted substances, and must maintain a wildlife resistant container in wildlife resistant condition at all times, and must maintain a wildlife proof enclosure in wildlife proof condition at all times.

- 15. No person shall leave garbage, waste, recyclable materials or other attractants outside a container or enclosure.
- 16. Every owner or occupier of a commercial, industrial, institutional and tourist accommodation building shall provide a garbage storage site located inside a building or within a wildlife proof enclosure. Single family and multiple family residential development having twelve or more dwelling units shall provide a garbage storage site located inside a building or within a wildlife proof enclosure or within a wildlife resistant container.

WILDLIFE ATTRACTANTS

- 17. No person shall store, handle or dispose of wildlife attractants in such a way that they are accessible to dangerous wildlife.
- No person shall feed or attempt to feed dangerous wildlife, or deposit wildlife attractants in a place or manner that attracts dangerous wildlife.
- 19. No person shall place or allow a bird feeder on a parcel so that the bird feeder is accessible to dangerous wildlife. Every person who occupies a parcel must keep the area below a feeder free of the accumulation of seed and debris from the feeder at all times.
- No owner or occupier of a parcel shall permit or allow fruit from a tree or bush on a
 parcel to accumulate on the tree, bush or ground such that it attracts or is likely to attract
 dangerous wildlife.
- No person shall fail to take remedial action to avoid contact or conflict with dangerous wildlife after being advised by a designated bylaw enforcement officer that such action is necessary.

GARBAGE CONTRACTOR

22. The Municipality may recover the costs incurred for contracting with a garbage contractor for the collection and disposal of garbage from charges and tipping fee revenues received under this Bylaw.

FEES

 Every person who delivers domestic garbage or waste to the Municipal Waste Transfer Station will be charged tipping fees as prescribed in Schedule B.

OFFENCE AND PENALTY

24. This Bylaw may be enforced by means of a municipal ticket in the form prescribed for the purpose of section 264 of the *Community Charter*.

- 25. Each day during which any violation, contravention or breach of this Bylaw continues shall be deemed a separate offence.
- 26. Every person who continues to violate any provision of this Bylaw, or who continues to permit, suffer or allow any act to be done in violation of any provision of this Bylaw, or who continues to neglect to do anything required to be done by any provision of this Bylaw, may have the case moved by Bylaw Services to a provincial court. Upon summary conviction by the court, the person is subject to a fine not less than \$2,000 and not more than \$10,000.00, or a term of imprisonment not exceeding three months, or both.
- 27. Pursuant to section 264(1)(b) of the *Community Charter*, Bylaw Enforcement Officers are designated to enforce this Bylaw.
- Pursuant to section 264(1)(c) and section 265(1)(a) of the *Community Charter*, Bylaw 1883, 2008, Municipal Ticket Information System Implementation Bylaw Schedule B8 designates the offence committed, Bylaw section number and fine amount.
- 29. Council hereby delegates to Bylaw Enforcement Officers the authority to refer any disputed ticket informations, under this or any other bylaw, to the Provincial Court.

SEVERABILITY

30. If any section or lesser portion of this Bylaw is held to be invalid by a Court, the invalid portion shall be severed without affecting the validity of the remaining portions of this Bylaw.

REPEAL

 The Resort Municipality of Whistler "Garbage Disposal Bylaw No. 1445, 1999", as amended, is repealed. GIVEN FIRST READING this ____ day of _____, 200_. GIVEN SECOND READING this ____ day of _____, 200_. GIVEN THIRD READING this ____ day of _____, 200_.

Approved by the Ministry of Environment on the _____day of _____, 2008.

6

ADOPTED this ____ day of _____, 200_.

Ken Melamed, Mayor

Shannon Story, Corporate Officer

I HEREBY CERTIFY that this is a true copy of "Garbage Disposal and Wildlife Attractants Bylaw No. 1861, 2008"

Shannon Story, Corporate Officer

SCHEDULE A

7

APPROVED WILDLIFE RESISTANT CONTAINERS

RECOMMENDED PRODUCTS:

VENDOR	CONTACT INFORMATION	PRODUCTS
Bear Saver Crystal McMillan, BC Sales Rep	www.bearsaver.com Bearawareucluelet@ukeecable.net	 BearSaver RCE Series Refuse Enclosures BearSaver CE Series Trash /Recycling Container Commercial Containers Animal Resistant Roll-Out Cart BearSaver HA Series Trash/Recycling Container
Rollins Machinery Limited	www.rollinsmachinery.ca Langley, BC 604-533-0048 1-800-665-9060	Haul-All Products for residential and commercial applications

Or alternative product that meets requirements of this bylaw.

SCHEDULE B

BYLAW NO. 1872, 2008

SOLID WASTE/RECYCLING RATES AMENDMENT

TYPE OF VEHICLE AND LOAD	TIPPING FEE
COMMERCIAL AND	\$ 120 per tonne
CONSTRUCTION VEHICLES	-
with garbage, rubbish or refuse; plant and	
grass clippings; commercial waste;	
demolition and construction wastes; wood	
waste; discarded or abandoned vehicles or	
parts thereof; septage screenings; discarded	
home and industrial appliances.	
GYPSUM BOARD drywall, must be kept	\$ 200 per tonne
separate from all other materials	
APPLIANCES including fridges, stoves,	\$ 15.00 per unit
A/C units, hot water tanks, washers, dryers	
and freezers	
TIRES	\$30.00 per m ³
	\$ 7.50 for a commercial truck tire or
	\$ 3.50 for a car or pick-up truck tire
	\$ 3.50 surcharge for each tire with a rim
CARDBOARD PENALTY -	50% surcharge
This penalty applies to any load of waste	
containing more than 10% cardboard	
content	
RECYCLABLE MATERIALS –	FREE
glass, tin, paper, etc. into bins at Transfer	
Station	
CLEAN WOOD WASTE - Branches	To be determined by RMOW General Manager
over 2" diameter; clean logs free of rocks;	Environmental Services based on current
wood without nails, screws, glue, stain or	market rates.
chemical treatment; chipped tree	
trimmings; clean sawdust, shavings, chips	
or hogfuel	
BIOSOLIDS – solid waste from	\$110 per tonne
municipal wastewater treatment plants	
ORGANICS – food waste, yard waste,	\$75 per tonne
organics, etc	

RESORT MUNICIPALITY OF WHISTLER

MUNICIPAL TICKET INFORMATION SYSTEM IMPLEMENATION BYLAW No.1883, 2008

A BYLAW TO AMEND MUNICIPAL TICKET INFORMATION SYSTEM IMPLEMENATION BYLAW No 1719, 2005

WHEREAS Section 260 (I) of the *Community Charter* authorizes the Council of the Resort Municipality of Whistler to make bylaws for the purposes of enforcing the bylaws of the municipality;

AND WHEREAS Section 264 (1)(a) of the *Community Charter* authorizes the Council of the Resort Municipality of Whistler to designate a bylaw for the purposes of Part 8 Division 3 of the Community Charter;

AND WHEREAS the Council of the Resort Municipality of Whistler deems it expedient to authorize the use of Municipal Ticket Information for the enforcement of certain bylaws, to designate certain bylaw offenses and set certain fine amounts;

NOW THEREFORE the Council of the Resort Municipality of Whistler, in an open meeting assembled, **ENACTS AS FOLLOWS**:

- This bylaw may be cited for all purposes as the "Municipal Ticket Information System Amendment Bylaw No.1883, 2008".
- 2) The Schedules to Municipal Ticket Information System Implementation Bylaw shall be amended as follows :
 - A. Schedule "A" is deleted and replaced with Schedule "A" attached to and forming part of this Bylaw.
 - B. Schedule "B8" is deleted and replaced with Schedule "B8" attached to and forming part of this Bylaw.

GIVEN FIRST, SECOND, AND THIRD READINGS this th day of , 2008. ADOPTED by Council this day of 2008.

Ken Melamed Mayor Shannon Story Corporate Officer I HEREBY CERTIFY that this is A true copy of the "Municipal Ticket Information System Implementation Amendment Bylaw No. 1883, 2008"

Shannon Story Corporate Officer

SCHEDULE A – ENFORCEMENT OFFICERS

Municipal Ticket Information System Bylaw No. 1719, 2005

COLUMN 1	COLUMN 2
Designated Bylaws	Designated Bylaw Enforcement Officer
"Building and Plumbing Regulation Bylaw	Building Inspector
No. 1617, 2002" as amended	Senior Building Inspector
	Plumbing Inspector
	Supervisor of Bylaw Services
	Bylaw Enforcement Officer
"Whistler Animal Control	Animal Control Officer
Bylaw No. 1555, 2001" as amended	Supervisor of Bylaw Services
	Bylaw Enforcement Officer
	Bear Response Officer
"Business License Bylaw No.567, 1987	Supervisor of Bylaw Services
as amended	Bylaw Enforcement Officer
"C' D I M 00 - 0 " I I	Business License Inspector
"Sign Bylaw No. 588, 1987" as amended	Bylaw Enforcement Officer
"Naine Control Balant Na -665, and (" an	Supervisor of Bylaw Services
Noise Control Bylaw No. 1000, 2004 as	Supervisor of Bylaw Services
amended	Boyal Canadian Mounted Police Officer
	Royar Canadian Mounted Fonce Officer
"Fire Protection and Fireworks	Fire Chief
Bylaw No. 1595, 2004" as amended	Supervisor of Bylaw Services
	Assistant Fire Chief
	Fire Fighter/Inspector
	Bylaw Enforcement Officer
"Parks Bylaw No. 1526, 2002" as amended	Supervisor of Bylaw Services
	Bylaw Enforcement Officer
	Animal Control Officer
	Royal Canadian Mounted Police Officer
"Garbage Disposal and Wildlife Attractants	Supervisor of Bylaw Services
Bylaw No., 1861, 2008"	Bylaw Enforcement Officer
	Bear Response Officer
	Royal Canadian Mounted Police
"Property Maintenance Bylaw No. 810,	Supervisor of Bylaw Services
1990"as amended	Bylaw Enforcement Officer
"Water Use Regulation Bylaw No. 1538,	Supervisor of Bylaw Services
2001 as amended	Bylaw Enforcement Officer
"Skateboard and Bicycle Bylaw No. 933,	Supervisor of Bylaw Services
1992 as amended	Dylaw Enforcement Officer Doubl Considion Mounted Police Officer
"Pusinger Deculation Pulaw No. 700000"	Royal Canadian Mounted Police Officer
as amended	Supervisor of Dylaw Services Bylaw Enforcement Officer
"Nuisance Bulaw No. 205, 1082" as amonded	Supervisor of Bulaw Services
ivuisance bytaw ivo. 305, 1903 as amended	Bulaw Enforcement Officer
	Royal Canadian Mounted Police Officer
"Business Regulation Bylaw No. 739, 1989" as amended "Nuisance Bylaw No. 305, 1983" as amended	Royal Canadian Mounted Police Officer Supervisor of Bylaw Services Bylaw Enforcement Officer Supervisor of Bylaw Services Bylaw Enforcement Officer Royal Canadian Mounted Police Officer

SCHEDULE B8

Garbage Disposal Bylaw and Wildlife Attractants Bylaw No. 1861, 2008

DESIGNATED EXPRESSION	SECTION	FINE
Failure to properly dispose of or store domestic	3	\$200
garbage, waste, recyclable material or wildlife	-	
attractant		
Failure to remove non bear proof bins from event.	4	\$200
Deposit waste other than domestic garbage in	6	\$200
compactor		
Failure to dispose of waste at the Municipal Waste	7	\$200
Transfer Station		
Cause domestic garbage, waste, hazardous waste,	8	\$200
recyclables or wildlife attractants to be on highway		
Place wildlife resistant container or wildlife proof	9	\$200
enclosure in unauthorized area		
Commercial garbage container without approval	IO	\$200
Failure to dispose of recyclable materials separately	12	\$200
from domestic garbage, waste or hazardous waste		
Deposit recyclable material in garbage compactor	13	\$200
Failure to keep wildlife resistant containers and	14	\$200
enclosures secure and in good repair		
Leave garbage, waste, recyclable material or	15	\$200
attractant outside container or enclosure		
Failure to provide wildlife resistant enclosure	16	\$500
Failure to properly store, handle and dispose of	17	\$200
wildlife attractant	-	
Feed dangerous wildlife	18	\$500
Allow fruit to accumulate	20	\$200

APPENDIX 5: BYLAWS

5-II. Garbage Disposal and Wildlife Attractant Bylaw for Kamloops, BC.

This is a consolidated by low prepared by the City of Kam loops for convenience only. The City does not warrant that the information contained in this consolidation is current. It is the responsibility of the person using this consolidation to ensure that it accurately reflects current by-low provision.

CITY OF KAMLOOPS BY-LAW NO. 40-7

AS AMENDED

A By-law of the City of Kamloops Relating to the Collection and Disposal of Garbage and Refuse

The Council of the City of Kamloops, in open meeting assembled, enacts as follows:

- By-Law No. 40-1 and amendments thereto are hereby repealed;
- Metric units are used for all measurements in this By-law. The approximate equivalent
 of those units in currently used units of Canada measure (feet, inches, etc.) are shown
 in brackets following each metric measurement and such bracketed figures are
 included for convenience only and do not form part of this By-law.
- In this By-Law, unless the context otherwise requires:
 - (a) "Bear Attractants" means any and all food wastes and accumulations of discarded fruit on public or private land, and includes offal."
 - (b) "<u>City</u>" means the City of Kamloops;
- (c) "<u>Designated Area</u>" means those areas identified, from time to time, by the Ministry of Environment, Lands and Parks and identified as Schedule "D" attached to this by-law, as areas common to bear sightings.
 - (d) "Garbage Collection Area" means the area shown on the drawing attached to this By-Law as Schedule 'A';
 - (e) "<u>Residential Dwelling Premise</u>" means the individual dwelling units within single family dwellings, duplexes, triplexes, fourplexes, and individually serviced units or apartments in condominiums.
 - (f) "<u>Residential, Multiple Family Dwelling Premises</u>" Residential, Multiple Family means a development where the building or buildings on a lot each are used for more than four (4) dwellings which are not individually serviced units.
 - (g) "<u>Commercial Premises</u>" means a building or self-contained part thereof, occupied and used for other than a dwelling, including but not restricted to warehouses, stores, eating places, wholesale or (40-10) retail business places and office blocks, packing houses, canneries, processing plants or manufacturing plants, hospitals, schools, institutions and churches.

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	BY-LAW NO.	40-7 CONSOLIDATION	PAGE 2
(40-16) (40-18) (40-31)	(h.)	"Assistant Administrator/City Engineer" means the person appointed by the Council of the City and any person delegated to assist him in out his duties under this by-law.	as such carrying
(40-16)	(i)	"Garbage" means and includes any and all trade waste, ashes, hous waste, discarded matter, rejected, abandoned or discarded waste or or animal food, floor sweepings, crockery, glass or metal ware having food, but does not include special waste or offal.	ehold vegetable contained
(40-32)	0)	"Rubbish" means garden refuse or rubbish if tied in suitable bundles not more than 22.7 kg (50 lbs.) and includes grass, if placed in a star special container, and newspapers, reading material and magazines, securely in bundles of not more than 22.7 kg (50 lbs.) but does not in waste or rubbish from renovating, remodelling or rebuilding, gases, li swill or manure, or petroleum products.	weighing ndard or , if tied nclude quids, slop,
	(k)	"Garbage Disposal" means the collection of garbage under the provis By-Law;	sions of this
	(1)	"Inspector" means the Medical Health Officer or Health Inspector or a appointed for the purpose of enforcing the provisions of this By-law;	any official
	(m)	" <u>Owner</u> " means the registered owner of any lands and premises situat the garbage collection area and shall, where applicable, include the a executor or administrator of such owner or the lessee or occupier of premises;	ated within agent, heir, the
(40-32)	(n)	" <u>Standard Garbage Container</u> " (hereinafter referred to as "standard or means non-corrosive, durable receptacles fitted with secure handles water-tight cover, which receptacles shall be of a capacity of not mor 100 L (about 3.5 cu. ft.) and must not weigh more than 22.7 kg (50 lb full;	containers") and a te than os.) when
		"Plastic Garbage Containers" (hereinafter referred to as "approved pl bags") shall be constructed of 1.5 mil. polyethylene, and shall have of of 66 cm (about 26 inches) in diameter by 91 cm (about 36 inches) in	astic limensions 1 height.
(40-31)	(0)	"Special Containers" shall mean a specially designed receptacle of fr (about 2.5 cu. yds.) to 2700 L (about 3.5 cu. yds.) fitted with equipme allow the said receptacle to be dumped mechanically by a garbage tr design of these special containers must be approved by the Assistan Administrator/City Engineer. Such containers shall be stored on a ha surfaced pad acceptable to the City.	om 1900 L Int that will ruck. The It ard

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(40-16)		(p)	"Special Pick-ups or Call-backs" are pick-ups or call-backs made in response to individual requests:		
			 Garden refuse will be picked up at designated times of the year for a flat fee. Special pick-ups or call-backs will be charged at regular rates. 	t	
			(iii) A special service will be charged at actual cost.		
(40-16)		(q)	"Special Waste" means hazardous, inflammable, radioactive and toxic materials including all products not described in Section 3, Subsection (g) or as defined in the Waste Management Act S.B.C. 1982.	¢ 1	
			(i) Special waste will not be deposited in a landfill without first notifying the City forty-eight (48) hours in advance. The City may require written documentation of the chemical composition or properties of the material. The dumper shall pay all costs associated with the disposal of special waste products and the City reserves the right to refuse any or all classes of special waste.	,	
(40-20) (40-31)		(r)	" <u>Universal Container</u> " means a specially designed cart of not more than 500 L (0.6 cu. yds.) which is equipped with wheels and is suitable for such semi or fully mechanized lift systems in use by the City of Kamloops. The design of the cart must be approved by the Assistant Administrator/City Engineer.		
(40-32)		(s)	" <u>Garbage Tag</u> " means a tag which must be placed on all standard containers, plastic bags or universal containers which exceed the quantity limits for garbage removal outlined in this by-law, with such tags being made available by the City of Kamloops for the fee set out in Schedule "B" attached to this by-law."	5	
(40-16) (40-18) (40-31)	4.	(a)	The City is authorized to establish, maintain and operate a system of garbage collection, removal and disposal, within the City, either by contract or by use of City-owned equipment and City labour, and such service shall be under the control and inspection of the Assistant Administrator/City Engineer.		
		(b)	The City is authorized to establish billing and collection systems under the control and inspection of the Director of Finance of the City.		
		(c)	The City is authorized to approve billing and collection systems employed by contractors, and such systems shall be inspected and approved by the Director of Finance.		
(40-15)		(d)	A charge shall be and is hereby imposed for the removal of garbage under the terms of this by-law and the rates therefor shall be those stated in Schedule "B" attached to and forming part of this by-law.		
	5.	No per accord	son within the garbage collection area shall dispose of garbage, except in lance with the provisions of this By-Law.		
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	BY-L	AW NO.	40-7	CONSOLIDATION	
(40-31) 6. (a) Every owner or occupier of premises within the garbage colle provide and maintain in sanitary condition and in good order standard, special, or universal containers or approved plastic number at all times to contain all garbage. The City or its cor be responsible for the replacement of any standard, special of containers or lids damaged or lost for any reason whatsoever					ollection area shall der and repair, either stic bags sufficient in contractors shall not ial or universal ever.
(40-20)			(aa) Notwithsta not be lifte of the City by-law.	nding the provisions of this by-law unive d, collected or emptied by the City of Ka outlined in Schedule 'C' attached to and	ersal containers shall amloops in those areas d forming part of this
		(b)	Such containers s be kept or put or e except when place this By-law;	hall at all times be kept on the premises encroach upon or project over any street ed on such street or lane for the purpose	and shall at no time t, lane or public place e of collection under
(40-40)			No person or pers defined in this by- activity, thereby or or vicinity.	ons may accumulate, store or collect ar law in such a manner as to promote an reating a risk to the safety of the public i	ny bearattractantsas increase in bear in the neighbourhood
		(c)	All standard conta more than 0.75 m accessible from th	(2.46 ft.) in height above ground level (e street, or lane abutting the premises;	or on a platform not nall be readily
(40-20)		(d)	Standard, univers readily accessible on the day of colle	al or special containers shall be kept an for emptying between the hours of 7:00 action;	d maintained at, and A.M. and 7:00 P.M.
(40-41)			No person in the o this by-law, shall p street or boulevar	designated area, shown outlined in Sche place any container containing bear attra d prior to 6:00 a.m. of the collection day	edule "D" attached to actants on any city
(40-16) (40-18) (40-31)		(e)	For collection purp the boulevard or a Engineer.	poses, all containers must be placed ne: at a place designated by the Assistant A	xt to the lane, on dministrator/City
		(f)	If standard contain opening upon the removed.	ners are enclosed in a structure, it shall pickup side so that the said containers	be built with doors may be readily
		(g)	Where arrangeme ready means of a no lane has access and such passage size and kind to e thereto.	ents have been made for on-site pickup, ccess to standard or special containers ss shall, at all reasonable times be provi eway means of access shall be unobstrunable any employee or contractor of the	a passageway and on premises to which ded from the street, ucted and of sufficient e City to have access

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	BY-LAW NO. 40-7		40-7	CONSOLIDATION PA		
(40-32)		(h)	i)	Residential dwelling premises shall be permitted to place out for collection a maximum weekly volume of garbage of 300 L (approcu. yd.), being the equivalent of three standard containers or applastic bags. Each standard container or approved plastic bag nweigh in excess of 22.7 kg (approximately 50 lb.) when full. Eacu universal container must not weigh in excess of 68 kg (approxim 150 lb.) when full.	ox. 0.39 proved nust not h ately	
			ii)	Additional standard containers or approved plastic bags in excess quantity limits set out in clause (i) may be collected providing a g tag issued by the City is attached to each additional piece.	arbage	
(40-37)			iii)	Notwithstanding the quantity limits set out in clause (i), on the fir collection only following December 25 of each year, residential of premises shall be permitted to place out for collection an addition standard containers or approved plastic bags."	st Iwelling nal three	
		i)	Multipl (1.0 m of app	e dwelling premises or commercial premises requiring removal of) (1.31 cu. yds.) or more of refuse per week must use special cor roved design.	1000 L ntainers	
		(j)	Hot as compo up.	hes from incinerators or burning barrels, any liquid wastes, bulk o sition waste, animal cuttings or waste or dead animals will not be	hemical picked	
		(k)	Tree b two-thi	ranches placed in approved universal containers must not be lon rds of the depth of the container.	ger than	
		(1)	Grass bagge	clippings, cold ashes and sawdust placed in universal containers d prior to being placed in the container.	must be	
(40-19) (40-20)	7.	All star cover access contai owner	ndard, u for such sible for ner has of the p	universal and special containers for garbage and any structure us a containers shall, at all times, be kept in good repair, clean and inspection at all reasonable hours. When any standard or unive been condemned by the City, such container shall be removed b premises who shall provide a suitable container in its place.	ed as a rsal y the	
(40-20)	8.	No liqu specia	uids sha I contai	Il be put in or be allowed to accumulate in any standard, universa ner and all containers shall be kept covered with watertight lids.	al or	
(40-20)	9.	All table and kitchen garbage and all wet garbage shall be enclosed in plastic bags before being placed within any standard, universal or special container.			ags	
(40-20)	10.	All solids, which might adhere to any standard, universal or special container, shall be separately wrapped or disposed of within individual disposable wrappings before being placed within the containers.				

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2002 March 20
- Ashes shall be placed in non-combustible standard or special containers and separate from other garbage or inflammable material.
- No person shall place or mix, with any material for removal as garbage any explosive, volatile, corrosive materials, dangerous chemicals or any other material dangerous to the health and/or safety of the garbage collection personnel.
- (40-16) 13. The City reserves the right to require commercial premises, notwithstanding the
 (40-31) amount of refuse, to use special containers if the garbage or refuse is determined by the Assistant Administrator/City Engineer to be a hazard or nuisance.
- (40-18) 14. The City reserves the right to refuse to remove all waste material which is not garbage, or refuse, as defined by this By-Law.
- (40-16) 15. Notwithstanding anything herein contained, all buildings, other than residential dwelling
 (40-31) premises may use special containers and shall place them in such locations as approved by the Assistant Administrator/City Engineer.
- (40-18) 16. No garbage collector shall enter any building for the purpose of carrying out or returning thereto any standard, universal or special container, nor shall he demand or receive any gratuity, gift, payment or consideration for services rendered in connection with garbage collection beyond his regular remuneration.
 - a) The City reserves the right to control the type and nature of garbage and waste which is dumped at City Disposal sites.
 - b) Commercial type waste materials shall not be deposited at the Bamhartvale Landfill.
- (40-22) c) No person shall remove or salvage any materials from the landfills at Mission Flats and Barnhartvale except by written permit authorized by the City of Kamloops and the person who has been issued a permit shall abide by all of the conditions of the permit.
- (40-25) d) No person shall deposit or discharge or allow or cause to be deposited or discharged any waste oil filters into the Mission Flats or Barnhartvale landfills.
- (40-19) 18. The City must suspend collection service or order collection service suspended from (40-20) properties where the standard, universal or special containers or location or design or accessibility of pickup facilities are contrary to the provisions of this By-Law, but such suspension shall not waive any requirement, or abate or waive any charges or rates under the provisions of this By-Law.
- (40-10) 19. The applicant for commercial collection service shall be the registered owner of the property or the lessee, occupier or renter thereof.

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- 20. Any person who violates any of the provisions of this By-Law, or who suffers or permits any act or thing to be done in contravention of any of the provisions of the By-Law, or who neglects to do or refrains from doing anything required to be done by any of the provisions of this By-law, shall be deemed to be guilty of an infraction hereof and liable to the penalties hereby imposed.
- (40-40) 21. Every person guilty of an infraction of this by-law shall be liable to a minimum penalty of One Hundred Dollars (\$100.00) and a maximum of Five Hundred Dollars (\$500.00), or upon summary conviction a maximum of Two Thousand Dollars (\$2,000.00) or six (6) months in jail, or both.

Original By-law No. 40-7	Adopted 1978 February 28
Amended by By-law No. 40-10	Adopted 1981 May 26
Amended by By-law No. 40-11	Adopted 1982 January 19
Amended by By-law No. 40-12	Adopted 1982 November 30
Amended by By-law No. 40-13	Adopted 1984 January 24
Amended by By-law No. 40-15	Adopted 1984 December 18
Amended by By-law No. 40-16	Adopted 1985 February 12
Amended by By-law No. 40-17	Adopted 1986 February 18
Amended by By-law No. 40-18	Adopted 1987 April 28
Amended by By-law No. 40-19	Adopted 1988 August 23
Amended by By-law No. 40-20	Adopted 1989 January 3
Amended by By-law No. 40-21	Adopted 1990 January 30
Amended by By-law No. 40-22	Adopted 1991 July 2
Amended by By-law No. 40-23	Adopted 1991 December 17
Amended by By-law No. 40-24	Adopted 1991 December 17
Amended by By-law No. 40-25	Adopted 1992 December 1
Amended by By-law No. 40-26	Adopted 1992 December 22
Amended by By-law No. 40-27	Adopted 1993 January 5
Amended by By-law No. 40-28	Adopted 1993 December 21
Amended by By-law No. 40-29	Adopted 1993 December 21
Amended by By-law No. 40-30	Adopted 1994 March 1
Amended by By-law No. 40-31	Adopted 1994 June 21
Amended by By-law No. 40-32	Adopted 1994 July 12
Amended by By-law No. 40-34	Adopted 1995 July 19
Amended by By-law No. 40-35	Adopted 1995 December 19 (effective 1996 January 2)
Amended by By-law No. 40-36	Adopted 1995 December 19 (effective 1996 February 1)
Amended by By-law No. 40-37	Adopted 1996 October 8
Amended by By-law No. 40-38	Adopted 1998 February 3
Amended by By-law No. 40-39	Adopted 1999 March 23
Amended by By-law No. 40-40	Adopted 2000 April 25
Amended by By-law No. 40-41	Adopted 2000 September 26
Amended by By-law No. 40-42	Adopted 2002 February 26 (effective 2002 April 1)

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SCHEDULE 'B'

The following rates and penalties shall be paid for the removal of garbage under the terms of this By-Law 40-7 as amended from time to time:

1. <i>I</i>	 Residential 	Premises

(40-37)	i)	garbage or refuse (up to a maximum of three standard pieces or one universal container with the exception of the first collection day only after December 25 up to a maximum of six standard pieces or two universal containers" after the words "universal container)	no charge
		ii) garbage or refuse (over three standard pieces)	\$1.00 per tag per piece
		iii) garbage or refuse (additional universal containers)	3 x \$1.00 tags per universal container
		iv) garden refuse	\$45.00 per hour"
(40-35)	В. <u>I</u>	Multiple Dwelling Premises	
	i)	3-1/2 cu. yd. special container rental	\$20.20 per month
	ii)	3-1/2 cu. yd. once a week collection	no charge
	iii)	3-1/2 cu. yd. additional collection	\$8.00 per lift
	iv)	6 cu. yd. special container rental	\$26.80 per month
	v)	6 cu. yd. once a week collection	no charge
	vi)	6 cu. yd. additional collection	\$11.20 per lift"
(40-23)	C.	Commercial Premises	
(40-35)		i) Special Container	
		- Special container rental, 3 1/2 cu. yd.	\$28.40 per month
		- Plus lift charge, 3 1/2 cu. yd	\$11.30 per lift
		- Special container rental, 6 cu. yd.	\$37.60 per month

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SCHEDULE 'B' (CONTINUED)

	C.	Commercial Premises (Continued)			
		i) <u>s</u>	Special Container (Co	ontinued)	
			Plus lift charge, 6	cu.yd.	\$15.60 per lift"
		ii) <u>(</u>	Commercial Loose		
			Collection Charge	•	\$2.55 per minute
(40-34)	D.	Landfill	Disposal		
(40-36) (40-38) (40-42)		i) ii) iii)	Residential Users: Commercial Solid Wa Minimum Commercia	aste (effective 1996 February 1) il Dump Charge	\$5.00 per trip \$33.00 per tonne \$2.00
(40-30)	Ε.	<u>Landfill</u>	adfill Hours of Operation		
		a)	Mission Flats Landfil	L	
			Summer Hours	 April 1 to September 30 0800 hours to 2000 hours; and 	
			Winter Hours	 October 1 to March 31 0800 hours to 1700 hours. 	
		b)	Bamhartvale Landfill	 Four Days per Week, Friday to Monday inclusive 	
			Summer Hours	 April 1 to September 30 0800 hours to 2000 hours; and 	
			Winter Hours	- October 1 to March 31 0800 hours to 1700 hours.	
	F.	Sale of	Compost		

The following payment schedule will apply to the purchase of compost from the Cinnamon Ridge Yard Waste Compost Facility:

- Loaded by the facility operator \$20.00 per m³
- b) Standard garbage receptacle (can) approximately 100 L loaded by the purchaser - \$2.00.

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SCHEDULE 'B' (CONTINUED)

- A. Any payment received shall be applied firstly to arrears, then to current charges.
 - B. All garbage collection recorded and invoiced with the quarterly billing for water and sewer shall be payable on or before the due dates of March 31, June 30, September 30 and December 31.
 - C. Current quarter rates paid on or before the due dates shall qualify for a discount equal to ten percent (10%) of the current quarter amount due.
 - D. Payments are first applied to the oldest balance. Any current quarter balance remaining unpaid shall result in loss of the discount.
 - E. Non-receipt of a quarterly billing does not relieve the customer from payment for the services received.
 - F. All charges created by a lessee/occupier/renter which are self-creating against the business and/or person and not attributable to the registered owner and/or property shall be recorded and invoiced through the Accounts Receivable system of the City.

Accounts paid within thirty (30) days from invoice date shall qualify for a ten percent (10%) discount. Payments received after this time period shall disqualify the customer from receiving a discount.

Charges imposed and unpaid, in this section, after forty-five (45) days from invoice date will result in discontinued service without due notice being rendered.

In this section, any charges unpaid after sixty (60) days shall be a debt due to the City recoverable by action in any Court of competent jurisdiction.

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APPENDIX 5: BYLAWS

5-III. Garbage Disposal and Wildlife Attractant Bylaw for Canmore, Alberta

TOWN OF CANMORE

BYLAW 09-2001

PROVINCE OF ALBERTA

BEING A BYLAW TO REGULATE THE COLLECTION AND DISPOSAL OF WASTE WITHIN THE TOWN OF CANMORE, IN THE PROVINCE OF ALBERTA

- WHEREAS Under the authority of Section 7 of the *Municipal Government Act*, being Chapter M-26.1 of the Statutes of Alberta 1994 as amended, a Council may pass Bylaws to establish and maintain a system for the collection, removal, and disposal of Waste throughout the municipality;
- WHEREAS The Municipal Council for the Town of Canmore recognizes the importance of and encourages an animal proof waste handling system, waste reduction and recycling while also supporting the concept of a user-pay system for waste disposal;
- WHEREAS The Municipal Council for the Town of Canmore repeals the Waste Control Bylaw 12-97;
- NOW THEREFORE The Municipal Council for the Town of Canmore in the Province of Alberta, duly assembled, hereby enacts as follows:

Part 1: Title and Application

- 1.1 This Bylaw shall be known as the "Waste Control Bylaw" for the Town of Canmore.
- 1.2 The system for collection, removal and disposal of Ashes, Waste, Commercial Waste, Construction, Renovation and Demolition Waste, Dangerous Goods and Recyclable Material generated within the corporate limits of the Town of Canmore shall be operated in the manner herein set forth.
- 1.3 The Town shall own and have sole right to collect and dispose or to contract the collection and disposal of all Waste collected from Residential Dwelling Units and Multi-Residential Dwelling Units in the Town pursuant to provisions of this Bylaw.

Part 2: Definitions

In this Bylaw, unless the context otherwise requires;

- 2.1 "Animal Attractant" means foodstuff or bait of any kind excluding Birdseed but including suet balls for the purposes of feeding any and all species of animal.
- 2.2 "Animal Proof Waste Container" means a receptacle for disposing of residential Waste or Commercial Waste constructed of metal and designed to be collected by automated means, and which meets the specifications for an animal proof waste container as outlined in Schedule 'B' hereto.
- 2.3 "Approved Storage Location" means a location within a Residential Unit, or a Multi-Residential Dwelling Unit, or a Commercial Premise, or any accessory structure that is deemed to be animal proof by the Engineering Design Standards or Director.
- 2.4 "Ashes" means the residue and cinders from any combustible material used for fuel.

- 2.5 "Birdseed" means a mixture of seed for the purpose of attracting and feeding birds.
- 2.6 "Cardboard" means a three layer corrugated fibre packaging. Examples include moving and shoe boxes.
- 2.7 "Commercial Premises" means a building, structure or premises used for the conduct of some profession, business, manufacturing process or other undertaking, and which includes; any institutional, industrial, commercial, restaurant and retail premises, a Residential Dwelling Unit or units if attached and includes areas designated as a Mobile Home Park in accordance with the Land Use Bylaw.
- 2.8 "Commercial Unit" means one self-contained working space having any or all of the following amenities; a separate entrance, office space, bay / work area, receiving and shipping area, washroom, kitchen and common area in a Commercial Premise or complex.
- 2.9 "Commercial Waste" means Waste that would normally be generated and discarded from a Commercial Premises or Residential Dwelling Unit located above or attached to a Commercial Premises, or any other place of business, and which is not acceptable for disposal at a Dry Waste Landfill Site.
- 2.10 "Commission" means the Bow Valley Waste Management Commission.
- 2.11 "Composter" means a plastic, metal or wooden structure for the purpose of composting organic material such as but not limited to Kitchen Organic Waste or Leaf and Yard Waste.
- 2.12 "Construction, Renovation And Demolition Waste" means all waste produced in the process of constructing, altering, renovating, repairing, or demolishing a building; including earth, vegetation, and rock displaced during the process of building, all of which is acceptable for disposal at a Dry Waste Landfill Site.
- 2.13 "Dangerous Goods" mean Dangerous Goods as defined in the Transportation of Dangerous Goods Act and its regulations.
- 2.14 "Director" means the Director of Environmental Services for the Town of Canmore or their designate.
- 2.15 "Dry Waste Landfill Site" means a Class III Landfill Site, maintained and operated by the Commission in accordance with applicable provincial legislation, for the disposal and burial of Construction, Renovation and Demolition Waste and other acceptable materials as defined by the Commission and the province.
- 2.16 "Engineering Design Standards" means the Town of Canmore's Engineering Design Standard as amended from time to time.
- 2.17 "Kitchen Organic Waste" means organic food waste generated in the kitchen of a Residential Unit, Multi-Residential Unit or Commercial Premises and includes but is not limited to fruit and vegetable peelings, table scraps, coffee grounds, egg shells, meat bones, etc.
- 2.18 "Land Use Bylaw" means the Town of Canmore's Land Use Bylaw as amended from time to time.
- 2.19 "Multi-Residential Dwelling Unit" means an apartment building, townhouse or condominium complex which contains five or more self contained Residential Dwelling Units each

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having sleeping, cooking and bathroom facilities.

- 2.20 "Occupancy Certificate" means a certificate issued by the Town that certifies that the property/building/development is ready to be occupied, and complies with the necessary provisions of the Safety Codes Act, and the Land Use Bylaw.
- 2.21 "Occupant" means any Person occupying a Residential Unit, Multi-Residential Dwelling Unit or Commercial Unit whether they are in fact the Owner, renter, tenant or lessee of the dwelling unit.
- 2.22 "Owner" means any Person holding title to a property and includes the Person managing or receiving the rent for a property on behalf of the property Owner.
- 2.23 "Peace Officer" means:
 - 2.23.1 A Bylaw Enforcement Officer appointed by the Town pursuant to the Municipal Government Act,
 - 2.23.2 A Special Constable appointed pursuant to the Police Act,
 - 2.23.3 A Provincial Fish and Wildlife Officer,

2.23.4 A member of the Royal Canadian Mounted Police.

- 2.24 "Pedestrian Waste Container" means a receptacle for the disposal of Pedestrian Waste constructed of metal and designed to be serviced by manual means, and which meets the specifications for an Animal Proof Waste Container as outlined in Schedule 'B' attached hereto.
- 2.25 "Pedestrian Waste / Returnable Container" means a receptacle with a partition separating sections for Pedestrian Waste and refundable containers as defined by the Alberta Bottle Depot Association and constructed of metal and designed to be serviced by manual means, and which meets the specifications for an Animal Proof Waste Container as outlined in Schedule 'B' hereto.
- 2.26 "Pedestrian Waste" means waste that is generated by pedestrian traffic on streets, walkways, parks and trails and includes but is not limited food wrappers, fruit cores, peels, and domestic animal waste, etc.
- 2.27 "Person" means any individual, Occupant, firm, partnership, association, corporation, company or organization of any kind.
- 2.28 "Prohibited Waste" means all Waste listed in <u>Part 8: Prohibited</u> <u>Waste</u> and herein defined.
- 2.29 "Recycling Container" means a container for the exclusive use and collection of Recyclable Material.
- 2.30 "Recyclable Material" means materials that are acceptable for recycling in the Town as set out in Schedule 'C' hereto.
- 2.31 "Residential Dwelling Unit" means a single detached dwelling unit and a self-contained dwelling unit in a duplex, triplex, or four-plex.
- 2.32 "Street" means public thoroughfares within the Town and includes; the sidewalks and borders of the Street and all portions thereof appearing in any registered plan pursuant to the Land Titles Act, or any private roadway on any bareland condominium site.

- 2.33 "Summons" means a Summons pursuant to Part 2 of the Provincial Offenses Procedure Act.
- 2.34 "Town" means the Municipal Corporation of the Town of Canmore, or the area contained within the boundaries thereof, as the context requires.
- 2.35 "Toxic Round Up" means a Town sponsored event for the collection of Dangerous Goods from Residential Dwelling Units and / or Commercial Premises.
- 2.36 "Waste" means the solid waste stream that would normally be generated and discarded as refuse from a Residential Dwelling Unit, or a Multi-Residential Dwelling Unit, and which includes; Kitchen Organic Waste, paper, plastics, Ashes, Yard Waste, broken dishes, edible food goods and other such material, but excludes; Construction, Renovation and Demolition Waste, Commercial Waste, and Dangerous Goods.
- 2.37 "Waste Collectors" means a public or private organization contracted to collect, transfer and dispose of Waste, Commercial Waste and Recyclable Material.
- 2.38 "Waste Transfer Station" means an enclosed building designed and constructed as per applicable legislation to transfer Waste and Commercial Waste to an approved Waste disposal site.
- 2.39 "Yard Waste" means the organic matter formed as a result of gardening or horticultural pursuits, and includes but is not limited to grass clippings, leaves, tree and hedge cuttings.

Part 3: Storage And Disposal Of Waste From Residential Dwelling Units

- 3.1 Occupants of Residential Dwelling Units shall deposit Waste into the Animal Proof Waste Container provided for that purpose.
- 3.2 Occupants of Residential Dwelling Units shall ensure Waste is stored in an Approved Storage Location at all times other than when the Waste is being transferred to an Animal Proof Waste Container.
- 3.3 Animal Proof Waste Containers shall be emptied by the Town or their designate on an as required basis.
- 3.4 Occupants of Residential Units are liable for service fees as identified in Schedule 'A' from the date of issuance of an Occupancy Certificate.
- 3.5 Waste deposited in an Animal Proof Waste Container, shall be sufficiently contained within a plastic bag so as to prevent the Waste from being scattered loosely into the container.

Part 4: Storage And Disposal Of Waste From Multi-Residential Dwelling Units

- 4.1 Occupants of Multi-Residential Dwelling Units shall deposit Waste into the Animal Proof Waste Container or approved alternative provided for that purpose.
- 4.2 Occupants of Multi-Residential Dwelling Units shall ensure Waste is stored in an Approved Storage Location at all times other than when the Waste is being transferred to the Animal Proof Waste Container or approved alternative.

- 4.3 Animal Proof Waste Containers shall be emptied by the Town or their designate on an as required basis.
- 4.4 Occupants of Multi-Residential Units are liable for service fees as identified in Schedule 'A' from the date of issuance of an Occupancy Certificate.
- 4.5 Waste deposited in an Animal Proof Waste Container, shall be sufficiently contained within a plastic bag so as to prevent the Waste from being scattered loosely into the container.
- 4.6 The coordination for removal and costs associated with the disposal of Waste or Prohibited Waste deposited inside and / or outside an Animal Proof Waste Container or approved alternative located at a Multi-Residential Unit complex shall be the responsibility of the association representing the Multi-Residential Dwelling Units.
- 4.7 A minimum distance of four (4) metres in front and three (3) metres on both sides of the Animal Proof Waste Containers or approved alternative, shall be kept free of all obstructions and liabilities including but limited not to vehicles, lawn care equipment, snow and ice.

Part 5: Storage And Disposal Of Commercial Waste From Commercial Premises

- 5.1 Owners of Commercial Premises are responsible for contracting with private firms or individuals for removal of Commercial Waste from their premises.
- 5.2 Owners of Commercial Premises are responsible for all maintenance and upkeep of Animal Proof Waste Containers, Recycling Containers and Commercial Waste containers located in an Approved Storage Location on their premises.
- 5.3 Occupants of Commercial Premises shall deposit Commercial Waste into an Animal Proof Waste Container or Commercial Waste container located in an Approved Storage Location provided for that purpose.
- 5.4 Occupants, Owners and worker(s) of Commercial Premises shall ensure Commercial Waste is stored in an Approved Storage Location at all times other than when the Commercial Waste is being transferred to the Animal Proof Waste Container or Commercial Waste container located in an Approved Storage Location.
- 5.5 Owners of Commercial Premises shall ensure the schedule for removal of Commercial Waste shall be of an appropriate frequency such that said material does not overflow or accumulate beside the Animal Proof Waste Container or Commercial Waste container located in an Approved Storage Location.
- 5.6 Owners of Commercial Premises shall ensure the schedule for removal of Recyclable Materials shall be of an appropriate frequency such that said material does not overflow or accumulate beside the Recycling Container provided for that purposes.
- 5.7 Owners of Commercial Premises are responsible for clean up and removal of litter or debris from their property that may have spilled out of an Animal Proof Waste Container, Commercial Waste container located in an Approved Storage Location or a Recycling Container during the filling or emptying process.

Part 6: Pedestrian Waste Collection

- 6.1 Pedestrian Waste Containers shall be for the sole purpose of Pedestrian Waste disposal only.
- 6.2 Pedestrian Waste Container service shall be completed by the Town or their designate on an as required basis.
- 6.3 Pedestrian Waste / Returnable Containers shall be for the sole purpose of Pedestrian Waste and returnable beverage containers in their respective designated partition.

Part 7: Special Waste Handling, Disposal and Preparation for Special Wastes for Collection

- 7.1 The following items shall be prepared as described prior to being placed in an Animal Proof Waste Container:
 - 7.1.1 Ashes shall be thoroughly quenched, secured and contained within a plastic bag;
 - 7.1.2 Damaged fluorescent lighting or gasfield electric discharge tubes – shall be completely crushed and encased in a container so that no portion of the tube may puncture the material in which it is encased;
 - 7.1.3 Hypodermic needles shall be broken at the hub, and be encased in a stout cardboard box, metal or plastic container or other such container that cannot be broken or punctured by the needle;
 - 7.1.4 Tree and shrub clippings shall be compactly and securely tied in bundles not exceeding one metre in length or twenty-five (25) kilograms in weight.
- 7.2 Animal carcasses contact a veterinary clinic, an applicable provincial body or Peace Officer for appropriate disposal requirements.
- 7.3 Dangerous Goods from a Residential Dwelling Unit or Commercial Premises shall be disposed of at a Toxic Round Up or other approved method in accordance with provincial legislation.

Part 8: Prohibited Waste

- 8.1 Unless special arrangements for collection are made with the Director, any material other than Waste is not acceptable for disposal in an Animal Proof Waste Container. This includes but is not limited to:
 - 8.1.1 Cardboard;
 - 8.1.2 Construction, Renovation and Demolition Waste;
 - 8.1.3 Commercial Waste;
 - 8.1.4 Dangerous Goods;
 - 8.1.5 Animal carcasses;
 - 8.1.6 Discarded furniture, household equipment and appliances;

- 7
- 8.1.7 Discarded automobile parts, including tires and other vehicles parts:
- 8.1.8 Tree limbs, whole shrubs, stumps or bushes, or portions of hedges;
- 8.1.9 Fences, gates and other permanent and semi-permanent fixtures from a Residential Dwelling Unit or Multi-Residential Dwelling Unit;
- 8.1.10 Discarded machinery;
- 8.1.11 Discarded household chattel, material or equipment which has an overall length of more than one metre or an overall weight of more than twenty-five (25) kilograms;
- 8.1.12 Heavy or bulky wrapping, packaging or crating materials or cases of greater length than one metre or of greater weight than twenty-five (25) kilograms;
- 8.1.13 Liquids or fluids of any kind.

Part 9: Prohibitions and Enforcement

- 9.1 No Person shall:
 - 9.1.1 Dispose of Waste or Commercial Waste in any manner, which contravenes any provisions of this Bylaw;
 - 9.1.2 Burn or bury Waste or Commercial Waste in any area of the Town unless prior approval has been received from the Director;
 - 9.1.3 Allow Waste or Commercial Waste to accumulate outside any building; on any land or other premises; or inside any building or portion thereof to which the public has access or anywhere in any manner which contravenes any provisions of this Bylaw;
 - 9.1.4 Fill any Animal Proof Waste Container in such a manner that the cover cannot be fitted properly thereon; or the contents thereof cannot be easily removed there from;
 - 9.1.5 Place or keep, an Animal Proof Waste Container upon any portion of a Street unless specifically authorized by the Director;
 - 9.1.6 Place Waste or Commercial Waste at the Street for collection;
 - 9.1.7 Dispose of Dangerous Goods by placing said material into any Animal Proof Waste Container, Commercial Waste container located in an Approved Storage Location or a Recycling Container;
 - 9.1.8 Allow any deceased domesticated animal to remain undisposed of on any Street, highway or public property;
 - 9.1.9 Store Construction, Renovation and Demolition Waste on any portion of any Street at any time;
 - 9.1.10 Convey through the Streets any Waste or Commercial Waste whatsoever, except in properly covered metal receptacles, or otherwise in vehicles which are covered with canvas or tarpaulins so constructed and arranged to prevent the contents or any portion of the contents from falling on the Streets;

- 9.1.11 Pick, sort over, rummage through, upset, overturn, remove or otherwise interfere with an Animal Proof Waste Container, Recycling Container or a Commercial Waste container located in an Approved Storage Location or with any material placed for collection in or near one of these receptacles;
- 9.1.12 Dispose of Dangerous Goods other than in accordance with the appropriate provincial legislation;
- 9.1.13 Dispose of Waste or Pedestrian Waste on any Street, highway or public property;
- 9.1.14 Dispose of or deposit Waste or Commercial Waste on any Street or in any public park, place or watercourse;
- 9.1.15 Dispose of or deposit Waste or Commercial Waste on private property except in a manner which is in compliance with this Bylaw;
- 9.1.16 Obstruct, interfere, mislead or fail to cooperate with a Peace Officer in the execution of their duty;
- Store Waste outside unless the Waste is Yard Waste contained in a clear plastic bag;
- 9.1.18 Paint, colour, tape paper or like material, mark, alter, damage, dent and / or scrape any residential Animal Proof Waste Container and Pedestrian Waste Container;
- 9.1.19 Place Waste on top of, or beside an Animal Proof Waste Container;
- 9.1.20 Place Waste or Commercial Waste on top of or beside a Pedestrian Waste Container;
- 9.1.21 Place Pedestrian Waste on top of or beside a Pedestrian Waste Container;
- 9.1.22 Store food destined for human or animal consumption in a location other than an Approved Storage Location;
- 9.1.23 Operate or maintain an outdoor Kitchen Organic Waste Composter;
- 9.1.24 Place or store Animal Attractants out of doors;
- 9.1.25 Place or store Birdfeed out of doors between April 1 and October 31 in each year.

Part 10: Recycling

- 10.1 The Town shall operate recycling depots for the collection and disposable of Recyclable Material as listed in Schedule 'C' hereto. Such depots shall accept Recyclable Material from Residential, Multi-Residential, and Commercial Premises.
- 10.2 Occupants of Residential Dwelling Units, Multi-Residential Dwelling Units and Commercial Premises are liable for service fees as identified in Schedule 'A' from the date of issuance of an Occupancy Certificate for said unit or premises.
- 10.3 Recyclable Materials shall be prepared for recycling as outlined in Schedule 'C'.
- 10.4 The Town reserves the right to add or remove items from the list of acceptable Recyclable Materials as identified in Schedule 'C'.

10.5 Loads of Recyclable Material contaminated with unacceptable materials as defined in Schedule 'C' hereto shall be removed of and disposed of appropriately at the hauler's expense.

Part 11: Duties and Responsibilities

11.1 Director

It shall be the responsibility of the Director to oversee the provisions of this Bylaw. The Director or their designate shall be the final authority on the following:

- 11.1.1 Supervision of the collection, removal and disposal of Waste;
- 11.1.2 The amount and types of Waste which the Town is obligated to remove from any premises;
- 11.1.3 The days and times that collections shall be made from different areas of the Town;
- Any private arrangements made for the disposal of Waste;
- 11.1.5 The location of Animal Proof Waste Containers on a site, for access for Collectors;
- 11.1.6 Disposal of Dangerous Goods in the Town;
- 11.1.7 The hiring and designation of Waste Collectors;
- 11.1.8 The location and construction of enclosures for Commercial Waste;
- 11.1.9 Direction over the Peace Officer or Legal Council to enforce the provisions of this Bylaw as required;
- 11.1.10 Direction over approving origin of Waste for transfer at Waste Transfer Station;
- 11.1.11 Direction over users of the Waste Transfer Station.

The Director and any employee authorized by the Director may summarily remove Waste from any building, structure, development or from any lot.

- 11.2 Construction, placement and screening of Animal Proof Waste Containers shall conform to the provisions of the Engineering Design Standards.
- 11.3 Waste Collectors
 - 11.3.1 It shall be the responsibility of the Waste Collectors to:
 - be as careful as is reasonably possible not to damage or misuse Animal Proof Waste Containers;
 - (b) ensure that all Waste placed inside and outside a residential Animal Proof Waste Container is disposed of in an approved Class II or Class III Landfill Site in accordance with applicable provincial legislation.
 - 11.3.2 No Waste Collector shall leave Waste on the ground, which the collector has spilled, from the Animal Proof Waste Container, or the collection vehicle.

11.3.3 No Waste Collector shall pick, sort over, or remove any Waste or discarded material from the collection vehicle or an Animal Proof Waste Container, except as directed by the Director.

Part 12: Convictions and Penalties

- 12.1 Where a Peace Officer has reasonable grounds to believe that a Person or Occupant has contravened any provision of this Bylaw, the Peace Officer may serve upon such Person, a Summons as outlined in this Bylaw.
- 12.2 A Person or Occupant who contravenes any provision of this Bylaw by:
 - 12.2.1 doing something that is prohibited in this Bylaw;
 - 12.2.2 failing to do something that is required in this Bylaw; or
 - 12.2.3 doing something in a manner different from that which is required or permitted in this Bylaw;

is guilty of an offense and liable upon summary conviction to a fine as set out in Schedule 'A' and not more than twenty-five hundred dollars (\$2,500.00); and in default of payment is liable to imprisonment for a time of not less than seven (7) days and not exceeding six (6) months.

- 12.3 Any Person or Occupant served with a Summons pursuant to Section 12.2 of this Bylaw may, where a Specified Penalty is indicated on the Summons, avoid prosecution by remitting payment of the Specified Penalty as noted on the Summons on or before the appearance date noted on the Summons. The Specified Penalty shall be the amount the Town will accept in lieu of prosecution.
- 12.4 Any Person or Occupant who does not pay the Specified Penalty on or before the appearance date noted on the Summons is liable to a fine as set out in Schedule 'A' hereto.
- 12.5 Where a Specified Penalty is not noted in the Summons, the Person served with the Summons is liable to a fine as set out in Schedule 'A' hereto.
- 12.6 Where a contravention of this Bylaw is of a continuing nature, further Summons, with the appropriate Specified Penalties, may be issued provided that no more than one Summons shall be issued for each calendar day that the contravention continues.
- 12.7 Nothing in this Bylaw shall prevent a Peace Officer from issuing a Summons for the mandatory court appearance of any Person who contravenes any provision of this Bylaw.

Part 13: General

- 13.1 A Peace Officer, witnessing a contravention of this Bylaw, may cause the contravention to be remedied.
- 13.2 When expenses are incurred by the Town for any work performed as a result of a direction by the Peace Officer under section 13.1, the Town may serve a statement of the expenses, together with a demand for payment to the Person responsible for the contravention, including all legal costs on a solicitor and their own client basis.

- 13.3 If the Person responsible for the contravention fails to pay the amount set out in the statement within 30 days, the Town may cause the amount to be paid to be levied against the land from which the contravention was remedied, in the same manner as municipal taxes.
- 13.4 Whenever, in this Bylaw, it is directed that an Owner or Occupant of any building or premises shall do any matter or thing, then in default of its being done, either the Owner or Occupant, or both, or if there are several Owners or Occupants, any or all such Owners or Occupants shall be liable to prosecution; and it shall be no defense for any Owner or Occupant so prosecuted to allege that any other Person is responsible for such default.
- 13.5 In the event that any portion of this Bylaw is found to be invalid, then the same shall be severed and the remainder of this Bylaw shall remain in force and effect.
- 13.6 Bylaw 12-97, Waste Control Bylaw, is hereby repealed.
- 13.7 This Bylaw shall come into effect upon the date of third and final reading thereof.
- FIRST READING: May 1, 2001
- SECOND READING: May 15, 2001
- THIRD READING: May 15, 2001

ORIGINAL SIGNED MAYOR

ORIGINAL SIGNED DESIGNATED OFFICER

APPENDIX 5: BYLAWS

5-IV. Amendment to the City of Fernie, BC, Waste Regulation Bylaw to include a wildlife attractant bylaw.

THE CORPORATION OF THE CITY OF FERNIE BYLAW NO. 2059 A bylaw to amend the City of Fernie Waste Regulation Bylaw No 1845

WHEREAS Council has adopted "Waste Regulation Bylaw", Bylaw No. 1845;

AND WHEREAS it is deemed desirous to amend Bylaw No. 1845;

NOW THEREFORE, the Municipal Council of the Corporation of the City of Fernie, in open meeting assembled **ENACTS AS FOLLOWS**:

1. <u>CITATION</u>

This Bylaw may be cited as the "Waste Regulation Bylaw Amendment Bylaw No. 5."

2. <u>DEFINITIONS</u>

Section 2, Definitions, of Bylaw No. 1845 is hereby amended by inserting the following definitions in alphabetical order:

"commercial waste container" means a loading type of commercial bin or receptacle

"wildlife" means a bear, cougar, coyote, deer, elk, moose or wolf

"wildlife attractant" means antifreeze, paint, petroleum products, food products, food waste, decaying matter and other accessible edible products or waste that attracts wildlife

3. **<u>REGULATIONS</u>**

Section 3, Regulations, of Bylaw No. 1845 is hereby amended by adding the following sections:

3.8 No person or persons may accumulate, place, store or collect any wildlife attractants as defined in this bylaw in such a manner as to attract wildlife, thereby creating a risk to the safety of any person in the neighborhood or vicinity or to the safety of any wildlife.

4. WASTE CONTAINERS

Section 4, Waste Containers, of Bylaw No. 1845 is hereby amended by adding the following sections:

- 4.6 No person shall place any wildlife attractant on any city highway in a residential area before 5:00 a.m. on the day designated by the City of Fernie as the garbage collection day for the said highway.
- 4.7 <u>Commercial Waste Containers</u>:

Commercial waste containers containing any wildlife attractants must be kept closed at all times and closed and secured at the end of the business day in such a manner so as to prevent access to the wildlife attractants by wildlife.

5. **GENERAL**

- 5.1 If any section, subsection or clause of this Bylaw is for any reason held to be invalid by the decision of a court of competent jurisdiction, such decision will not affect the validity of the remaining portions of this Bylaw.
- 5.2 This Bylaw shall come into full force and effect upon adoption except that businesses or individuals responsible for commercial waste containers have until March 31, 2008 to replace or modify them so that they may be closed and secured at the end of each business day in such a manner so as to prevent access by wildlife to any wildlife attractants contained therein.

Read a first time the _____day of _____, 2007.

Read a second and third time the _____day of _____, 2007.

Finally passed and adopted on the _____day of _____, 2007.

MAYOR

DIRECTOR OF CORPORATE ADMINISTRATION SERVICES

I certify the foregoing to be the original Bylaw No. 2059.

APPENDIX 6: Bear Smart Resolution passed by the City of Prince George

Taken from the Minutes of the Regular Meeting of Council held June 29, 2009 Only those pages (#1 and #10) of relevance have been included. Refer to C13.

REGULAR COUNCIL MEETING

Minutes of the Regular Meeting of Council of the City of Prince George, held in the Council Chambers of City Hall, 1100 Patricia Boulevard, Prince George, BC, on Monday, June 29, 2009, at 7:00 p.m.

PRESENT:

His Worship Mayor Dan Rogers – Chairperson < 7:00 – 8:20 pm / 8:22 – 10:08 pm >

His Worship Acting Mayor Don Bassermann – Chairperson $^{\rm < 8:20-8:22\ pm>}$

Councillor Bassermann < 7:00 - 8:20 pm / 8:22 - 10:08 pm > Councillor Frizzell Councillor Green Councillor Krause Councillor Munoz Councillor Skakun < 7:00 - 8:29 pm / 8:30 - 10:08 pm > Councillor Stolz Councillor Wilbur

IN ATTENDANCE:

Ms. Soltis, Acting City Manager; Mr. Radloff, General Manager of Development and Operations; Whitwham, Director of Administrative Services; Milburn, Manager of Long Range Planning; and Babicz, Corporate Officer; and Ms. Van Mook, Acting Director of Community Services; and Dery, Legislative Support Clerk.

A. <u>ADOPTION OF AGENDA</u>

Moved by Councillor Skakun, seconded by Councillor Wilbur, that the Agenda for the Regular Council Meeting of June 29, 2009, BE ADOPTED.

Carried Unanimously

B. <u>DELEGATIONS</u>

B1. Railway and Forestry Museum, regarding Update on Museum Activities

Kirk Gable, Chair, Central British Columbia Museum Board; Ranjit Gill, General Manager; and James Tirrul-Jones, Curator, Railway and Forestry Museum were in

Regular Council Minutes - June 29, 2009

Moved by Councillor Bassermann, seconded by Councillor Krause, that the proposed service enhancements to the Prince George Transit conventional system to take effect September 1, 2009, BE APPROVED.

Carried Unanimously

C12. Report dated June 12, 2009, from Dan Milburn, Manger of Long Range Planning, regarding Prince George Cycle Network

> The Superintendent of Operations came to Centre Table and responded to questions from Council.

Moved by Councillor Munoz, seconded by Councillor Green, that the report regarding Prince George Cycle Network, BE RECEIVED.

Carried Unanimously

C13. Report dated June 3, 2009, from Bill Gaal, Superintendent of Operations, regarding Achieving Bear Smart Status for the City of Prince George

> Moved by Councillor Bassermann, seconded by Councillor Frizzell, that the report regarding Achieving Bear Smart Status for the City of Prince George, the Bear Hazard Assessment Report Executive Summary and the Human Conflict Prevention Management Plan – Draft Package, BE RECEIVED.

> > Carried Unanimously

The Superintendent of Operations came to Centre Table and responded to questions from Council.

Moved by Councillor Bassermann, seconded by Councillor Krause, that Administration BE DIRECTED to prepare a proposed plan and budget to achieve British Columbia Bear Smart status for Council consideration.

Carried Unanimously

C14. Report dated May 29, 2009, from Pam Hext, Supervisor of Current Planning, regarding Bylaw No. 8215, 2009 to amend City of Prince George Sign Bylaw No. 7202, 2001

> Moved by Councillor Bassermann, seconded by Councillor Krause, that Bylaw No. 8215 to amend City of Prince George Sign Bylaw No.

Bear Occurrence Reports and Mortalities for Prince George, BC, 2011-2017



Submitted to: THE CITY OF PRINCE GEORGE Laurie-Ann Kosec, Strategic Parks Planner Parks & Solid Waste Services 3990 18th Ave. Prince George, BC



Submitted by: Lana M. Ciarniello, Ph.D., RPBio Aklak Wildlife Consulting

3021 Jody Lynne Way Campbell River, BC, V9H 1N3 Email: <u>aklak@telus.net</u>



"When we put our houses and cabins next to good bear habitat, the onus falls on us to learn how to live with bears."

Chuck Schwartz, Retired Chief Researcher with the federal Yellowstone Interagency Grizzly Bear Study team.



<u>Photos</u>: Bears and bear damage in Prince George, BC. Copyright[©] Dave Bakker, President, Northern Bear Awareness Society.

Disclaimer

This document was prepared exclusively for The City of Prince George by Aklak Wildlife Consulting and uses 2011 to 2017 BC Conservation Officer Service Problem Wildlife Occurrence Report data and expert knowledge to assess the types and spatial distribution of human-bear reports within the city of Prince George, BC, Canada. It is intended as an update of the Bear Occurrence Report results in the 2008 Hazard Assessment and 2009 Management Plan, which were prepared in accordance with the Provincial Bear Smart guidelines. Any other use or reliance on this report by any third party is at that party's sole risk. *Bears are wild animals that can occur anywhere in Prince George at any time and the author assumes no liability with respect to use and application of the information contained herein.*

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Research bear, "Nechako" and her 4 cubs of the year in a residential yard in Hart Highlands. Photo curtsey the Northern Bear Awareness Society, D. Bakker.



A black bear eating birdseed in a carport in Prince George. Photo: Frank Ogiamien, 2010.

1.0 Introduction

This report provides an update of the BC Conservation Officer Service (COS) Problem Wildlife Occurrence Report (PWOR) data for Prince George, B.C., 2011 to 2017. The information contained with the PWORs may be used to assess the type and spatial distribution of humanbear occurrence reports within the city. The bear occurrence reports in the PWOR database are not necessarily 'problematic' in nature and indeed the majority may simply be the public reporting a bear sighting. The goal of this report is to update the results in the 2008 Hazard Assessment, specifically Figures 2-6 and Tables 3-5 and 7-8; comparison with past results is used to determine whether there has been an improvement or not in human-bear conflicts since the Bear Hazard Assessment (Ciarniello 2008) and Management Plan (Ciarniello 2009) were completed.

The results of the 2008 Hazard Assessment were used to formulate the Management Plan for Prince George. Those documents were prepared in accordance with the Provincial Bear Smart guidelines (Davis et al. 2002). There are six steps required for a city to achieve Provincial Bear Smart Status (Table 1).

Steps	Description of Activity	Completed for Prince George
1	Prepare a Bear Hazard Assessment using criteria outlined in Davis et al. (2002).	V
2	Prepare a Human-Bear Conflict Management Plan designed to address the bear hazards and land-use conflicts identified in the hazard assessment.	V
3	¹ Revise planning and decision-making documents to be consistent with the human-bear conflict management plan.	
4	² Implement a continuing education program directed at all sectors of the community.	V
5	¹ Develop and maintain a bear-proof municipal solid waste management system.	
6	¹ Implement "Bear Smart" bylaws prohibiting the provision of food to bears as a result of intent, neglect, or irresponsible management of attractants.	J
¹ Fulfillme	nt of these activities requires partnership between the City of Prince George, the Region	al District of

Fraser Fort George, the Conservation Officer Service, and the Northern Bear Awareness Society.

²Since 1998, this activity has been almost solely carried out by the by the Northern Bear Awareness Society.

The goal is to examine the PWORs to determine the root-cause of human-bear occurrence reports in order to apply proactive management techniques to dissuade bears from using the city and reduce the probability of human-bear conflicts (HBC).

2.0 Methods

Problem Wildlife Occurrence Reports are reports of bears by the public to the COS or RCMP. The report does not necessarily need to be 'problematic' in nature and may simply be a bear sighting. The database also contains bears destroyed by the RCMP, COS, or the public (if reported). PWOR for Prince George, BC, 2011-2017, were obtained from the BC Ministry of Environment, Conservation Officer Service.

The database contained 8,824 entries. Each entry was reviewed and the "Nature of Complaint" and "Occurrence Notes" was read in detail. Based on those categories a preliminary list of 19 attractants types was developed (Table 1). In order to make the 2008 Hazard Assessment results comparable the same 5 primary attractant categories were used:

- 1. *Domestic attractants* which included apiary, BBQ, bird feeders, carcass, cookhouse, crops, freezers, hunter kills, and livestock;
- 2. Fruit Trees including gardens;
- 3. Garbage;
- 4. *Sightings* including bears feeding on vegetation, bears along the road, bear-dog interactions; and,
- 5. Not Recorded.

Table 2. List of bear report categories developed using the COS PWOR information. The categories were then combined to match the 2008 Hazard Assessment for Prince George.

	Bear Activity Reported	Combined Bear Activity Category
1	Ants	Foods Natural
2	BBQ	Domestic Attractant
3	Bird Feeder/Food	Domestic Attractant
4	Break in attempt	Garbage/Food
5	Break in	Garbage/Food
6	Compost	Domestic Attractant
7	Dogs	Sighting
8	Freezer/Fridge outdoors	Domestic Attractant
9	Fruit Trees	Fruit Trees
10	Natural Fruits	Foods Natural
11	Garbage/Food	Garbage/Food
12	Gardens	Domestic Attractant
13	Injured & Dead Bears	Injured Bears
14	Livestock	Domestic Attractant

15	N/A No Attractant	N/A No Attractant
16	Not Recorded	Not Recorded
17	Pet Food	Domestic Attractant
18	Property Damage	Garbage/Food
19	Sighting	Sighting

The 2011-2017 PWOR reports contained additional information than the past 2004-2007 reports. The recorder now asks the caller specifically about the nature of bear attractants, such as the type of fruit the bear is feeding on. Because of the additional information the data can be more fully explored and two categories were added:

- 1. *Foods Natural* which in the 2008 report was included under "Fruit Trees"; however, I was able to record whether bears were feeding on natural fruits versus domestic varieties; and,
- 2. *N/A No Attractant* which represents residents calling to solicit advice or report that a bear was in the trap, for example.

Each report was evaluated for its contribution to determining the root cause of the conflict type, or the nature of the report type, for Prince George. There were cases where some callers that had bears on their property or in their neighbourhood would call, possibly up to 10 times during one day. Each call was evaluated for its contribution and if it was believed to be related to the same event it was omitted from the database. This resulted in 5,048 reports remaining. Next, it was determined that reports should only be evaluated for the City of Prince George. Of the 5,048 reports, 602 reports fell outside PG City boundary (with a 500 m buffer), leaving 4,446 reports within the city for 2011-2017.

Each report was assigned a geographic location based on the address/location provided by the caller. If a location was not provided or if it was general location, such as RCMP, it was used in the summary analyses but omitted from spatial maps. Of the 4,446 reports, 617 had no or general locations assigned to them, therefore, their information was used in the tables and charts but not in the spatial representations (i.e., maps). Spatial mapping used 3,882 reports for 2011-2017. Reports were mapped on LandSat images using ArcMapTM (ESRI Inc., ArcGIS version 10.5.1, Environmental Systems Research Institute, Inc., Redlands, California) in order to identify areas with high potential for human-bear conflict or destructions (i.e., clusters/hotspots).

The reader is cautioned that bear occurrence reports represent those areas where bears are reported sighted and are therefore are not necessarily representative of bear use of the city of Prince George and surrounding area. For example, bears are less likely to be sighted in forested or areas with heavy brush than they are walking down a road, and the public may also be less likely to report them using those areas as they expect them to be there. Furthermore, rural

residents may be less likely to report bears unless there is a direct threat to persons or property than urban residents.

An additional reminder when viewing these data is that bears may be sighted multiple times by different people resulting in more than one report of the same animal to the COS. Bear occurrence reports should not be used to estimate the number of bears using Prince George and/or to make inferences about the bear population; that is, an increase in bear sightings does not imply an increase in bear numbers.

3.0 Bear Occurrence Report Results

From 2004-2007, 2,124 reports were recorded for an average of 531 reports per year. From 2011-2017, 4,446 reports were recorded for an average of 635 reports per year. This is an increase of ~100 bear reports per/year.

	No.				
Year	Reports				
2011	539				
2012	641				
2013	745				
2014	787				
2015	531				
2016	673				
2017	530				
Total	4446				

Table 3. Number of bear reports used in analysis for Prince George, BC, by year.

Similar to the 2008 report, the bear calls continue to cluster along the outskirts of town and in specific neighbourhoods, such as the Hart Highlands, College Heights and Charella Gardens (Figure 1, yellow dashed lines). In fact, the cluster for the College Heights area appears to now be joined and is larger than the 2008 report.

In order to match the 2008 Hazard Assessment for Prince George, the data were broken into 4year intervals (i.e., 2011-2014 & 2014-2017; Figures 2 & 3). As the years progress, there are more calls reported for the city centre although the "hotspots/clusters" continue for the chronic 'problem' areas.

Calls in the College Heights area are increasing which is likely in part due to expanding human development without consideration of Bear Smart landscape planning; there continues to be a general lack of Bear Smart planning for all city areas, such as managing the placement of green-spaces, implementing bear-resistant garbage cans and electric fencing for those that want to keep their fruit trees.

Figure 1. Location of Bear Reports for the city of Prince George with a 500m buffer, 2011-2017.

Similar to the 2008 Hazard Assessment the bear reports continue to cluster along the outskirts of town and in specific neighbourhoods, such as the Hart Highlands, College Heights and Charella Gardens (yellow dashed lines).



Figure 2. Location of Bear Reports for the city of Prince George with a 500m buffer by 4-year intervals, 2011-2014.



Four year intervals were used to make the maps comparable to the 2008 Hazard Assessment.

Figure 3. Location of Bear Reports for the city of Prince George with a 500m buffer by 4-year intervals, 2014-2017.

As the years progress, there is an increase in bear reports in the city centre as well as the College Heights area.



Four year intervals were used to make the maps comparable to the 2008 Hazard Assessment.

The reports were classified into 19 primary reasons why the caller was calling to report the bear. The idea is to identify the primary reason the bear was in the area. If a caller thought the bear was "looking for garbage" it was included as a "sighting" because people do not know the motivation of the bear. However, if a bear was actively knocking over garbage cans while they were walking down a street then that was recorded as "garbage/food".

Primary Reason for		Grizzly
Report	Black Bear	Bear
Ants	2	
BBQ	8	
Bird Feeder/Food	132	
Break in	24	
Break in attempt	13	
Compost	18	
Dog	23	
Freezer/Fridge outdoors	11	
*Fruit Trees	217	1
*Garbage/Food	1,736	5
Gardens	14	
*Injured & Dead Bears	125	1
Livestock	33	
N/A No Attractant	35	
Natural Fruits	65	
Not Recorded	6	
Pet Food	4	
Property Damage	22	
*Sighting	1,917	34
Total	4405	41
Total Reports	444	6

Table 4. Detailed reporting categories used for bear reports for the city of Prince George, 2011-2017.

*Also recorded for grizzly bears

This table was Table 3 in the 2008 Prince George Hazard Assessment (Ciarniello 2008).

Sightings of bears continue to be the primary reason why bears are reported in Prince George followed very closely by garbage (Table 5). Indeed, assigning "sighting" to a number of reports where bears appear to be 'looking for garbage' is conservative. It appears that the garbage attractant in Prince George has increased substantially.

It is likely that the majority of the grizzly bear calls were actually brown phase black bears are often reported as grizzly bears. Most grizzly bear reports were related to encounters with livestock and occurred outside the city limits; therefore, they were omitted from analysis.

Table 5. Number and nature of bear reports by the public to the COS using broad categories of the primary reason for the call for Prince George, 2011-2017.

	Black Bear	Grizzly Bear	Total	%
Domestic Attractant	29	1	30	6
Foods Natural	10		10	2
Fruit Trees	17		17	3
Garbage/Food	225		225	42
Injured Bears	17		17	3
N/A No Attractant	7		7	1
Not Recorded	3		3	1
Sighting	228	2	230	43
2011 Total	536	3	539	100
Domestic Attractant	33		33	5
Foods Natural	8		8	1
Fruit Trees	20		20	3
Garbage/Food	279	1	280	44
Injured Bears	12	1	13	2
N/A No Attractant	1		1	0
Not Recorded			0	0
Sighting	279	7	286	45
2012 Total	632	9	641	100
Domestic Attractant	29		29	4
Foods Natural	5		5	1
Fruit Trees	34	1	35	5
Garbage/Food	322	2	324	43
Injured Bears	29		29	4
N/A No Attractant	9		9	1
Not Recorded	0		0	0
Sighting	309	5	314	42
2013 Total	737	8	745	100
Domestic Attractant	52		52	7
Foods Natural	14		14	2
Fruit Trees	67		67	9
Garbage/Food	275		275	35
Injured Bears	21		21	3
N/A No Attractant	4		4	1
Not Recorded	0		0	0
Sighting	345	9	354	45
2014 Total	778	9	787	100
Domestic Attractant	24		24	5
Foods Natural	3		3	1
Fruit Trees	31		31	6

Garbage/Food	218		218	41	
Injured Bears	10		10	2	
N/A No Attractant	2		2	0	
Not Recorded	3		3	1	
 Sighting	235	5	240	45	_
 2015 Total	526	5	531	100	_
Domestic Attractant	39		39	6	
Foods Natural	23		23	3	
Fruit Trees	25		25	4	
Garbage/Food	258	1	259	38	
Injured Bears	19		19	3	
N/A No Attractant	3		3	0	
Not Recorded	0		0	0	
 Sighting	303	2	305	45	
 2016 Total	670	3	673	100	2014-2017
Domestic Attractant	22		22	4	137
Foods Natural	4		4	1	44
Fruit Trees	23		23	4	146
Garbage/Food	210		210	40	962
Injured Bears	17		17	3	67
N/A No Attractant	9		9	2	18
Not Recorded	0		0	0	3
 Sighting	241	4	245	46	1144
2017 Total	526	4	530	100	2521

*Table 4 on page 15 of the 2008 Prince George Hazard Assessment (Ciarniello 2008).

Figure 4. Percent of the nature of occurrence reports for each of the main reporting categories for the city of Prince George, BC, 2011-2017.



*Figure 3 on page 16 of the 2008 Prince George Hazard Assessment (Ciarniello 2008).

Once "Sightings" are removed (since they are not an 'attractant type') garbage becomes the overwhelming primary reason bears are reported in Prince George. Garbage is followed by "Fruit Trees" and it is not realistic to think a bear can discern a natural fruit from a domestic fruit so in reality and in relation to attractant types these categories should be combined resulting in 12% of reports.

The calls for bears accessing "Domestic Attractants" is somewhat similar to previous reports; however, it was apparent that raising chickens and rabbits has increased in the city over time and is cause for a number of reports (Figure 5).



Figure 5. Percent of occurrence reports for the primary non-natural attractant categories (i.e., excluding bear sightings) for the city of Prince George, BC, 2011-2017.

*Figure 4 on page 16 of the 2008 Prince George Hazard Assessment (Ciarniello 2008).

Bear reports by year, season and type appear to be similar between the 2008 report and today despite a hazard assessment and management plan (Table 6). There is a slight increase in spring sightings and a "winter" sightings needed to be added. Two of these reports were dogs that entered bear dens and aroused them from hibernation. The rest are likely due to climate change and bears waking up earlier due to warmer spring temperatures. These types of reports can be expected to increase as the climate continues to warm. If it continues that little to no proactive management is being done to manage for the anthropogenic attractants that are attracting bears into Prince George then it can be assumed that as global warming increasing the amount of time bears spend not hibernating there will be an increase in human-bear conflicts.

		Domestic	Foods	Fruit -	Garbage	Injured or	N/A No	Not	e:		% of
Season	Year	Attractant	Natural	Trees	/Food	Orphaned	Attractant	Recorded	Sighting	Total	Total
Greenup	2011	11		1	82	6	3	2	51	156	
	2012	15	2	2	65	6	1		85	176	
	2013	7		1	84	17	2		80	191	
	2014	18	1		61	5	1		85	171	
	2015	14		1	68	3	1	1	79	167	
	2016	16	1		47	5	1		69	139	
	2017	8	1		52	8	2		67	138	
	п	89	5	5	459	50	11	3	516	1138	
	%	8	0.4	0.4	40	4	1	0.3	45	100	26%
Summer	2011	8	8	5	18	7	1		47	94	
	2012	4		8	76	5			81	174	
	2013	10	4	26	129	9	1		159	338	
	2014	27	9	41	144	9	1		171	402	
	2015	3	2	8	48	2		1	67	131	
	2016	16	20	18	140	8	1		169	372	
	2017	5	3	11	52	7	1		99	178	
	п	73	46	117	607	47	5	1	793	1689	
	%	4	3	7	36	3	0.3	0.1	47	100	38%
Fall	2011	11	2	11	125	4	3	1	132	289	
	2012	14	6	10	135	2			118	285	
	2013	11	1	8	111	3	6		75	215	
	2014	7	4	26	70	7	1		98	213	
	2015	7	1	22	102	5	1	1	94	233	
	2016	7	2	7	71	6	1		63	157	

Table 6. Primary reason reported by the caller for the bear occurrence report by year, season and sighting or attractant type for Prince George, BC, 2011-2017.

Bear Occurrence Reports & Destructions for Prince George, BC
	2017	8		12	102	2	6		77	207	
	п	65	16	96	716	29	18	2	657	1599	
	%	4	1	6	45	2	1	0.1	41	100	36%
Winter	2012				4				2	6	
	2013	1								1	
	2014						1			1	
	2016				1				4	5	
	2017	1			4				2	7	
	п	2			9		1		8	20	
	%	10			45		5		40	100	0.4%
Grand Total		229	67	218	1791	126	35	6	1974	4446	
											_
2014-	-2017	137	44	146	962	67	18	3	1144	2521	_
	%	5	2	6	38	3	1	0	45	100	

¹Definition of seasons follows Ciarniello et al. (2003) where spring = den emergence to 14 July, Summer = 15 July to 20 September, and fall = 21 September to den entry. The winter season was added for reports that occurred during January to March.

The two main attractant types were garbage (74%) and fruits (natural & domestic, 12%; Fig 6). They often occurred together but often it was a bear in garbage then in the fruit tree. If a bear was reported in a fruit tree and then that same bear got into the garbage fruit tree was selected as main 'attractant type.' The primary hotspots remain but the city center appears to be receiving more calls than previously, i.e, Ciarniello 2008.

Figure 6. Location of Garbage/Food, Fruit Trees Domestic and Fruit Natural Bear Reports for the city of Prince George, 2014-2017.



Figure 7. Garbage/Food, Fruit Trees Domestic and Fruit Natural for the city of Prince George, by year, 2014-2017. All other reporting categories have been omitted.



Bear Occurrence Reports & Destructions for Prince George, BC

3.1 Bear Mortalities

176 of the 218 (81%) mortalities in the COS database were within the City of Prince George. It appears the number of mortalities is similar or slightly greater than the 2008 report. It has not decreased (Table 7).

Table 7. Number of bears destroyed within the city of Prince George and surrounding areas, 2011-2017. The numbers in brackets indicate numbers of bears destroyed within the City limits only. Mean and SE were based on 4-year intervals to match the 2008 Hazard Assessment.

	Black	Grizzly	Bears	Yrs. Used to	Mean No. Bears	Standard
Year	Bear	Bear	Destroyed	calculate mean	Destroyed	Error
2011	15		15			
2012	23	1	24			
2013	36		36			
2014	52		52	2011-2014	32	8
2015	28		28			
2016	49		49			
2017	35	1	36	2014-2017	41	5.6
Total	238	2	240			

*Table 7 on page 19 of the 2008 Prince George Hazard Assessment (Ciarniello 2008).

Garbage remains the primary attractant category resulting in the death of a bear (Table 8). The number of bears injured saw a drastic increase since 2007 (Ciarniello 2008). Bear-vehicle and bear-train collisions were reported. Table 8 includes the larger surrounding area which is largely comprised of acreages. In those outlying areas bear conflicts are higher for livestock attractants, such as grain, bee hives, chickens, sheep, and even donkey and llama. There are more grizzly bear reports for outlying areas.

Table 8. Attractant category resulting in the death of a bear for the city of Prince George and surrounding area, 2011-2017.

	-	2011	2012	2013	2014	2015	2016	2017	Total
Domestic Attractant		3	2 (1)	1	6	1	5	1	19
Foods Natural			3				1		4
Fruit Trees				2	1	1	4		8
Garbage/Food		5	4	11	10	9	14	12	65
Injured Bears		1	3	5	8	5	6	4	32
N/A No Attractant			1	6	1		3	7	18
Not Recorded		2				2			4
Sighting		4	8	9	20	8	12	7 (1)	68
	Total	15	21	34	46	26	45	31	218

*Numbers in brackets indicate grizzly bears

The primary attractant category resulting in the death of a bear for the city of Prince George is garbage followed by injured bears (Table 9). Bear-vehicle collisions appear to be coming more common.

		2011	2012	2013	2014	2015	2016	2017	Total
Domestic Attractant		1		1	4	1	2		9
Foods Natural			3				1		4
Fruit Trees				2	1	1	3		7
Garbage/Food		5	4	10	9	8	13	8	57
Injured Bears		1	2	4	9	3	6	2	27
N/A No Attractant				6	1		3	7	17
Not Recorded		1				2			3
Sighting		3	6	6	16	5	9	6 (1)	51
	Total	11	15	29	40	20	37	24	176

Table 9. Attractant category resulting in the death of a bear for the city of Prince only, 2011-2017. Bears deaths outside the city have been omitted from analysis.

*Table 8 on page 21 of the 2008 Prince George Hazard Assessment (Ciarniello 2008).

The number of bears destroyed appears to follow a similar pattern to past years (Figure 8). The 2008 report contains destructions that occurred when the McLeod Lake landfill was closing so are not directly comparable until ~2002. It would be of value to study how this level of mortality is sustainable to the larger black bear population.



Figure 8. Number of bears destroyed in Prince George by year, 2011-2017.

*This is a variation of Figure 5on page 20 of the 2008 Prince George Hazard Assessment (Ciarniello 2008) because it is only mortalities within the City boundaries and does not include outlying areas.

Figure 9. Mortality location for bears by primary reporting category for the city of Prince George, 2011-2017.



4.0 Select Comments of Interest from the PWOR

The PWOR reports reveal several important points about the development of behaviours of bears that lead to human-bear conflict and the management of anthropogenic food sources within the city:

1. The misconception remains that because the city provided the automated garbage cans in winter 2004 they are bear-resistant and are meant to be kept outside.

- PWOR report CO advised the caller that he needs to secure the garbage; com said that it was in an approved city garbage container. CO advised the com that these are city garbage cans, not bear proof cans and he must secure the garbage. COM was argumentative towards CO and just wants us to move the bear, CO advised that if we caught the bear it will be destroyed. COM didn't care as the bear is the problem getting into his garbage. Culvert trap to be set as bear is garbage habituated.
- PWOR report Caller reports a bear getting into garbage... Caller does not have any place the garbage can be stored inside, and the city requires they uses specific cans, so he doesn't know what he can do to keep the bear out.

2. There is a lack of Landscape-level planning to deter bears both for new developments and greenspaces.

Housing the backs onto greenspaces report more conflicts with bears and need to be targeted for attractant management. For example, there were six calls from one such household and they had accessible garbage and fruit trees that they were not managing.

Mismanagement of attractants in neighbourhoods surrounding schools was a common problem and bears on school property were responded to by the COS, RCMP or both. All fruit trees close to schools need to be cut down or this problem will continue to happen.

Parks are greenspaces; all parks must have bear-resistant garbage cans and the garbage in parks needs to be emptied frequently.

3. There is a common misconception that once a resident has secured their garbage the bear will immediately leave the area. It was very common to read that 'I secured my garbage a week ago and the bear still comes around"

*The Key is to manage attractants before bear season! *

Bears are extremely quick learners and there is a need for proactive management of attractants. The earlier attractants are secured the faster the bear will move along. PWOR reports:

• ...The bear got into her garbage once a couple months ago. The garbage is now locked up in the shed but the bear routinely returns to investigate.

- ...they said they secured all of their attractants 4 days ago but the bear keeps coming around and that the bear broke their gate on their deck and was up on their deck and pawed at the window.
- ...Bear was around last fall and got into their garbage which they secured. A trap was
 set but the bear was not caught. The bear came back this spring and go into their
 garbage once. They secured the garbage, trap set, but the bear was not caught. Bear
 returned this fall and ripped apart the shed they built for their garbage. They reinforced
 the shed. The bear came back and tried pushing on all three sides of the shed.
-[the bears] got into the garbage, they put it in the shed. They got into their freezer, they moved it into the shed. [The bears] have now been trying to break into the shed, ripping off panels...

An Example in the PWOR of Escalating Human-Bear Conflict Behaviour

Once a bear has accessed a non-natural attractant it becomes difficult to deter and its conflict behaviour can quickly escalate. The following reports highlight the development of unwanted bear behaviours (PWOR reports):

- Black bear has been hanging around the last 3 mornings and the caller is worried about her small children. Bear keeps going to a tree that has some kind of small berries on her property.
- Advises that the bear has still been hanging around and pried the metal doors on her garbage shed open last night. Her garbage had just been emptied, however it got a bucket of dog food out. She also has livestock.
- Advises that the black bear returned late last night and broke the newly installed lock on door to garbage shed. There was no garbage inside shed as she immediately took all garbage to dump yesterday after reporting the black bear on her property. This morning at 0630am, BB came and knocked over a dog kennel that houses COMs ducks. The bear kills a duck.
- Advises that last night the bear opened/ ripped the bunny cage open and both bunnies were missing. The caller found one bunny hiding and it had some injuries. The bear tried to get into the livestock feed cage, and bent through the wood and metal. The neighbour said if they see the bear again they will shoot the bear.

A trap was set for this bear but it was not captured. The residents also reacted immediately to the situation. They purchased electric fencing and made all attractants bear resistant. There were no further reports.

4. There is segment of the population that was trying to secure their garbage cans using bungees and/or ratchets.

It was good to see that a segment of the population was trying to deter bears from accessing their garbage. Bungee cords alone did not appear to work to secure garbage lids and were easily removed by bears, but if that is the only resort then try it. Some people reported to

solidly secure the can with ratchets to a solid object to hold it in one place and they also strapped the lid down. On occasion it was reported that this worked to deter bears from obtaining the garbage; however, it is likely that the bear just moved to an easier source of unsecured garbage.

5. There are chronic annual problems with some of the Trailer Parks, particularly Inverness Trailer Park. The mismanagement of garbage at the Trailer Parks is negatively affecting the surrounding neighbourhoods.

In October 2016, Caledonia Park removed the large dumpsters and went to individual containers that were not bear resistant. It is apparent that problems with bears increased. Sometime in 2017 the park was under new management and went back to large waste containers.

6. Garbage Storage. Bears attempting to or actually breaking into areas where garbage is being stored has increased.

The vast majority of the sheds people are using to store their garbage in are not bear-resistant. Storage boxes made of wood were commonly reported to be used and commonly reported to be broken into by bears. Wood boxes or the small metal sheds sold at hardware stores are not bear-resistant.

The food conditioning and habituation of bears that used the Inverness Trailer Park area had a negative effect on surrounding dwellings and bears appeared to attempt more break-ins in this area to access non-natural attractants.

7. The garbage bylaw was not being enforced. There was a segment of the population that was becoming increasingly frustrated with the City and the COS for what they stated was a lack of support in trying to get their neighbours to manage their attractants.

There are members of the public that want to help manage attractants but they stated that they were not getting the support from the City or the COS.

- PWOR report Caller wants to report people who keep putting out bird feeders and attracting a bear. It's a young bear that's just on its own for the first time. He still runs when dogs bark but he's getting more familiar. He talked to one man who got angry and said he wasn't taking his bird feeders down.
- The caller is calling to complain about the garbage that her neighbour is currently leaving out on an ongoing basis which is attracting black bears. The caller stated she has complained to bylaw in the past and is unsatisfied with the actions being taken or lack thereof.

This caller called on 5 separate occasions to report her neighbours overflowing garbage. The escalating frustration with the lack of support and enforcement appeared to foster negative attitudes towards the City and the COS.

8. Few Dangerous Wildlife Protection Orders (DWPOs) were being issued and traps were set in areas where bears had access to excessive non-natural attractants including garbage.

There also was a general lack of consistency with how or when DWPOs were issued. It is known that education alone is not a panacea to alter human behaviour (Dietsch et al. 2017). Enforcement action must be coupled with education, especially where garbage is identified as the attractant.

9. The Destruction of bears in conflict is not effective at addressing the bear issues in Prince George; at best destructions are a short-term solution to complaints. It is apparent that a "catch-22" situation exists in Prince George where when one bear is destroyed another just moves in to take its place.

If attractants are not managed then a "catch-22" situation occurs where one bear is removed and another just takes its place and management is caught in continually responding to calls and destroying bears.

There is a general lack of structure in the decision on when a bear(s) is destroyed. There are times when a trap will not be set until the attractant is removed and other times when traps are set despite the extreme availability of non-natural attractants to bears. Often there are reports of multiple bears in the area and it appears that for the most part the bear that is destroyed is the bear that gets into the trap and if the attractant is not managed then the problem continues.

• PWOR report -Not sure if they trapped the correct bear as last night another huge large black appeared. The bear got into the garbage.

Destroying bears simply because they are 'in the city' or within a block of a school takes away from the actual root cause of the problems – excessively abundant and easily accessible garbage and fruit trees, and the need to manage the greenspaces properly to deter bears from entering the areas in the first place.

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