Alberta Environment and Sustainable Resource Development

Mountain View County - West of Highway 22 Preliminary Bear Hazard Assessment

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Executive Summary

Alberta Environment and Sustainable Resource Development (AESRD) developed the Alberta BearSmart Program (ABSP) as a province-wide initiative with the goal of reducing human-bear conflicts. The BearSmart Program is a community-driven process that is usually conducted in two phases. In the first phase the sources of conflict between humans and bears are identified in a preliminary bear hazard assessment and in phase two a human-bear management plan is produced and implemented. This document addresses the first phase of the BearSmart Program for Mountain View County (MVC) and includes the following objectives:

- identify sources of human-bear conflict in and around the urban service area,
- provide a general overview of community specific attractants (natural and unnatural) and practices that contribute to human-bear conflict,
- provide recommendations to the community on initial steps to become "bear smart" and
- identify important information and research gaps.

This preliminary bear hazard assessment used interviews and existing ENFOR databases to address the following:

- historic human-bear conflicts based on wildlife occurrence reports;
- identification of natural and non-natural bear attractants;
- identification of bear habitat suitability adjacent to and surrounding the community;
- identification of human-bear issues occurring outside of the region that may impact the effectiveness of Bear Smart;
- identification of future initiatives that may increase human-bear conflict; and,
- current Bear Aware initiatives in Sundre.

Riparian areas within MVC are key black and grizzly bear habitat, primarily because of the variety of natural food attractants. It is possible that bears move along natural riparian travel routes and are then attracted to unnatural food sources within the rural community, increasing the potential for human-bear conflicts. Bears involved in conflicts are usually relocated from the area or removed from the population.

Areas with high potential for human-bear conflict within the Sundre area were identified through mapping AESRD Bear Occurrence reports, 1999-2011. The Enforcement and Occurrence Reporting System (ENFOR) database included 421 bear occurrence records for the MVC collected between 1999 and 2011. Black bears comprised 67% of historic occurrences, grizzly bears 30% and unknown bear species 3%. The majority of the bear occurrence complaints occurred in August (18%), September (27%) and October (15%) coinciding with the ripening of fruit on trees and a number of berry species. Thirteen non-natural attractants were reported through the bear occurrence reports. Garbage accounted for 26% of the occurrence reports, followed by attraction to bird feeders (16.5%), and carcasses (15%). AESRD Fish and Wildlife Officers respond to all human-bear complaints. The predominant management action taken was concluding on the phone (57%) as most of the occurrence reports were sightings. Excluding phone calls, other management actions included patrolling the area (39%), or setting traps but no bears captured (28%). Approximately 14% of the occurrence reports resulted in bears being captured and relocated, and bears were destroyed in 13% of the occurrences. Of the 23 bears that were destroyed, 21 were black bears and 2 were grizzly bears. Garbage was the main non-natural attractant (39%) in the instances where bears were relocated or destroyed.

A questionnaire was developed and residents residing west of Highway 22 were interviewed, with effort concentrated in areas having the highest bear incident reports (based on mapped locations of bear occurrences in the Sundre area for the years 1999-2009). Acreage with a dwelling accounted for 61% (105) of those interviewed, farms and ranches for 38% (64) and there was one commercial operation. Most acreage owners and farms and ranches rated their property and MVC as good or excellent bear habitat. Good to excellent ratings were based on

the presence of natural habitat, cover and shelter, berries, and proximity to water. Other criteria included hay fields, garbage dumps, livestock and beehives. Poor or no habitat ratings were based on lack of food or cover, too many people, or too busy an area.

Bears were observed on 76% of the acreages, farms and ranches. Black bears were reported more often than grizzly bears (70% vs 19%), and the frequency of sightings was primarily infrequent (52%) or occasional (37%). The majority of the incidences were bears passing through (50%). Where human-bear conflicts occurred, most black bear incidences were related to garbage (16%) and bird feed (8%) while most grizzly bear incidences were related to livestock (33%). The majority of those interviewed had more than 1 natural attractant (buffaloberry, dandelion, clover, insects, dead wildlife) at their location. Non-natural attractants included garbage, human food, barbecues, bird feeders, ornamental fruit trees, compost, livestock and pet food. Barbecues, compost and garbage occurred at higher frequencies on acreages while burn barrels, vegetable gardens, and pet foods occurred at higher frequencies on farms and ranches. Horses and cattle were the two primary livestock attractants, and were recorded on 50% of the farms/ranches. Horses were also recorded on 24% of the acreages. A noted agricultural attractant to bears within MVC is the disposal of domestic animal carcasses. The most common practice was to burn, bury or leave the carcasses out in the pastures.

Over 68% of the 169 acreages and farms/ranches interviewed felt that black and grizzly bears have aesthetic, ecological or economic value and should remain part of our natural heritage. Forty-three percent felt that black bear populations should be maintained. Grizzly bears instilled greater feelings of uneasiness and fear (77%) compared to black bears (48%). More respondents felt that grizzly bear populations should be decreased compared to black bears (19% vs 11%) and fewer felt that grizzly bear populations should be maintained or increased compared to black bear populations (35% vs 47%). All bears can be tolerated in national and provincial parks and backcountry areas and bears are least tolerated in rural communities, campgrounds, and urban areas/tourist centres.

Over 50% of the acreage owners and farms and ranches were not willing to participate in a community Bear Smart program, however, they were willing to participate in a bear notification system and to share bear sightings and activity with the community. When asked what management actions they would recommend to minimize human-bear conflicts, almost half of the landowners interviewed (47.9%) recommended education as a management action. Organized or formal education processes being conducted within MVC that facilitate the adoption of a BearSmart community include Bear Awareness Week, regular Bear Awareness articles in the local newspapers, and Bear Awareness presentations in the local schools. Options to minimize human-bear conflicts are suggested.

Human-bear interactions are at an increased risk in areas where human activity is situated adjacent to movement corridors or key habitat patches. The risk of human-bear conflicts would be reduced by locating new residential developments away from bear movement areas.

There are opportunities for the Sundre area and MVC to reduce human-bear conflict through careful consideration of the underlying causes of the conflicts and through the implementation of BearSmart strategies. Recommendations to assist MVC and Sundre in implementing a bear smart program include:

- The development of communication materials that highlight the goals of the Mountain View BearSmart Society and provide the community with specific voluntary actions to assist reducing human-bear conflict.
- The development and distribution of materials targeted at campground users that promote sustainable bear management practices, such as food storage and disposal as well as information on how to respond to bear sightings would assist in reducing human-bear conflicts.
- Develop programs to address fruit tree issue within MVC. Some suggestions include a volunteer pick program with fruit made into products that can be distributed through the food bank and a nursery swap where you can replace your existing attractant plants for others.

- Investigate bylaws used in other communities to address attractant issues including garbage, ornamental plants, bird feeders and livestock.
- Create guidelines for new developments in MVC to facilitate Mountain View BearSmart initiatives. Working with developers during the planning stage can help mitigate bear attractants.

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1.   INTRODUCTION

Bears are a unique part of Alberta's natural heritage. Many communities in Alberta overlap high value natural feeding areas for bears, particularly in valley bottoms. A bear's behaviour and the territory it covers are largely influenced by its continual search for food. Natural bear foods vary widely in distribution, quality and abundance and bears move widely in search of this variable supply. These wide-ranging movements increase their chances of finding non-natural foods. Bears are naturally inquisitive and normally timid, preferring to avoid humans. With repeated exposure to humans at close range and without negative consequence, bears can learn to tolerate people at these distances and become habituated. Providing bears with easy food sources such as garbage or fruit trees may alter bear behaviour, including time and frequency of feeding and deviate the bear from traditional habitat patches and movement areas. Bears that are both habituated and food-conditioned are the most likely to be a problem, and may, on occasion, become aggressive. Conflict often results when bears come into contact with a wide variety of human attractants, especially during seasons of lower natural food availability or during periodic berry crop failures. Conflicts between bears and people include any negative interaction between a person and bear that is aggressive, defensive, or nuisance in nature. Such conflicts can have safety, behavioral, ecological, economic, psychological, and social impacts such as crop or livestock damage, destruction of property, and perceived and real threats to personal safety, including, although rarely, human injury or death. In September 2008, a sow grizzly bear with cubs fatally injured a local hunter approximately 1 km west of highway 22 in a primarily agricultural area of Mountain View County (MVC). The majority of county residents did not expect grizzly bears to be found that far east of the green forestry zone. Prior to that, in November 2007, a hunter from Calgary was killed by a sow grizzly bear with cubs in the forestry green zone west of MVC. As a result of these human-bear conflicts, residents of Sundre and MVC, Alberta Environment and Sustainable Resource Development (AESRD), and the municipality of MVC joined together to form Mountain View BearSmart Society (MVBS), a not for profit society that strives to promote bear and wildlife awareness through education, public information and notification systems and that works in collaboration with residents, tourists, industry and government agencies to achieve it's goals.

AESRD developed the Alberta BearSmart Program (ABSP) as a province-wide initiative with the goal of reducing human-bear conflicts, increasing public safety and reducing the number of bears killed. The BearSmart Program is a community-driven process that is usually conducted in two phases. In the first phase the sources of conflict between humans and bears are identified in a preliminary bear hazard assessment and in phase two a human-bear management plan is produced and implemented (Davis *et al.* 2002). Hazard assessments have been conducted in communities in British Columbia (McCrory and Cross 2002, McCrory 2006, Ciarniello 2008), Alberta (Honeyman 2007, Miistakis Institute 2006, 2007, ASRD 2010, Aspen Wildlife and Environmental Services and KBSIC 2010), and Montana (Wilson 2007). This document addresses the first phase of the BearSmart Program for Mountain View County and includes the following objectives:

- identify high use bear habitat in the county,
- review and map historic human-bear conflicts based on AESRD Bear Occurrence complaint records,
- identify key areas and practices where human-bear conflict is occurring and why,
- identify and map non-natural attractants in the county,
- to better understand the attitudes and knowledge that people in Mountain View County currently have about bears, and
- provide options for reducing human-bear conflict.

Human food conditioning of bears is considered to be the primary cause of conflicts and the primary factor that can be changed to reduce or prevent bear problems (Herrero 2003). The intent of this assessment is to identify existing and potential sources of human-bear conflicts and provide recommendations to minimize these conflicts. The results

and recommendations from this bear hazard assessment will be used by MVBS to establish county specific priorities and to develop and implement a Human-Bear Conflict Management Plan.

2.   ENVIRONMENTAL SETTING

Mountain View County (MVC) is located in Central Alberta with a land area of 3,804 km² and a population of 12,570 (2007 census). It lies between Calgary and Edmonton, straddles the Queen Elizabeth II Highway the province's main north-south transportation corridor, and is bounded by the Bow-Crow Forest on the west. The landscape is extremely varied from mixed stands of aspen, spruce, pine, and poplar in the Lower Foothills and Dry Mixedwood Natural Subregions in the west; rolling to hilly native grasslands, aspen woodlands and haylands in the Foothills Parkland Natural Subregion in the central part of MVC; and the intensively cultivated Central Parkland Natural Subregion to the east (Natural Regions Committee 2006; Figure 1). Elevation varies from 1260 m in the west to 1020 m in the east. There are five towns in MVC with the largest town being Olds followed by Didsbury, Sundre, Carstairs, and Cremona (Figure 2). There are numerous rural neighbourhoods (Figure 3). Today, agriculture is still a vital economy of MVC. In addition, MVC supports thriving oil and gas, forestry and industrial sectors.
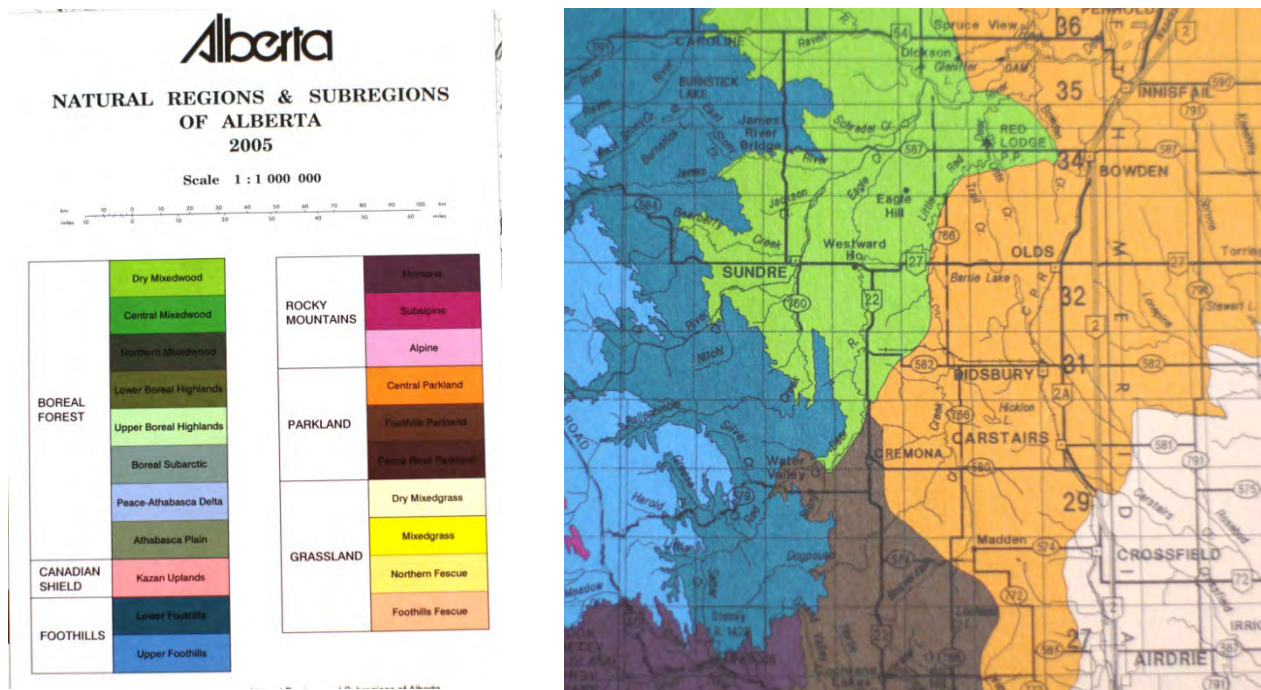
Figure 1. Natural subregions within Mountain View County, central Alberta
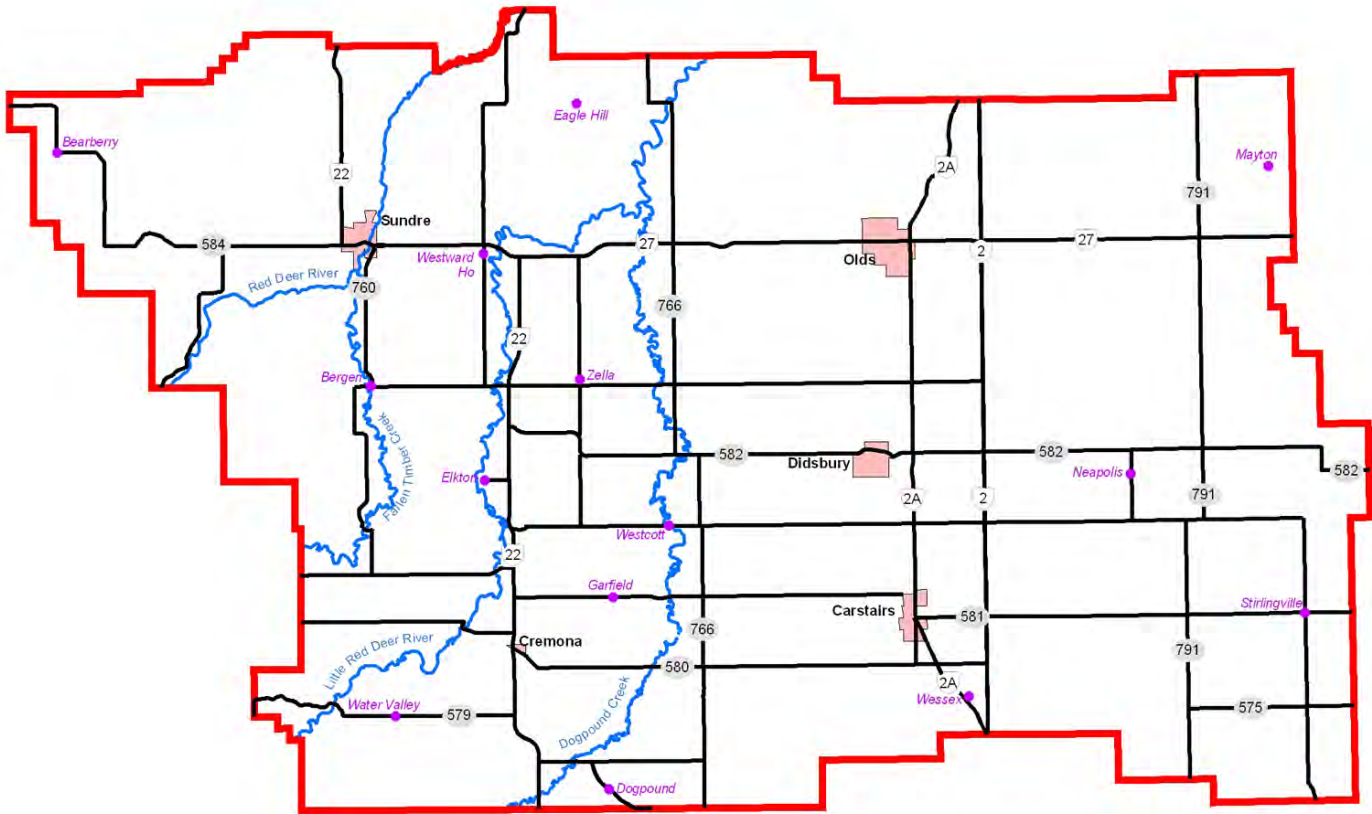
Mountain View County

Figure 2. Road networks and landmarks in Mountain View County, central Alberta
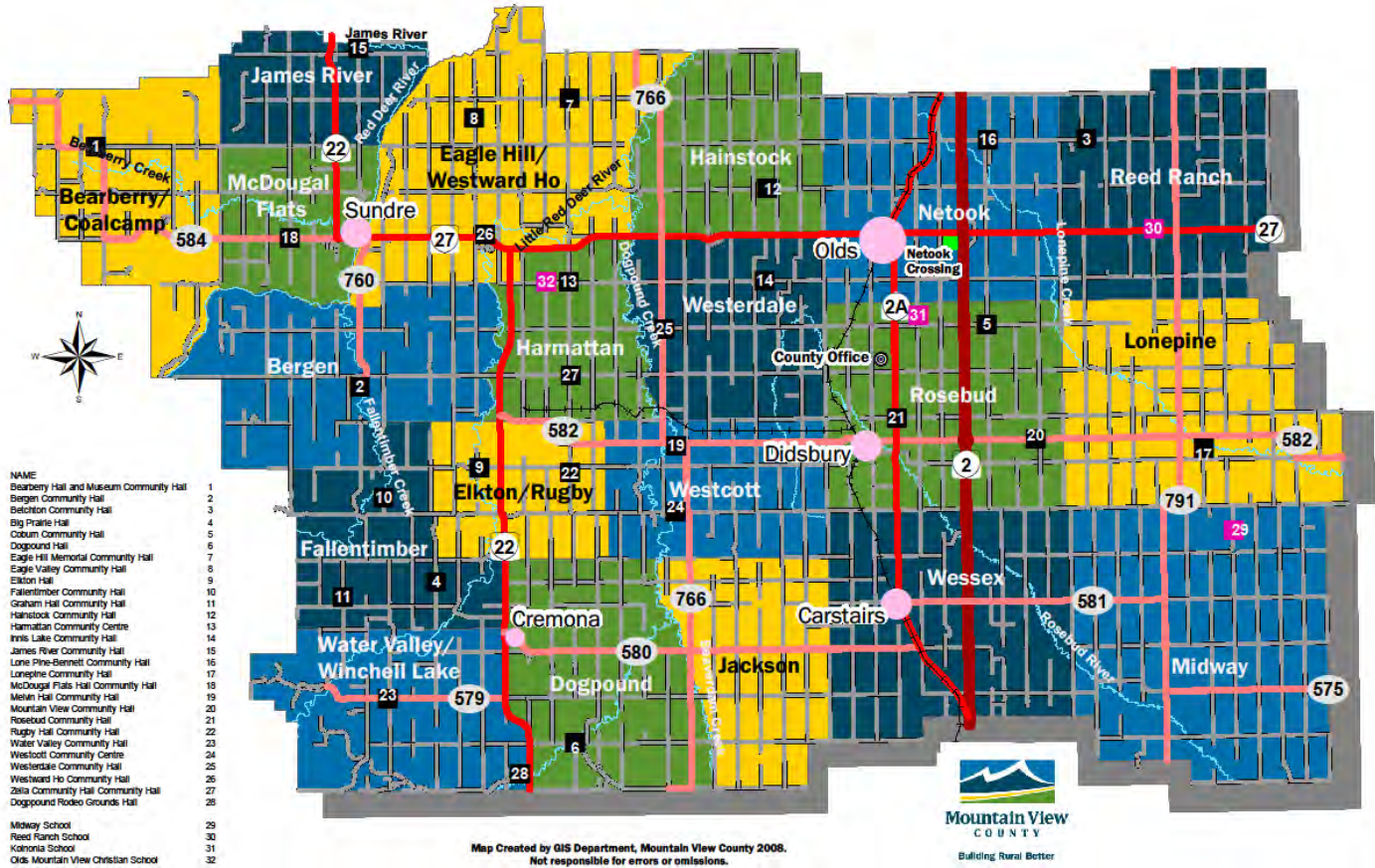
Figure 3. Rural neighbourhoods in Mountain View County, central Alberta

3.　STUDY AREA

For the purposes of this report, the study area consists of that portion of Mountain View County that lies to the west of Highway 22 and includes the Foothills Parkland, the Dry Mixedwood and the Lower Foothills Natural Subregions. Major rivers and creeks within the study area include the Red Deer, Little Red Deer and the James Rivers; and Bearberry, Fallen Timber and Dogpound Creeks. Forestry and energy exploration and development (oil, gas, and coal) have led to a recent and rapid change in land use patterns, landscape characteristics, and human accessibility of the region.

The Foothills Parkland Natural Subregion (Figure 4) consists of rolling to hilly native grasslands on southerly slopes, aspen *(Populus tremuloides)* woodlands on northerly slopes, willow *(Salix sp)* shrublands in low-lying areas and along rivers, and cultivated hay lands on undulating to rolling terrain. The aspen woodlands have understories of saskatoon (*Amelanchier alnifolia*), prickly rose (*Rosa acicularis*), silverberry *(Elaeagnus commutata)*, snowberry (*Symphoricarpos albus*), white meadowsweet *(Spiraea betulifolia)*, wild red raspberry *(Rubus parviflorus)*, wild white geranium *(Geranium richarsonii),* and a diverse array of forbs and grasses. Balsam poplar *(Populus balsamifera)*, plains cottonwood *(Populus deltoides),* and white spruce *(Picea glauca)* also occur along rivers and on moister sites. Willow, sedge *(Carex sp)* and tufted hair grass (*Deschampsia caespitosa)* communities occur in poorly drained depressions and along rivers.

The Dry Mixedwood Natural Subregion (Figure 4) is characterized by undulating plains, aspen-dominated forests, cultivated landscapes, with fens commonly occurring in low-lying areas. Although much of the subregion has been cultivated, it is primarily aspen forest with some white spruce and jack pine *(Pinus banksiana)* and shrubby understories of bearberry *(Arctostaphylos uva-ursi)*, common blueberry *(Vaccinium sp)*, buffaloberry *(Shepherdia canadensis),* red-osier dogwood *(Cornus stolonifera)*, green alder *(Alnus viridus)*, prickly rose, wild lily-of-the-valley, wild sarsaparilla *(Aralia nudicaulis)*, milk-vetch *(Astragalus* sp.*)*, peavine *(Lathyrus* sp.*)*, and a diverse array of other forbs, grasses and herbaceous species including feather mosses and horsetails *(Equisetum* sp.*)* in coniferous stands. Wet, poorly drained sites support a variety of bog and fen communities the composition and structure of these communities depends on water levels and nutrient status.

The Lower Foothills Natural Subregion (Figure 4) has the most diverse forests in Alberta in terms of forest types and tree species. This subregion has rolling, till-covered plateaus forested by closed canopy mixed stands of aspen, balsam poplar, white birch *(Betula occidentalis)*, lodgepole pine *(Pinus contorta)*, white spruce, black spruce, balsam fir *(Abies balsamea)* and tamarack *(Larix laricina)*. Understory plants include bearberry, common juniper *(Juniperus communis)*, green alder, low-bush cranberry *(Vaccinium vitis-idaea)*, prickly rose, buffaloberry, milk-vetch, peavine, sweet-vetch *(Hedysarum sp),* wild sarsaparilla, dewberry *(Rubus sp)*, fireweed *(Epilobium angustifolium)*. Moist sites also support bracted honeysuckle *(Lonicera involucrate)*, cow parsnip *(Heracleum lanatum),* common Labrador tea *(Ledum groenlandicum)*, bog cranberry *(Vaccinium macrocarpon)*, common blueberry, Devil's-club (*Oplopanax horridus),* feather mosses, and ferns. Pure deciduous stands are more common at lower elevations. Shrubby grasslands occur on the driest sites. Fens dominated by black spruce, tamarack, shrubs and herbs occur on low, wet sites along with horsetail, common Labrador tea, willows, bog birch *(Betula pumila)*, and various mosses.

Foothills Parkland Natural Subregion

Dry Mixedwood Natural Subregion

Lower Foothills Natural Subregion

Lower Foothills Natural Subregion

Figure 4. Natural Subregions in Mountain View County, central Alberta

4. BEAR BIOLOGY AND BEHAVIOUR

4.1 GENERAL BIOLOGY

To fully understand what makes a "problem" bear, it is necessary to understand bear biology and natural behaviour. Two species of bears occur in MVC, the grizzly bear (*Ursus arctos*), and the black bear (*Ursus americanus*) which is the smaller of the two species. The Alberta Government has accepted the Endangered Species Conservation Committee (ESCC) recommendation that the grizzly bear be listed as Threatened because of the small size of the breeding population, restricted dispersal from adjacent jurisdictions and the expectation that current and future land use and human activity will lead to declines. Currently there is no hunting season for grizzly bears in Alberta. The black bear breeding population is stable and of sufficient numbers to be considered Secure therefore, there is a hunting season for black bears.

Some general distinguishing traits of bears include a large stocky body covered with thick shaggy hair, long snout, powerful forelegs, short tail, plantigrade walk (bears walk on the heels of their feet), and non-retractile claws. They use their paws and claws adeptly and can climb trees, even as adults. Bears have highly developed senses of smell and hearing. Their eyesight is good, although poorer than that of humans, and they have colour vision. Bears stand on their hind legs often to better detect odours and see over vegetation.

Both bears are omnivorous, having diets that include both plants and animals. Both bears typically forage for their food, and will eat carrion if it is available. They will also hunt for a meal, and may take invertebrates, fish, rodents, and the calves of ungulates like deer, elk and moose.

Both bears have a relatively unspecialized digestive system, which is essentially a carnivore's gut that has been lengthened. They have difficulty digesting the woody parts of plants, but both species can still survive on a very high proportion of plant foods in their diet. They choose food items that are easy to digest and counterbalance low digestibility by large intake. In the spring, bears primarily forage on emergent shoots of grasses (graminoids), dandelions (leaves, flower heads, and roots), clovers, fireweed (green portion tops of small plants), horsetails, cow parsnip, and pea vines. Bears switch to feeding on calorie-rich berries as soon as berries are available, which is primarily during the summer. Bears continue to feed on berries in the fall 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. Both black and grizzly bears become dormant in the winter months as a means of avoiding the harsh climate and short food supply.

Except during the breeding season, and sows with cubs, bears are basically solitary. Male bears do not share in the raising of young. When breeding, both black and grizzly bears have the ability to delay implantation of the embryo, with the result that young are born and nursed by the mother while she is sleeping in her winter den. The embryo will not implant unless the female has enough reserves to successfully sustain herself and accumulate a large fat reserve to survive the winter hibernation (Samson and Huot 1995).

4.2 GRIZZLY BEAR

4.2.1 Description

In profile, the snout rises sharply into broad "dished" face. The ears are rounded, noticeable but not prominent. There is a pronounced shoulder hump. The claws of the front feet are long, sometimes with a white streak, and they make an obvious imprint in the track — five to eight centimetres (two to three inches) ahead of the toes. When standing on the level, a grizzly's body profile slopes backward from the high point at the front shoulders. Colour varies from tawny brown to black. Fur is often "grizzled" in appearance (silver-tipped) but this is not true of all grizzlies, nor does this occur at all times of the year.

The adult male (or boar) body weight average is 180 kilograms (400 pounds), but in better habitats, body weight can be 325 kilograms (716.5 pounds) or more. The adult female (or sow) body weight average is about two-thirds that of the male. Adult forefoot print width is about 14 centimetres (5.5 inches). Adult rear foot print length is about 25 centimetres (9.75 inches).

4.2.2   Distribution

Historically, grizzlies once occupied the prairie and parkland areas of Alberta, but conflicts with people have resulted in them being eliminated from most of these areas. Grizzly bears prefer open or semi-open country, and are found in the foothill, mountain and boreal regions of the province. Their current range includes areas in or near the Rocky Mountains and in some boreal forest areas of north-central and north-western Alberta.

4.2.3   Reproduction

Grizzly bears reach breeding maturity by the age of five to seven years. Female grizzlies, on average, breed only once in three to four years. Mating takes place in June or July, and the embryo does not develop until fall when bears enter dens for their winter dormancy. One or two cubs, or more rarely three, are born during the winter (the most common litter size is two). At birth, cubs weigh only 340 to 680 grams (12 to 24 ounces), but grow rapidly to about 15 kilograms (33 pounds) by the time they leave the den in April. Cubs remain with the sow for 28 to 29 months, through the second winter, but leave her before she mates again. The sow aggressively protects her cubs from all real or possible threats, including adult male grizzly bears, which may attack and kill undefended cubs.

4.2.4   Habitat

Because of a combination of social and other ecological requirements, grizzly bears require large areas of land or "space" on an annual and lifetime basis. Grizzly bears also require a mix of seasonal habitats in their annual home ranges in order to have sufficient access to the full range of primary food sources. Greater topographic complexity can result in improved habitat for grizzly bears (Merrill et al. 1999), and several studies of grizzly bear habitat selection find positive relationships between terrain ruggedness and habitat selection (Nielsen 2005, Northrup 2010). In the spring, dry, steep subalpine grasslands are the favoured habitat for grizzlies in the mountain regions, whereas moist stream banks and channels are preferred by grizzlies in the boreal forest. In the summer, typical grizzly bear habitats may include wet streamsides in mature spruce forest, gully bottoms, groundwater seepage areas, wet meadows and fens, disturbed sites (e.g., roadsides), toes of avalanche slopes, moist east- and north-facing slopes near treeline, and regenerating burns and clearcuts. In winter, the grizzly usually digs its den on a slope where the ground is stabilized by root systems of trees and shrubs and where accumulation of snow adds insulation.

Bears may use roadways for both food and travel (Roever et al. 2008a,b). However, increased road density typically reduces habitat for both grizzly bears and black bears (Rogers and Allen 1987, Mace et al. 1996). Grizzly bears tend to be more sensitive to roads than black bears (Aune 1994). Aune (1994) found that grizzly bears avoided areas within 300m of roads while black bears would select for areas within 100m of roads. For grizzly bears, high road densities can render areas non-habitat (Mace et al. 1996). Grizzly bear sensitivity to roads has been linked to human use (Northrup 2010). Northrup (2010) found that grizzly bears selected areas around roads that were used by <20 vehicles/day, but avoided areas with higher traffic volumes.

4.2.5   Food Habits

The diet of a grizzly bear changes with the seasons and can include berries, grasses, roots, ground squirrels, insects, mice and fish. In early spring, diet is primarily vegetarian, consisting of such food items as overwintered bearberry and roots of *Hedysarum sp*. Grizzlies will readily eat carcasses of winter killed animals, carrion, and

occasionally kill deer, moose, elk or even black bears. By summer, the diet can expand to include horsetails, grasses, sedges, cow parsnip, elk and moose calves, and ants. The autumn diet includes buffaloberry, blueberry, crowberry, low-bush cranberry, saskatoon, and other berries.

4.2.6   Behaviour
In Alberta, grizzly bears are active from spring until late autumn. As a rule, grizzlies enter dens during a major snowfall (late October for females, late November for males). They spend the winter in a mostly dormant state, though they do not do so for the same long duration as black bears, and they will periodically wake and roam close to their winter den. Like northern black bears, grizzlies "hibernate" for the winter, although the period spent in the winter den averages slightly less and they do occasionally wake up and roam near the den during the winter.

4.3   BLACK BEAR

4.3.1   Description
In profile, the snout and face form a straight line - no "dished" face. The ears are pointed and somewhat prominent. They have no shoulder hump. The claws of front feet are short, usually black and make little or no imprint in the track. When standing on the level, a black bear's body profile slopes forward from the high point at the hips. The normal colour is black and it may have a brownish muzzle or a white v-shape across the throat or chest. However, the colour varies brown through cinnamon to blond. The adult male (or boar) body weight average is 100 to 200 kilograms (220 to 440 pounds). The adult female (or sow) body weight average is 45 to 140 kilograms (100 to 310 pounds). Adult forefoot print width is about 9.5 centimetres (3.75 inches). Adult rear foot print length is about 18 centimetres (7 inches).

4.3.2   Distribution
Historically, the black bear was widely distributed throughout most of North America. It evolved as a forest-dwelling species and under natural conditions is shy and secretive, rarely venturing far from the security of forest cover. Currently it occurs in about 74 percent of the province.

4.3.3   Reproduction
Black bears usually reach breeding maturity by the age of three-and-a-half years. Mating takes place in June and July. However, development of the embryo is delayed until the fall. One to four cubs are born in February while the sow is in the winter den. Tiny at birth, weighing about 250 to 350 grams (9 to 12 ounces), black bear cubs grow rapidly, and weigh about two kilograms (five pounds) by the time they emerge from the den in April. Cubs remain with the sow, sharing her den during the second winter. The following spring, the cubs leave to forage on their own. While not as aggressive as sow grizzly bears, a sow black bear will protects her cubs from all real or possible threats.

4.3.4   Habitat
Black bears can be considered forest obligates (Weaver 2000) and utilize forested habitat more than do grizzly bears (Aune 1994). The black bear inhabits most of Alberta's forested land and are also common in open forests throughout the mixed-wood, foothill, and montane life zones. .

4.3.5   Food Habits
The diet of black bears varies with the seasons. Their spring diet may include carcasses of winter killed animals, overwintered bearberry, poplar buds, horsetails, sedges, dandelions, peavines and clovers, and moose and caribou

calves. Their summer diet may include sarsaparilla, peavine, ants and other insects, and fish. Their autumn diet may include berries, particularly red buffaloberries in mountain regions, and blueberries and other berries in the boreal forest. In years of berry failures, black bears may seek out human refuse.

4.3.6   Behaviour

Black bears are active from spring through to autumn. In northern climates such as Alberta, black bears escape severe winter weather and food shortages by hibernating. Black bears in Alberta spend 5 to 6 months in their winter dens in a state of hibernation. In this state, the black bear's body temperature is lowered by 7 to 8°C, and metabolism is reduced 50 to 60 percent. They do not eat, drink, or excrete anything during the entire denning period and lose 10 to 30 percent or more of their body weight.

5.   METHODOLOGY

The components of the bear hazard assessment include:
- identify bear habitat within the county,
- review of AESRD Enforcement and Occurrence Reporting System (ENFOR) Occurrence Reports to identify areas of historic human-bear conflicts, and
- identify non-natural foods and attractants that occur (ranching and agricultural attractants, local orchards, honeybee colonies, ornamental fruit trees, vegetable gardens, bird feeders, apiaries, golf courses, residential and commercial garbage containment, garbage landfills and transfer stations, park and highway litter barrels, etc.) within the county.

5.1   Bear Habitat

Habitat Suitability Index (HSI) models predict the suitability of habitat for a species based on an assessment of attributes such as habitat structure, habitat type and spatial arrangements between habitat features. The intended use is to predict habitat suitability at landscape scales. Assumptions with the models are: (1) late summer and fall is the critical season for black and grizzly bears, and (2) water and minerals are not limited resources.

Suitability of habitat was based on potential natural movement patterns of bears in the area (travel corridors), natural foods, non-natural attractants, and protective cover that conceals bears (Fuller and Keith 1980, Pelchat and Ruff 1986). Bears are opportunistic feeders, and alter their diet according to the availability of food (Nagy and Russell 1978, Nagy *et al.* 1983, Hamer and Herrero 1983, Hamer *et al.* 1985, Holcroft and Herrero 1991). Herbaceous material and fruit are the major food items. Fruit is usually associated with berry producing shrubs, so a shrub cover component is important. Effective habitat is determined by the distance the habitat is from human activity, roads and trails and reflects the area's ability to support bears (Gibeau 1995). Some preferred bear foods are more prevalent along forest edges. Edges can be particularly attractive to bears because the available food is also associated with nearby cover (Roever *et al.* 2008). Food habitat is only useful when it is within a safe distance from cover therefore cover is used to define an HSI component. Roads and trails tend to affect bears only within a relatively short distance due to the noise and the injuries or deaths sustained on roads. The distance to nearest road or trail is used to define the HSI human disturbance component.

GIS layers were constructed using Agriculture Canada's Circa 2000 Land Cover for Agricultural Regions of Canada as the base vegetation classification (http://www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1227635802316&lang=eng). Additional layers (roads, rivers, DEM) were provided by Donna Rystephanuk from AESRD. Data for the building density layer came from Therese Morris at Mountain View County (MVC).

All layers were generated initially at a 30m pixel size and then the FOCALMEAN function in Spatial Analyst was used to generate layers at a quarter section scale (810m x 810m). All layers used in the models had a quarter-section pixel size. A quarter section pixel was chosen for two reasons: (1) to follow Northrup (2010) and (2) because of the management applicability of that scale. A 6 km moving window was used to describe the home-range availability of some habitat features for both black and grizzly bears. This moving window size was chosen because it is within the range of what the literature reports for home range sizes of both species (Gunson 1993, Apps *et al.* 2006, Northrup 2010).

All layers used in models are described in the excel file: MVC_Black & Grizzly bear models_HSI and Conflict. Justification for the layers and values used in the HSI models for both black and grizzly bears is provided in the excel file: MVC_Black & Grizzly bear models_HSI and Conflict.

In general, however, the black bear HSI model is a forest-driven model where areas of more extensive forest cover at both the home-range and quarter section scale are classified as more suitable habitat for black bears. Unlike black bears, grizzly bears are not forest obligates and the grizzly bear model reflects this species increased sensitivity to anthropogenic development. Habitat suitability for grizzly bears is diminished in areas of extensive agriculture or development.

5.1.1   Black Bear Habitat Suitability

Variables in the Black Bear Habitat Model:
- Cover: available forest (within the home range and quarter section); availability of wetland/riparian areas within the quarter section
- Human disturbance: average road density within 1 km
- Food availability: amount of native grassland or shrub cover within 250m of forested habitat in a quarter section; availability of wetland/riparian areas within the quarter section.

5.1.2   Grizzly Bear Habitat Suitability

Variables in Grizzly Bear Habitat Model:
- Human disturbance: proportion of agricultural land at the home-range scale; the amount of developed land within the quarter section; the proportion of the quarter section within 500m of a high-volume road
- Food: availability of forbs, grasses and sedges at the home-range scale; availability of wetland/riparian areas within the quarter section
- Cover: availability of forested areas within the quarter section

5.2   Historical Human-Bear Conflicts

AESRD has produced a map of locations of bear occurrence reports from the Sundre office for the years 1999-2007. In an attempt to identify the root cause(s) of complaints, the description of each occurrence report was reviewed, type of interaction (sighting or human-bear conflict), the attractant type noted (e.g., bird feeders, BBQ, crops, livestock, apiary, carcass, garbage, freezers, hunter kills, etc.), time of year, and species of bear involved. The information was further divided into two primary season: pre-berry (den emergence to July 15), and berry season (July 16 to den entry).

5.2.1   Conflict Risk Model

Data on human-bear conflict in MVC from 1999 – 2011 were provided by AESRD. Because there were only 92 conflict events in MVC over this time period (16 grizzly bear, 73 black bear, 3 unknown), data from both bear species were combined to generate one conflict model. An information-criterion based approach was used to model human bear conflict in MVC. Based on a literature review, 18 *a priori* candidate models were generated to describe human-bear conflict. For each species, the habitat suitability map was overlaid with the conflict risk map in order to identify areas where there was good bear habitat and low risk of conflict (source habitat) and areas where there was high risk of human-bear conflict (sink habitat).

5.2.2   Source-Sink Maps

Nielsen *et al*. (2006) and Northrup (2010) created maps of source habitat and sink habitat for grizzly bears by overlaying habitat models with models of mortality/conflict. One problem with this methodology is that the sink areas that are identified may overestimate the negative impact of certain features (i.e. roads) if those features are used in both models. Therefore, Nielsen et al. (2006) and Northrup's (2010) methodology was modified to avoid this type of error. To identify source areas, Nielsen et al. (2006) methodology was followed and the HSI models for each species was overlaid with the conflict model. All layers were classified on a 5-point scale (for HSI models 1 = very poor habitat, 5 = very good habitat; for conflict 1 = very high conflict, 5 = very low conflict). Areas scoring > 6 were classified as source habitat (ranked from source – moderate to source – high). Areas of high to very high conflict were pulled from the conflict layer and merged with the source layer and classified as sink – poor and sink – very poor.

5.3   Natural and Non-natural Attractants

A questionnaire was developed and residents residing west of Highway 22 were interviewed, with effort concentrated in areas having the highest bear incident reports (based on mapped locations of bear occurrences in the Sundre area for the years 1999-2009). Landowners were interviewed to identify general bear habitat and travel corridors, non-natural foods and attractants (ranching and agricultural attractants, local orchards, honeybee colonies, ornamental fruit trees, vegetable gardens, bird feeders, apiaries, golf courses, residential and commercial garbage containment, garbage landfills and transfer stations, park and highway litter barrels, etc.) that occur within the county, and practices that are considered high risk for human-bear conflict. Landowners were also interviewed to get a better understanding of their attitudes towards bears and their knowledge that people currently have about bears. This knowledge could help researchers and community leaders to make informed decisions about bear and human management issues, which will be especially beneficial in developing a Community Bear Smart Program.

5.4   Risk Assessment and Management Recommendations

The information gathered from the bear occurrence reports and questionnaire was compiled and summarized to provide a risk assessment and management recommendations to the residents, industry, AESRD and MVC to reduce existing and potential conflict within the county.

6.   RESULTS AND DISCUSSION

6.1   Habitat Suitability Analysis

6.1.1   High Use Bear Habitat

Quality bear habitat is generally considered to contain significant mixed forest cover (>80% forest canopy) consisting of a variety of tree and shrub species of varying ages which provides security and shelter and a variety of natural food sources. Lowlands, wet areas, rivers, creeks and lakes are important sources of succulent vegetation. Travel routes tend to follow rivers and creeks. Large tracks of undeveloped land occur in MVC and extensive cover and bush allows bears to travel into the interior of the county (Figure 5). The amount of undeveloped habitat with its extensive network of walking trails, oil and gas access roads, seismic cutlines and logging roads affords bears close proximity to humans.

Figure 5. Bear habitat consisting of large tracts of undeveloped land in close proximity to humans

Figure 6. River/creek systems in Mountain View County provide high use bear habitat

Black bear

Habitat suitability for black bears was primarily driven by the availability of forest cover but higher food availability and lower levels of human disturbance were also features of highly suitable bear habitat. Black bear habitat was best on the western edge of the county and suitability decreased around towns (i.e., Sundre) and on an east-west gradient and was predominantly poor to very-poor east of the Little Red Deer River (Figure 7).
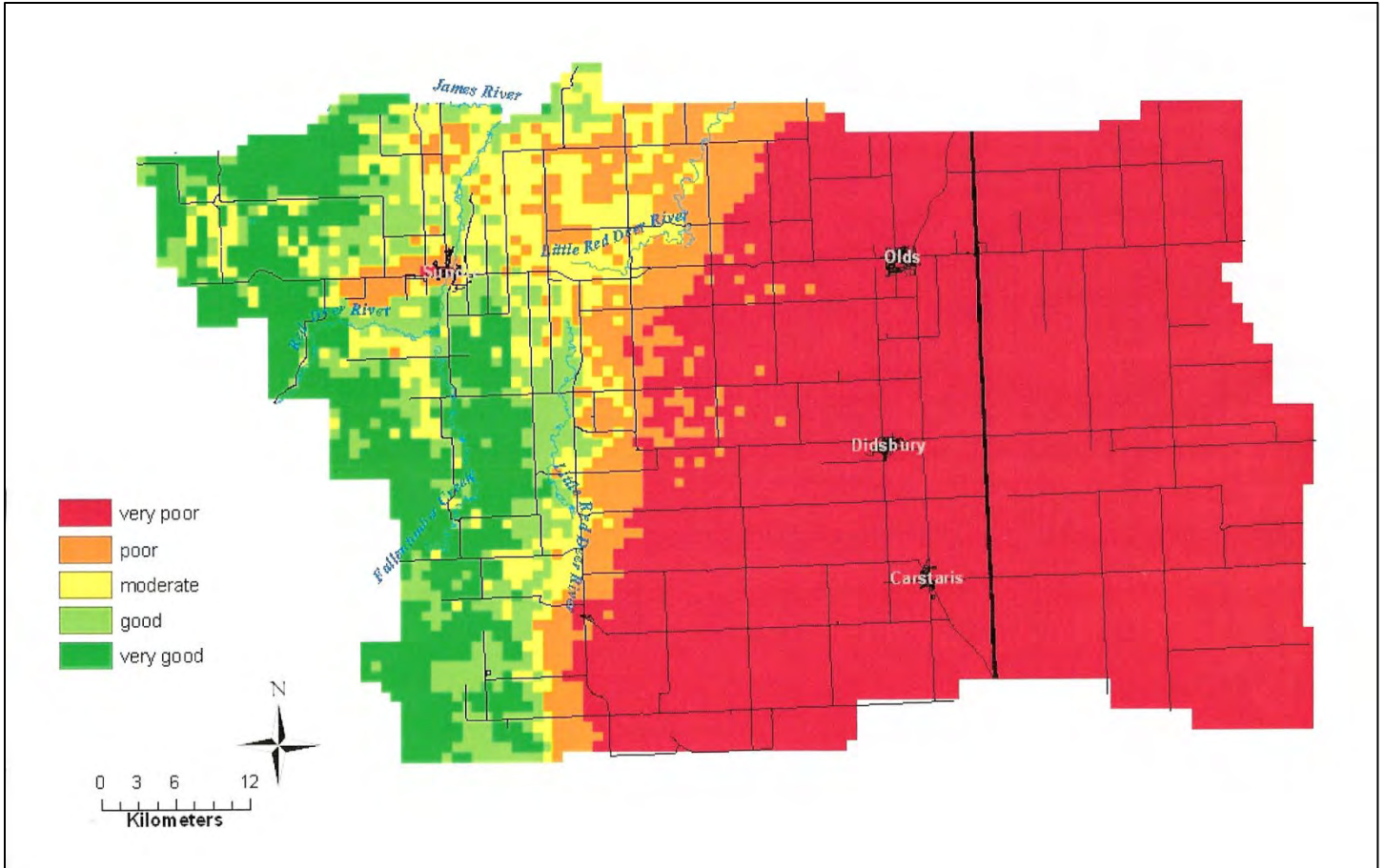
Figure 7. Black bear habitat suitability, Mountain View County, central Alberta

Grizzly bear

Habitat suitability for grizzly bears within MVC was driven primarily by the amount of human disturbance on the landscape. Areas with high human disturbance were identified as poorer habitat for grizzly bears but food availability and cover also contributed to habitat suitability. The area to the west of Highway 22 was identified as the best habitat for grizzly bears in MVC however, there were patches of moderate to good habitat identified throughout the county (Figure 8).
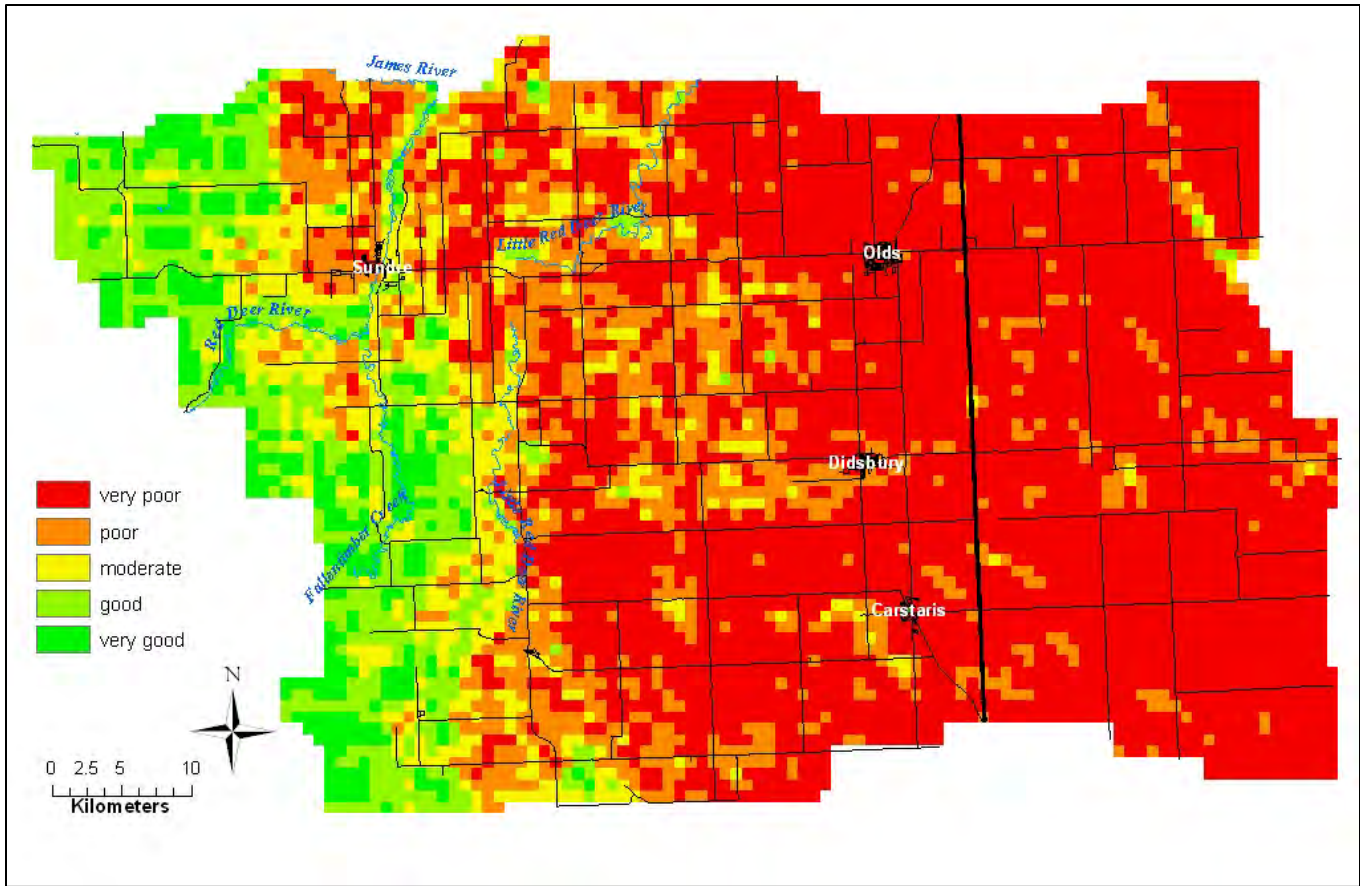
Figure 8. Grizzly bear habitat suitability, Mountain View County, central Alberta

6.1.2   Human-Bear conflict (sink) habitat

For each species, the habitat suitability map was overlaid with the conflict risk map in order to identify areas where there was good bear habitat and low risk of conflict (source habitat) and areas where there was high risk of human-bear conflict (sink habitat). Areas identified as moderate sources tend to be areas of very good habitat with a reasonably high risk of conflict. These areas might be where BearSmart/ASRD might want to focus efforts to preserve habitat and to minimize the opportunity for conflict.

The model that best described human-bear conflict in MVC indicated that conflict was most likely to occur in areas where there was an abundance of cover, food, and human use. The conflict model highlighted several habitat features that occurred in the black bear habitat suitability model. This is likely due to the fact that the vast majority of conflict events involved black bears (~80%).

Conflict was positively associated with:
- Home-range forest cover
- Quarter sections that had both forest cover and buildings present
- Availability of native grassland or shrub cover within 250 m of forested habitat in a quarter section
- Availability of riparian habitat within a quarter section
- Average road density within 1 km
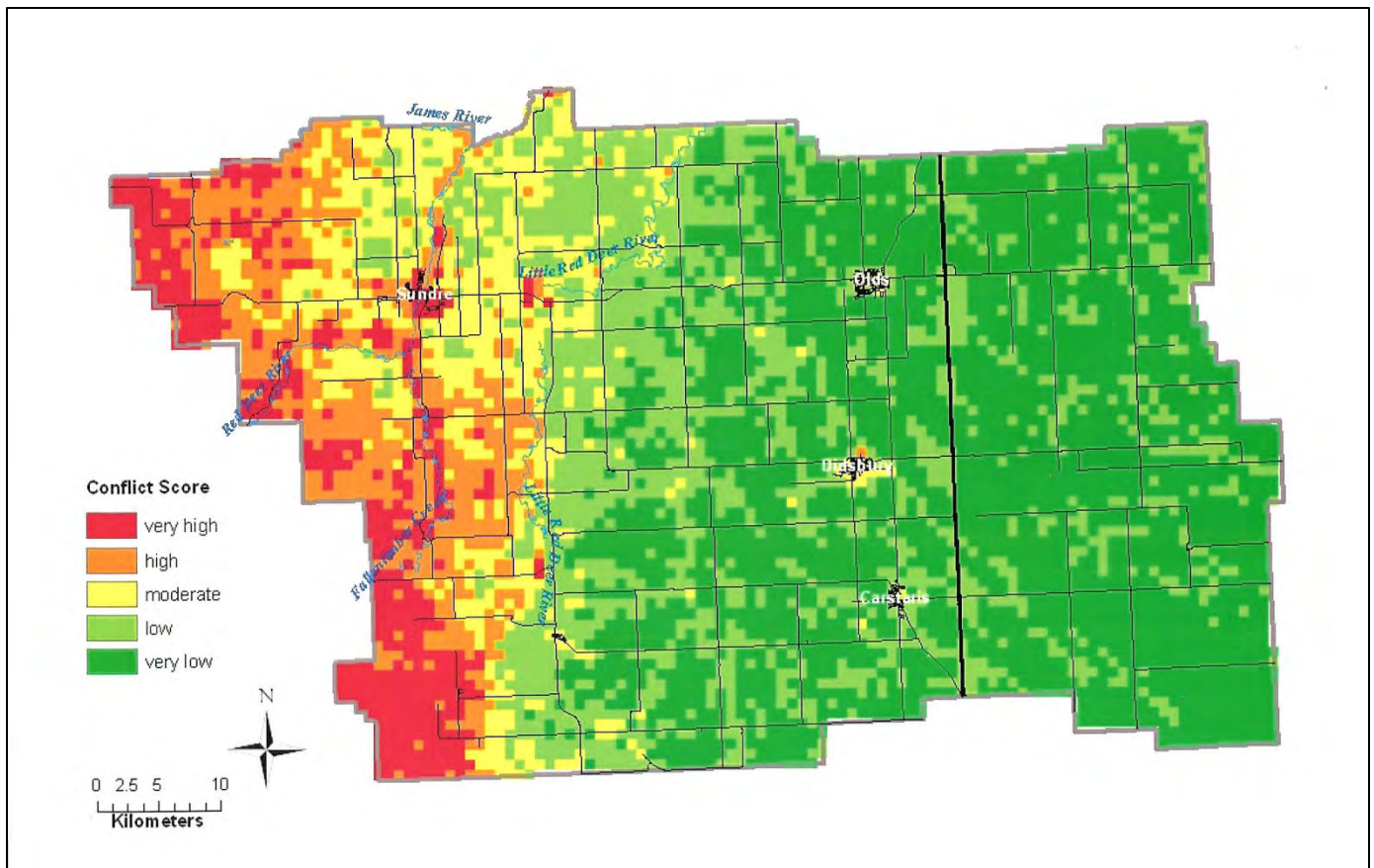
Figure 9. Human-bear conflict risk areas, Mountain View County, central Alberta

6.2   Analysis of Environment and Sustainable Resource Development (SRD) Bear Occurrence Reports

Areas with high potential for human-bear conflict within the Sundre area were identified through mapping Bear Occurrence reports, 1999-2009, obtained from AESRD, Rocky Mountain House, Alberta. These reports indicate complaints received by the public. Bear occurrence reports represent those areas where bears are reported sighted and are therefore not necessarily representative of bear use of MVC's surrounding area. For example, bear numbers are likely higher in adjacent pristine 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.

6.2.1   Location of Bear Occurrences

The ENFOR database included 421 bear occurrence records for the MVC collected between 1999 and 2011 (Figure 10). The exact location was not available for most of the occurrence records, and only a general description was recorded (i.e., quarter section, section, township, range and meridian). Three areas where human-bear conflicts appear to be higher included the terminus of the Pioneer Lodge Road at the Red Deer River, the SE portion of Sundre along Bergen road, and the subdivision west of Water Valley.
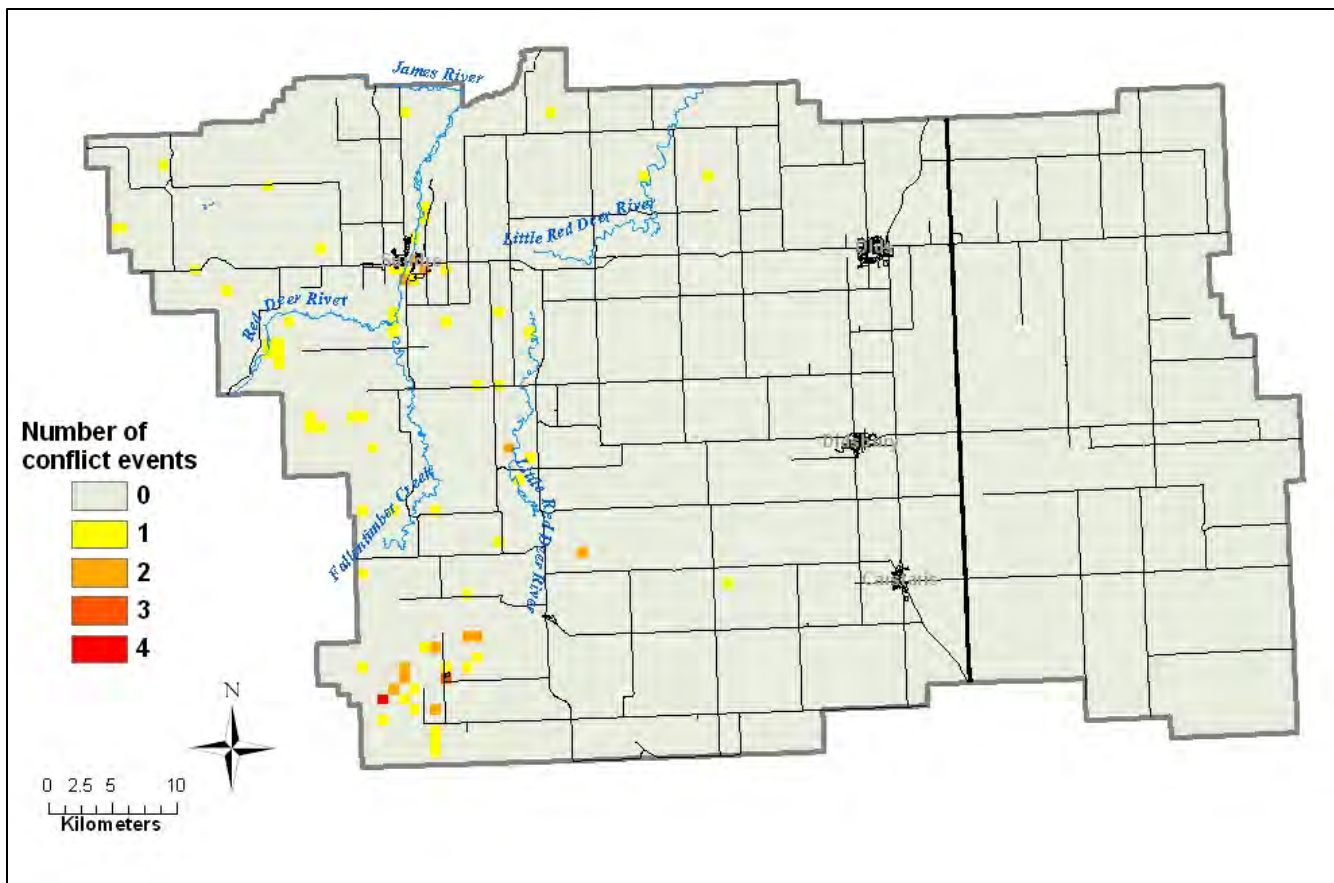
Figure 10. Bear occurrence reports, Mountain View County, central Alberta (1999-2011).

6.2.2   Timing of Occurrences

Black bears comprised 67% of historic occurrences (283 of the 421 records), and grizzly bears 30% (126 of the 421 records). The majority of the bear occurrence complaints occurred in August, September and October coinciding with the ripening of fruit on trees and a number of berry species (Figure 12).
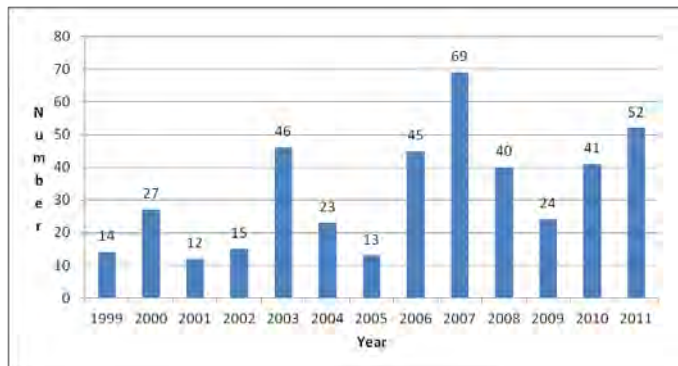
Figure 11. Bear occurrence reports by year.
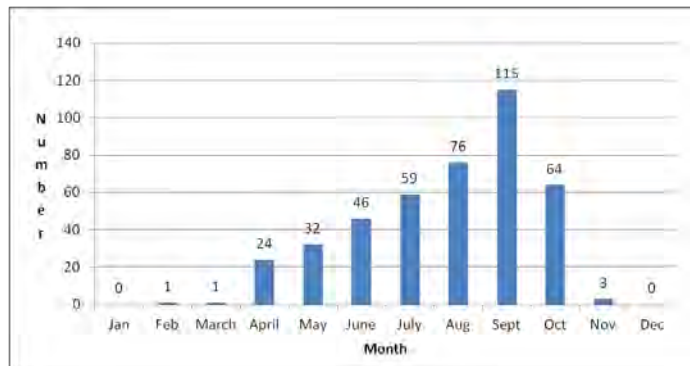
Figure 12. Bear occurrence reports by month.

6.2.3   Attractants

Of the 421 occurrence records assessed in this analysis, the majority were recorded as sightings (32%). The remaining 285 occurrence records were categorized into the following attractants:

Table 1. Attractant categories for bear occurrence reports

Attractant	Occurrences (%)
Garbage	75 (26.3)
Bird Feeders	47 (16.5)
Carcass	43 (15.1)
House	23 (8.1)
Livestock	22 (7.7)
Pet Food	8 (2.8)
Compost	7 (2.5)
Fruit trees	7 (2.5)
Crop	6 (2.1)
Apiaries	7 (2.5)
Natural	5 (1.8)
Human Food	6 (2.1)
Barbecue	3 (1.1)
Unknown	19 (6.7)

The unknown category includes bear sightings where an attractant was not necessarily established. Garbage is a higher source of calories for bears than green vegetation and accounted for 26.3% of the occurrence reports, followed by attraction to bird feeders (16.5%), and carcasses (15.1%). During pre-berry season (post-denning to July 15), bird feeders accounted for almost 29% of the human-bear complaints where attractant was recorded (n=52),

whereas during berry season (July 16 to denning), garbage accounted for almost 37% of the human-bear complaints where attractant was recorded (n=163).

6.2.4   AESRD Responses to Human-Bear Conflicts

AESRD Fish and Wildlife Officers respond to all human-bear complaints. Bears that become used to eating foods associated with humans usually develop into food-conditioned animals and must either be relocated or destroyed. Relocation is often unsuccessful because a bear takes its learned bad habits and applies them in the area where it was relocated or it dies in the territory of another bear. Often, it returns to the original area and resumes its nuisance behaviour. Destruction becomes the only alternative when a bear becomes habituated and food-conditioned. People can reduce this consequence by removing all attractants and by handling food and garbage responsibly. The actions taken by Fish and Wildlife are presented in the following table:

Table 2. Actions taken by ASRD Fish and Wildlife officers for human-bear complaints

Action Taken	Occurrences (%)
Concluded on phone	240 (56.7)
Patrol Area	72 (17.0)
Trap Set Not Captured	52 (12.3)
Animal Killed	23 (5.7)
Animal Relocated	25 (5.9)
Animal Scared	8 (1.9)
Closed Area	2 (0.5)

The predominant management action taken was concluding on the phone (56.7%) as most of the occurrence reports were sightings. Almost 6% of the occurrence reports resulted in bears being captured and relocated, and bears were destroyed in 5.7% of the occurrences. Of the 23 bears that were destroyed, 21 were black bears and 2 were grizzly bears. Garbage was the main non-natural attractant (39%) in the instances were bears were relocated or destroyed (Figure 13).
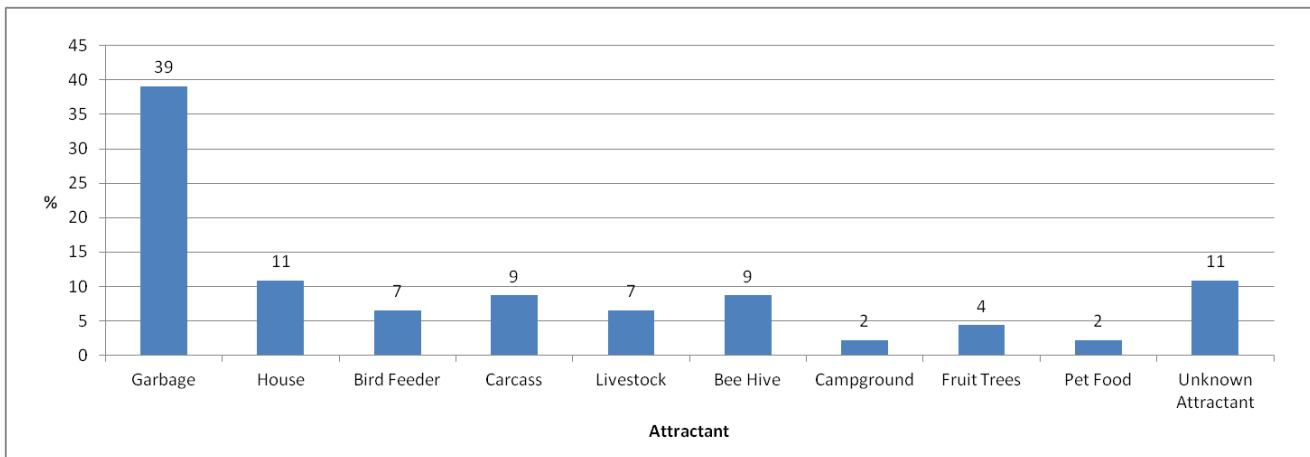
Figure 13. Attractants reported in bear occurrences where a bear was relocated or destroyed

6.3   Interview Results

Residents residing west of Highway 22 were interviewed, with effort concentrated in areas having the highest bear incident reports (based on mapped locations of bear occurrences in the Sundre area for the years 1999-2009). A total of 169 residents were interviewed. The land location was the primary residence for 94.7% (160) of those interviewed, the secondary residence for 4.7% (8), and a commercial operation for 0.6% (1). Acreages with a dwelling accounted for 61% (105) of those interviewed, farms and ranches for 38% (64) and there was one commercial operation. Average years on a farm/ranch was 24.3 years (range 1-84) compared to 14 years (range 1-65) for acreage dwellers.

6.3.1   Natural Attractants

Natural attractants can be found throughout the county and the list is extensive. Therefore, those interviewed were asked to indicate which of the most common natural attractants occurred at their location: buffaloberry, clover, dandelion, general vegetation, dead wildlife, and/or insects. The majority of those interviewed had more than 1 natural attractant at their location. Buffaloberry, dandelion, clover, insects, and dead wildlife occurred more often on ranches than acreages (Figure 14).
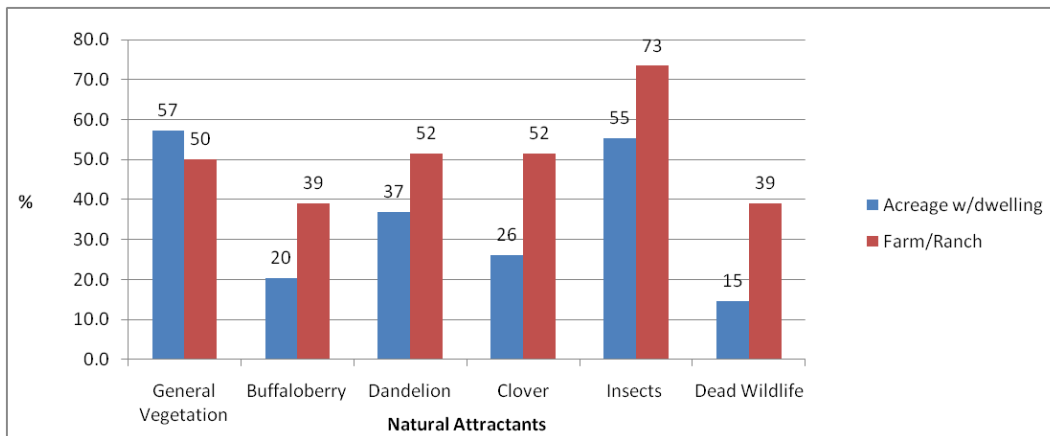
Figure 14. Percent frequency of natural attractants reported on acreages and farms/ranches

6.3.2   Non-natural Attractants

Non-natural attractants include garbage, human food, barbecues, bird feeders, ornamental fruit trees, compost, and pet food. Barbecues, compost and garbage occurred at higher frequencies on acreages while burn barrels, vegetable gardens, and pet foods occurred at higher frequencies on farms and ranches (Figure 15).

Garbage was identified as a non-natural attractant in approximately 42% of acreage owners interviewed and 31% of farms/ranches. When sightings were excluded from the bear occurrence records, garbage was the main non-natural attractant in the ENFOR data (67 of 236 or 28.4%) and garbage was involved in 45% of the instances were bears were destroyed.

Compost made up a small portion of the domestic attractant occurrence reports (see Table 3) and is not considered to be a significant attraction for bears. However, compost bins are believed to contribute to food-conditioned behaviour of bears within MVC.

Public crown land to the west of MVC provides designated and random camping areas. Bears frequenting these camping areas can become food-conditioned if exposed to improperly disposed food. Bears accustomed to humans and their food will pose an increased hazard should they venture into MVC because bears conditioned to human foods may eventually become aggressive in their efforts to obtain human foods and damage property or injure people in the process.
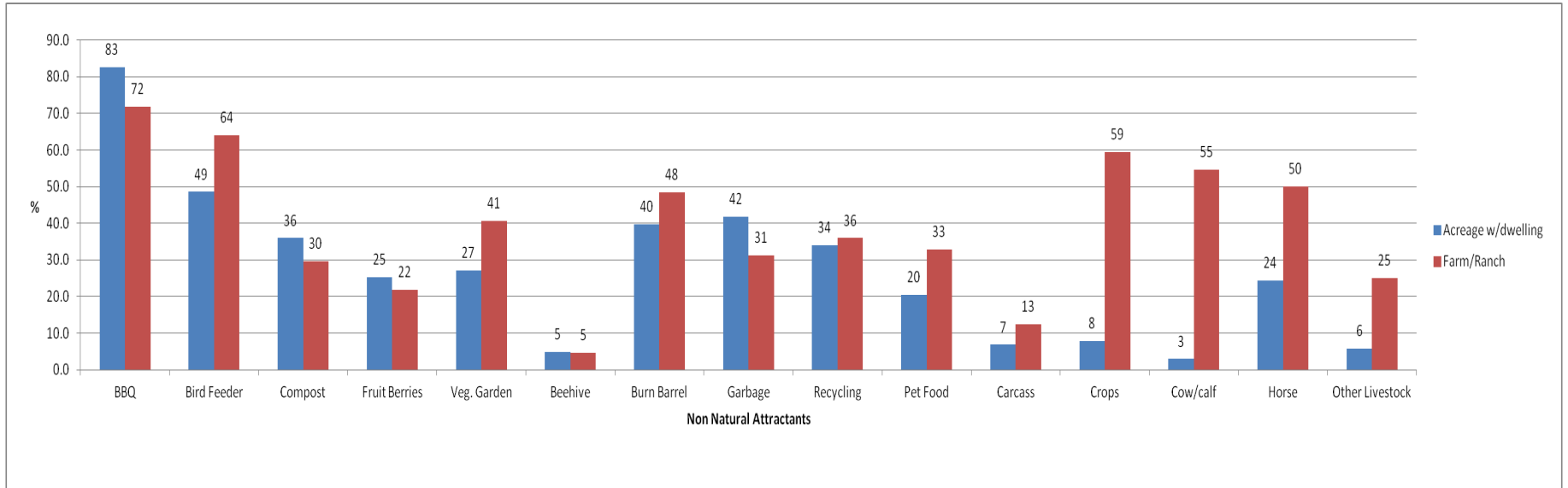
Figure 15. Non-natural attractants recorded on acreages and farms/ranches, Mountain View County, central Alberta

6.3.3   Agricultural Attractants (crops, honey bees, ranching)

Cattle ranching, and forage crops (hay and oats) appear to be the primary agricultural activities in the Sundre area. Horses and cattle were the two primary livestock attractants, and were recorded on 50% of the farms/ranches. Horses were also recorded on 24% of the acreages. A higher proportion of the barns or corrals and summer pastures tended to be located <500 ft from both farm/ranch and acreage dwellings (Figure 16).
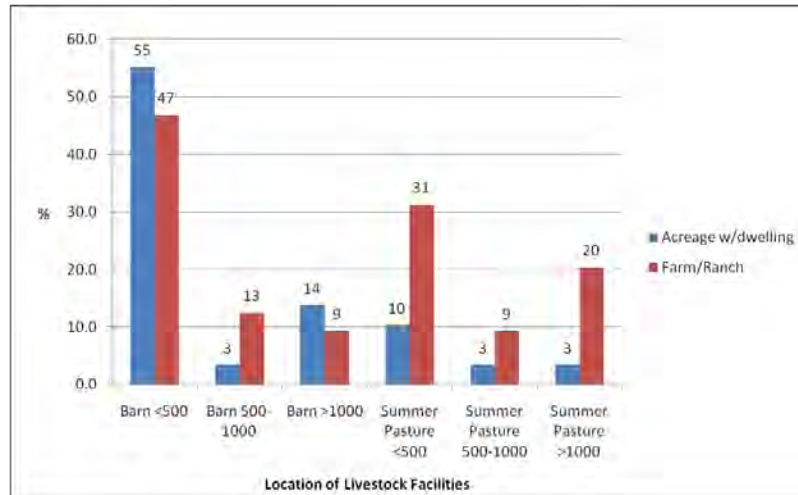
Figure 16. Location of livestock facilities in relation to dwellings

A noted agricultural attractant to bears within MVC is the disposal of domestic animal carcasses. Carcass disposal information was available for 22 of 29 acreage owners that have livestock, and 59 of 64 farms/ranches. The most common practice was to burn, bury or leave the carcasses out in the pastures (Figure 17). Approximately 43% of the acreage owners and 30.5% of the farms/ranches had carcasses picked up.
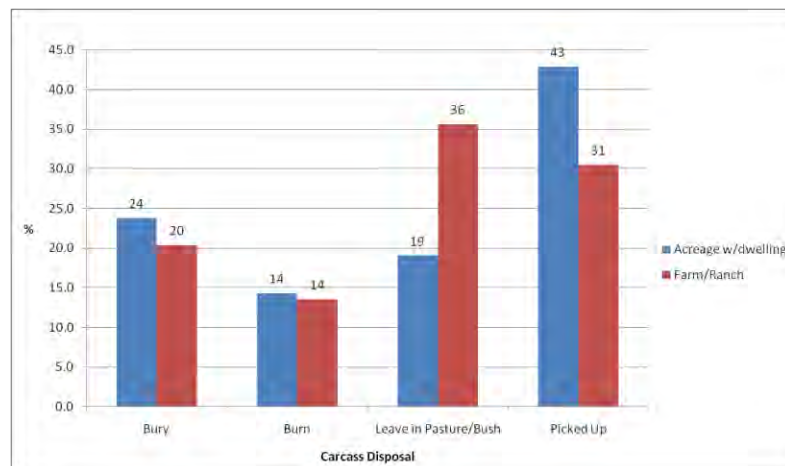
Figure 17. Method of disposal of carcasses

Crops grown in that portion of MVC west of Highway 22 include alfalfa, hay, greenfeed, oats and barley (Figure 18). There are a few honeybee colonies around Sundre and surrounding areas. Only eight apiaries (4.6%) were reported from the 169 residents interviewed, and made up <1% of the attractant responsible in the Bear Occurrence reports.
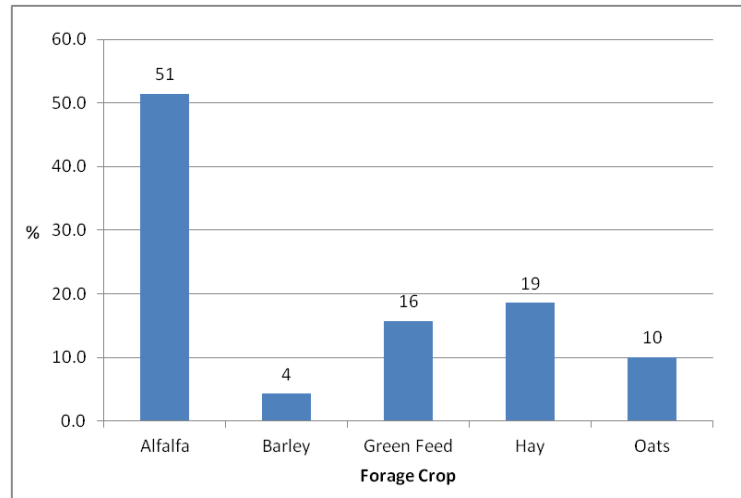
Figure 18. Crops (non-natural attractants) grown west of Highway 22

6.3.4   Bear Incidences

Bears were observed on 76% of the acreages, farms and ranches interviewed. Black bears were reported more often than grizzly bears (70% vs 19%). This is very similar to the bear occurrence reports where black bears accounted for 67% and grizzly bears 30%. Unknown bear species accounted for 11% of the bear sightings by those interviewed. Black bears were reported more often on acreages than farms and ranches (80% vs 55%) while grizzly bears were reported more often on farms and ranches compared to acreages (30% vs 12%).

Over 50% of the bear incidences were very infrequent (<1 bear incident per year), 37% were occasional (1-2 per year), and <11% were frequent (3-5 bear incidents per year). Frequency of sightings by bear species is shown in Figure 19.
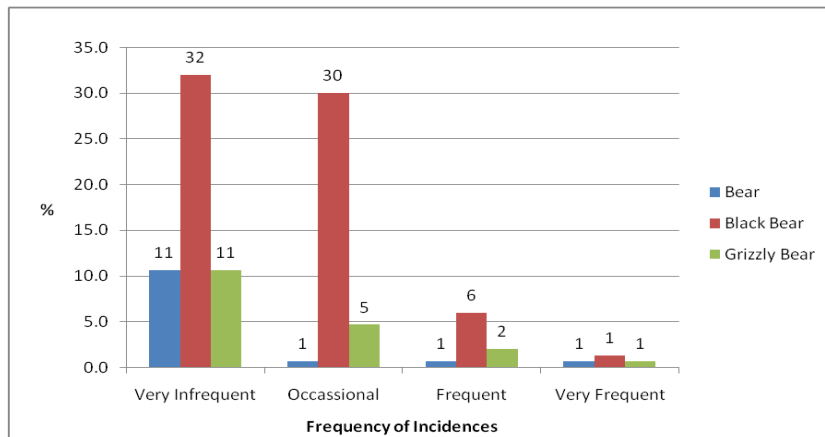
Figure 19. Frequency of bear incidences by species

Bear activity was noted for 122 of the 140 bear incidences reported. The majority of the incidences were bears passing through. Where human-bear conflicts occurred, most black bear incidences were related to garbage and bird feed while most grizzly bear incidences were related to livestock (Figure 20).
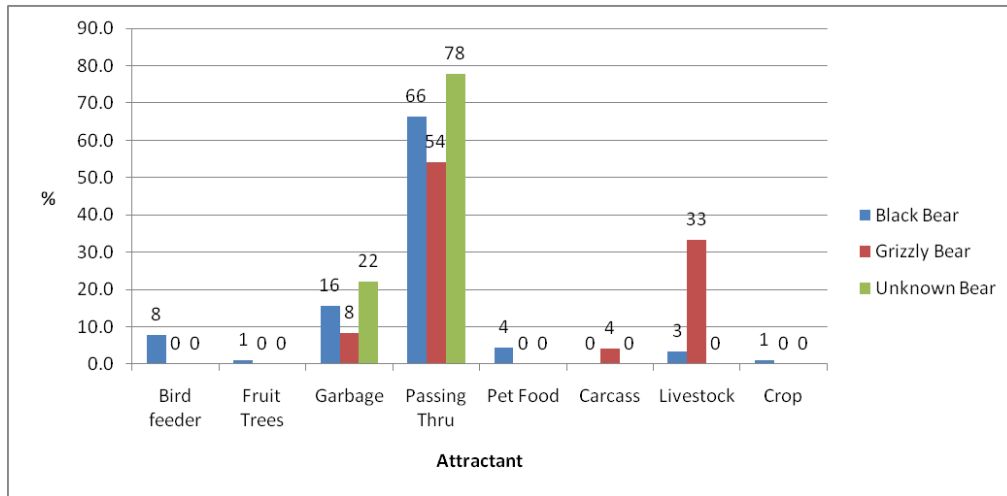
Figure 20. Attractants reported from bear incidences

6.4 Mountain View County Area Residents Perceptions of Bears

6.4.1 Bear Habitat

Persons interviewed were asked to rate their property as bear habitat. The majority of the acreage owners and farms and ranches were similar in their ratings. Sixty-three percent rated their property as good or excellent while 32% rated their property as poor or no habitat (Figure 21). Good to excellent ratings were based on the presence of natural habitat, cover and shelter, berries, and proximity to water. Other criteria included hay fields, garbage dumps, livestock and beehives. Poor or no habitat ratings were based on lack of food or cover, too many people, or too busy an area.
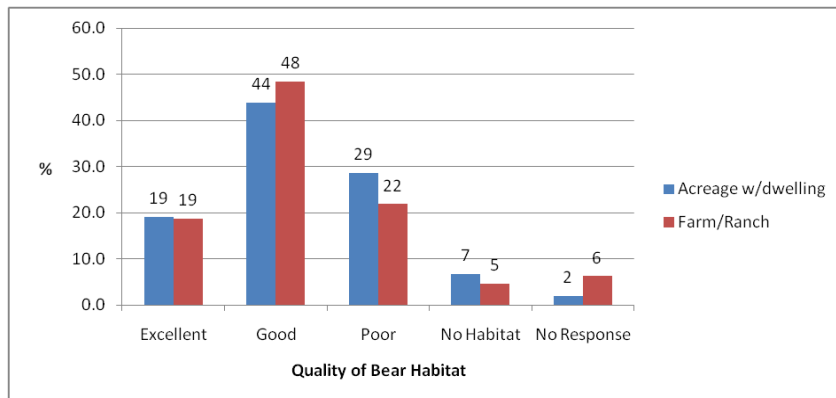
Figure 21. Quality of bear habitat on acreages and farms/ranches

When asked to rate that portion of Mountain View County west of Didsbury as bear habitat, 85% of the respondents rated the county as good to excellent habitat, 7% as poor or no habitat, and 9% had no response. The ratings for the various habitat types were the same as described above. There was a slight difference in habitat ratings between acreage owners and farms and ranches. Farms and ranches gave a higher excellent rating while acreages gave a higher good rating (Figure 22).
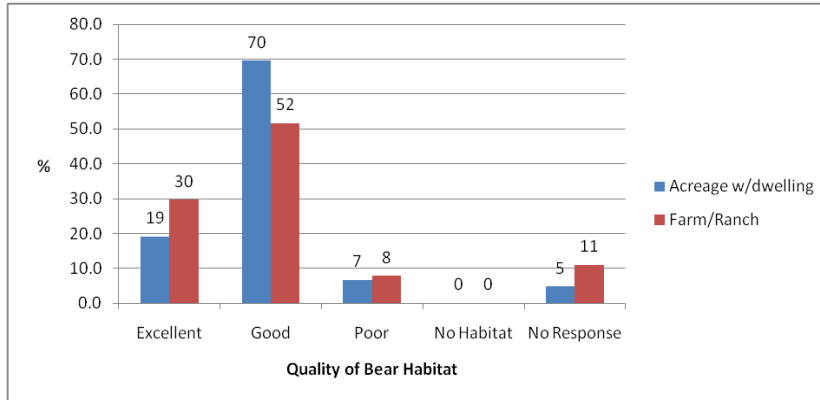
Figure 22. Quality of bear habitat in Mountain View County west of Didsbury

6.4.2   Perception of Bears

When asked whether black bear populations should be maintained, increased or decreased, 43% of the respondents felt black bear populations should be maintained, 4% said increased and 11% said decreased. However, 42% of the respondents had no opinion or didn't provide a response (Figure 21). When asked whether grizzly bear populations should be maintained, increased or decreased, more respondents felt that grizzly bear populations should be decreased compared to black bears (19% vs 11%) and fewer felt that grizzly bear populations should be maintained or increased compared to black bear populations (35% vs 43%). However, 46% of the respondents had no opinion or didn't provide a response (Figure 23).
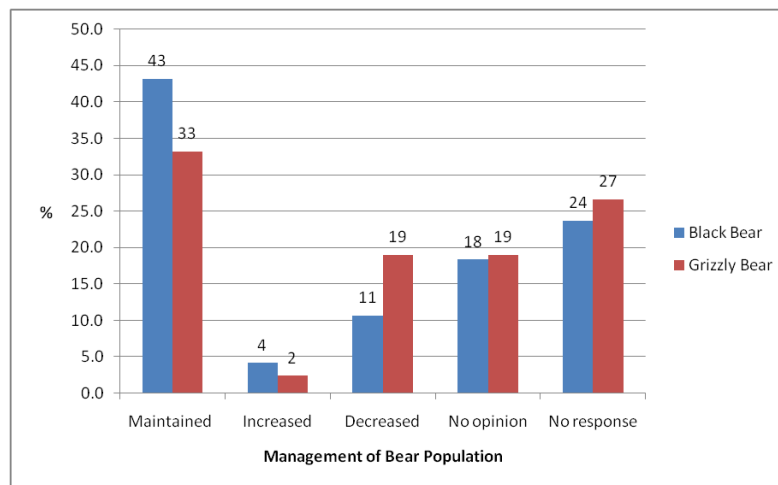
Figure 23. Perceptions of the management of black and grizzly bear populations in Mountain View County

When asked which emotions black bears evoke, marvel and curiosity was recorded by 66% of the respondents, and uneasiness and fear was recorded by 48% (Figure 24). When asked which emotions grizzly bears evoke, marvel and curiosity was recorded by 54% of the respondents. Grizzly bears instilled greater feelings of uneasiness and fear (77%) compared to black bears (48%) (Figure 24).
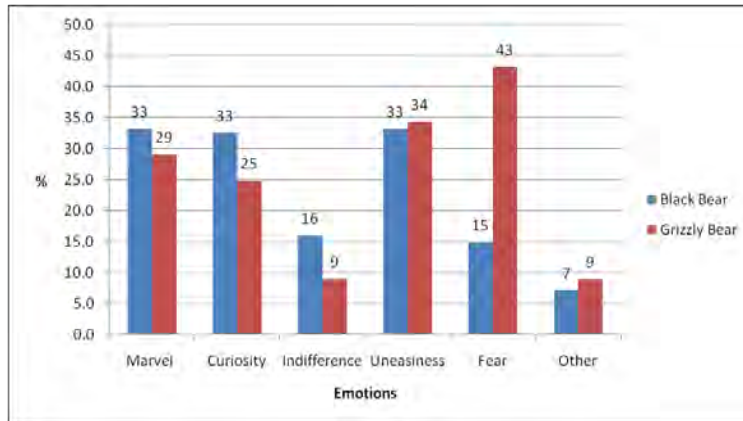
Figure 24. Emotions evoked by black and grizzly bears

Grizzly bears prefer open or semi-open country, and are found in the foothill, mountain and boreal regions of the province. Black bears inhabit most of Alberta's forested land and are found in open forests throughout the mixed-wood, foothill, and montane life zones of the province. Bears may be displaced from their natural habitats by community expansion and development, and they may be drawn into communities by non-natural foods and garbage. Mountain View residents were asked where co-existence with bears is tolerable. Those interviewed felt that coexistence with bears can be tolerated in national and provincial parks and backcountry areas. Bears are least tolerated in rural communities, campgrounds, and urban areas/tourist centres (Figure 25).
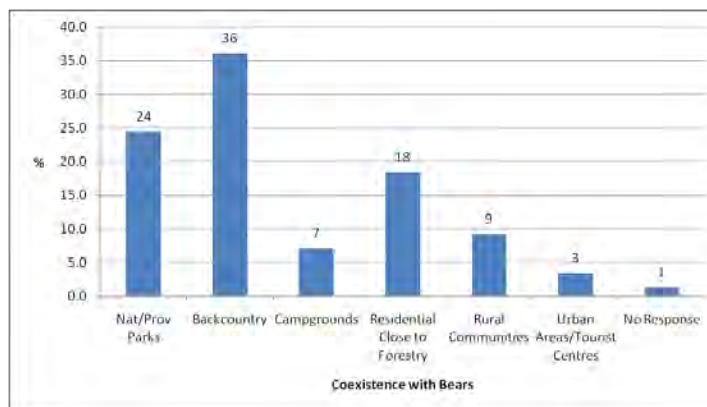
Figure 25. Mountain View County residents perception of where co-existence with bears is tolerable

6.4.2.1   Black Bears

Seventy-five percent of the 169 acreages and farms/ranches interviewed felt that black bears have aesthetic, ecological or economic value and should remain part of our natural heritage. Acreage owners felt that black bears are inconvenient but should be tolerated while more farms/ranches felt black bears are pests and should not be tolerated (Figure 26).
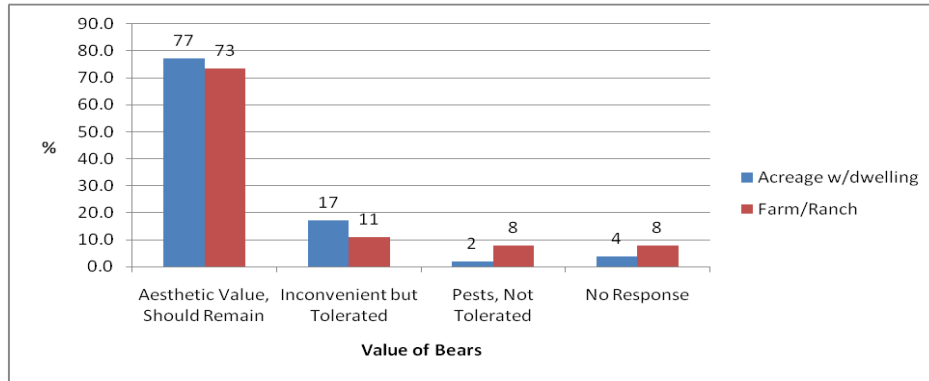
Figure 26. Value of black bears as perceived by Mountain View County residents

Current regulations allow private landowners to shoot a black bear on their property on sight. Residents of MVC were asked under what circumstances they felt it was appropriate to shoot a black bear. While the majority of respondents felt it was okay to shoot a black bear if it was damaging property or threatening livestock, pets or human life, farmers and ranchers appeared to be less tolerant than acreage owners and more inclined to shoot a bear that was passing through or eating natural foods (Figure 27).
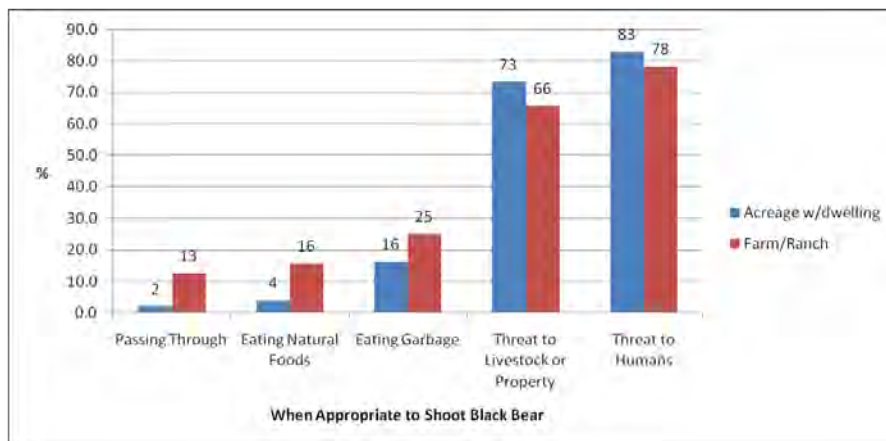
Figure 27. Landowners perception of when it is appropriate to shoot black bears on their property

6.4.2.2   Grizzly Bears

Sixty-six percent of the 169 acreages and farms/ranches interviewed felt that grizzly bears have aesthetic, ecological or economic value and should remain part of our natural heritage. More farms/ranches felt that grizzly bears are inconvenient but should be tolerated or are pests and should not be tolerated (Figure 28).
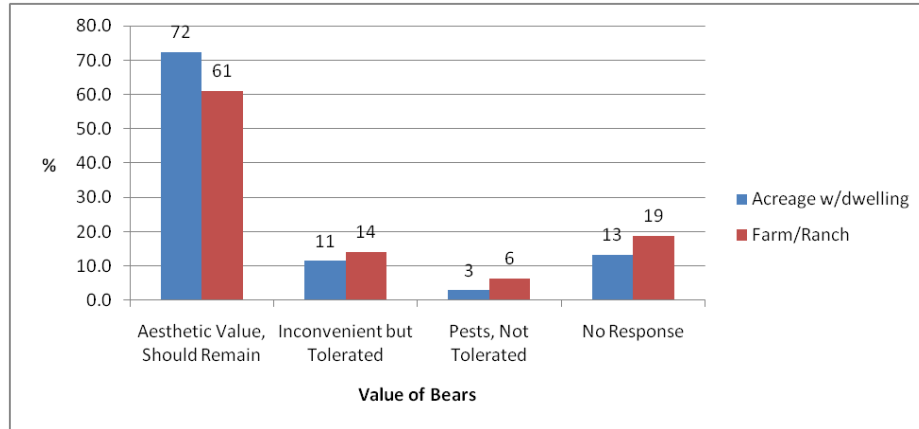
Figure 28. Value of grizzly bears as perceived by Mountain View County residents

6.4.3   Participation in Programs to Minimize Human-Bear Conflict

The latter part of the questionnaire was to ascertain landowners level of commitment and willingness to participate in a Community BearSmart Program. Without public and community support for proactive management, human-bear conflicts will continue and as a result, bears will continue to be relocated or destroyed and property damage and economic loss will continue to occur.

When asked if they would be interested in minimizing human-wildlife conflict at their place, 35% of those interviewed wanted to receive more information about bears and other wildlife and possibilities to minimize conflict. Thirty-seven percent were willing to actively participate in workshops and community-based programs such as BearSmart or use bear-proof garbage cans or electric fence to minimize human-wildlife conflict.

6.4.3.1   Participation in BearSmart Program

Landowners were asked if they:
- would be willing to participate in a Bear Smart program,
- would participate in a bear sighting notification system,
- would like more information about the activities the Bear Smart program promotes, and
- would like to share sightings and bear activity with other members of the community.

More than half of those interviewed were willing to participate in the BearSmart program (Figure 29).
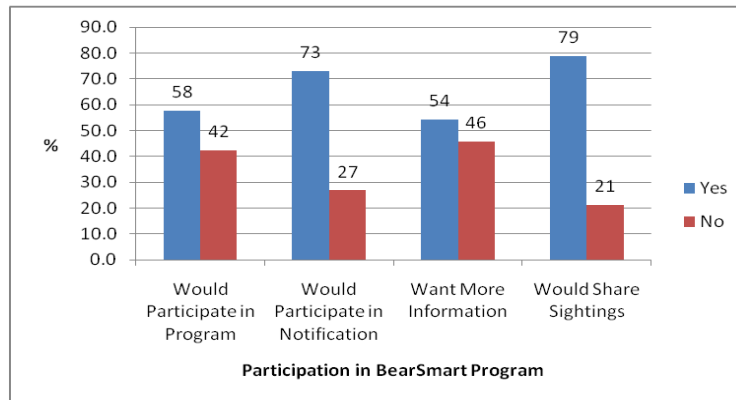
Figure 29. Mountain View County residents willingness to participate in a community BearSmart program

Forty-five percent of the acreage owners were willing to participate in a community BearSmart program, and of these, the majority (>87%) wanted more information, and were willing to participate in a bear notification system and share bear sightings and activity with the community. Fifty-five percent of the acreage owners were not willing to participate in a community BearSmart program but wanted more information about the activities the BearSmart program promotes, were willing to participate in a bear notification system and were willing to share bear sightings and activity with the community.

Forty-one percent of the farms and ranches were willing to participate in a community BearSmart program, and of these, the majority (74%) wanted more information, and were willing to participate in a bear notification system and share bear sightings and activity with the community. Fifty-nine percent of the farms and ranches were not willing to participate in a community BearSmart program, and only 18% of them wanted more information about the activities the BearSmart program promotes. However, 55% were willing to participate in a bear notification system and 7% were willing to share bear sightings and activity with the community.

6.4.3.2   Method for Receiving/Sharing Information

Landowners were asked how they would like to obtain information about bear sightings and activity. The majority would like to receive information through the internet or by phone (Figure 30).
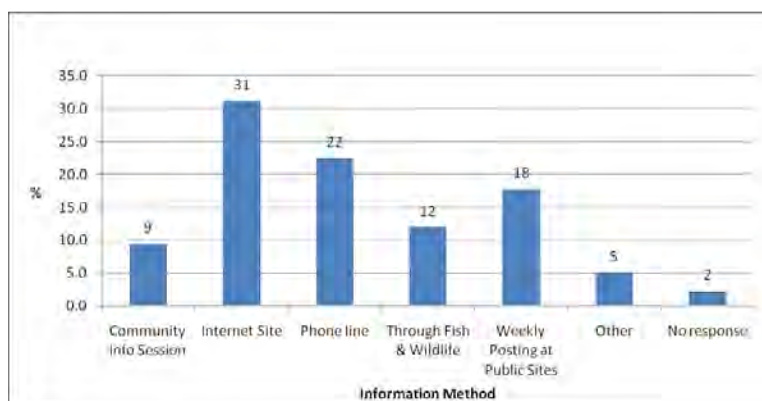
Figure 30. Method of exchanging information about bear sightings and activity in Mountain View County

6.4.3.3   Management Actions Recommended by Landowners to Minimize Human-Bear Conflicts

Landowners were asked what management actions they would recommend to minimize human-bear conflicts. Almost half of those interviewed (47.9%) recommended education as a management action (Table 3). Acreage owners felt that proper storage of garbage and bear proof garbage bins was another important management action. Besides education, management actions considered important to farm/ranch owners included managing attractants, and respecting and leaving bears alone. A management recommendation suggested by farm/ranch owners was to shoot bears and/or have a hunting season for grizzlies.

Table 3. Management actions recommended by landowners to minimize human-bear conflicts

Management Action	% of Acreage recommendations (N=105)	% of Farms or ranches recommendations (N=64)	Total (%)
Education	48.6	46.9	47.9
Proper garbage storage & bear proof bins	11.4	1.6	7.7
Manage attractants	3.8	6.3	4.7
Respect bears/leave alone	1.9	7.8	4.1
Bear sighting notification	2.9	4.7	3.6
Trap and relocate bears	2.9	3.1	3.0
Common sense practices	3.8	0.0	2.4
Reduce logging	2.9	1.6	2.4
Shoot bears & open hunting season	0.0	6.3	2.4
SRD's job	1.9	0.0	1.2
Bylaws	1.0	0.0	<1.0
Aversive conditioning	1.0	0.0	<1.0
Fencing	1.0	0.0	<1.0
No Response	17.1	21.9	18.9

6.5   CURRENT CONFLICT REDUCTION ACTIVITIES

6.5.1   Bear-Focused Methods

Reducing negative human-bear encounters can be accomplished through modifying behavior of bears or people. Current actions directed at bears include relocation, exclusion (electric fencing), aversive conditioning, or lethal removal. Although many agencies use relocation as a mitigative strategy, reviews on the procedure suggest high costs and limited success. Relocating habituated or food-conditioned bears is not an effective solution as bears often become a problem in or near the release area, or they return to their original territory where they continue to be in conflict (Ciarniello 1996, Linnell et al. 2007, Spencer et al. 2007). Relocation doesn't address the root cause of the human-bear conflict, and often another bear will take the place of the one that was removed.

While lethal removal is sometimes used, it is unpopular both with the public because of concerns about what constitutes an acceptable response, and with managers because it doesn't solve the problem of attractants.

Shooting bears creates a population vacuum (i.e., empty niche) that will be filled by other bears. If not managed properly, this can lead to a population sink where animals attracted to these areas suffer higher mortality rates. It's better to "teach" resident bears through aversive conditioning to avoid trouble and allow them to stay in the niches.

Bear aversion uses negative conditioning to modify undesirable bear behaviour so the bear then learns to associate undesirable behaviour with a negative experience, and will be more likely to avoid conflict in the future. Currently, bear aversion techniques are being used as part of bear management programs in Kananaskis Country and Whistler, BC, and there has been a notable reduction in the number of bears that are destroyed and relocated, and considerably fewer resources are required to deal with conflict situations.

6.5.2   Human-Focused Activities

6.5.2.1   Education

There are organized or formal education processes currently being conducted within MVC that facilitates the adoption of a BearSmart community (Figure 31). MVBS hosts a Bear Awareness Week in April with presentations in the local schools and publishes Bear Awareness articles in the local newspapers. Some educational brochures do exist on a variety of bear related topics, and have been made specifically for MVC.

During the first Bear Awareness Week in April 2009, bear awareness presentations were conducted at the schools in Didsbury, Cremona and Sundre with the assistance of officers and staff from AESRD. There were two evenings of guest speakers in Sundre dealing with bear ecology, rancher-bear interactions, and conflict avoidance as well as a family fun day at Elkton Campground with Karelian Bear Dogs, crafts and scavenger hunts for the kids, bear proof garbage bins, other activities and displays, snacks of "genuine bear-poo" chocolate, and most importantly, a free hamburger lunch.

In April 2010, bear awareness presentations were conducted at the schools in Olds and Carstairs and an evening lecture on the accomplishments of the WildSmart group from Canmore was held in Sundre. Mark Hoskins, AESRD Fish & Wildlife Officer, spoke at the family fun day at Elkton Campgound and demonstrated various bear deterrents available.

Figure 31. Mountain View BearSmart Society Bear Awareness Week

Through 2011 to 2013, bear awareness presentations rotated amongst the five schools and the family fun day attracted more participants every year. MVBS intends to continue these annual events and add family days in other communities. In March 2013, MVBS held its first bear awareness day at Water Valley and it was well attended by the community.

In October 2010, AESRD held a workshop for MVBS volunteers to learn, enhance and practice their public speaking and presentation skills. Through grants and funding from AESRD and Alberta Community Spirit, MVBS has purchased audio/visual equipment, display booth items, and an education kit of skulls, paw prints, scats, and claws. Beginning in 2011, MVBS volunteers annually attend Sundre Petroleum Operators Group (SPOG) Neighbour's Day in Sundre, Living in the Natural Environment in Cochrane, and Safety Day in Rocky Mountain House to distribute Alberta BearSmart pamphlets and disseminate the bear awareness message. MVBS Directors created a bear and cougar safety presentation in 2011 which was shown to Dickson Fish & Game Association, Sunpine Forest Products Sundre, Shell Burnt Timber and Shell Caroline. In 2012, it was shown to Cottonwood Gordon Junior Forest Wardens, Saracen Tactical Rescue Canmore, and Milestone Oilfield Services Sundre. To date in 2013, it was shown to the Didsbury and Olds Search and Rescue organizations and other SARs have expressed interest in attending.

6.5.2.2   Notification and Communication

In 2009, MVC created a page on their website to inform the public of bear sightings provided to them from AESRD. In August 2010, MVBS created its own website (www.mountainviewbearsmart.com) to help educate people on how to prevent human-bear conflict in and around their homes and communities. The MVBS website has also taken over from the County the task of providing up-to-date bear sightings information from AESRD and the public. The website includes sightings of black bears, grizzly bears and cougars and 19 sightings were posted in 2010, 55 in 2011, and 103 in 2012. The greatest number of sightings occur during June through September. From the website, people can subscribe to a weekly bear activity report which a MVBS Director emails every Thursday. The website generated 20 subscribers in 2010, 119 in 2011 and 117 in 2012. The greatest number of subscribers join during April through October. As of December 31, 2012, MVBS email list totalled 264 subscribers including MVBS volunteers/directors, AESRD employees and Fish and Wildlife Officers.

In 2010, MVC erected Bear Country road signs on all the township roads heading west from Highway 22 to remind residents and all travelers that they are in bear country and to act accordingly (Figure 32).

MVBS most ambitious project for the future is to develop a telephone fan-out notification system.

Figure 32. Bear country road signs in Mountain View County, central Alberta

6.6   OPTIONS FOR CONFLICT REDUCTION ACTIVITIES

Mitigation strategies that have traditionally involved lethal removal or attempts to alter the behavior of depredating bears (aversive conditioning) are largely only short-term solutions and fail to address the root causes of urban bear problems. Several state and provincial agencies, along with local municipalities, have moved toward a human behavior approach that employs education and persuasion campaigns to reduce the availability of anthropogenic attractants (Gore *et al.* 2006, Dunn *et al.* 2008).

6.6.1   Intercept feeding

Based on a similar program in Montana, AESRD launched an intercept feeding program in 1999. Wildlife killed in winter road accidents are picked up and stored. In spring, the carcasses are flown in and dropped by helicopter at carefully planned locations in known spring grizzly bear range. The idea is to 'intercept' bears by keeping them away from livestock during spring green up and calving time until other natural food sources are available. This program has been used in Waterton Lakes National Park and by the Drywood Yarrow Conservation Partnership in southwestern Alberta. Its success has been measured by a significant decrease in both the number of complaints by ranchers, and the need to trap and remove bears.

6.6.2   Habitat Modification

In order to minimize human-bear conflicts, it is necessary to effectively manage natural attractants. The removal of natural attractants is becoming more commonplace and has had positive results in Banff and Jasper National Parks, and Canmore (Honeyman 2007).

Fruit-bearing trees and shrubs like mountain-ash are an easy source of high calories for a bear. It is important to remove berry-producing trees and shrubs in areas where bears are not welcome. At minimum, the ripe berries and fruit should be removed from plants.

6.6.3   Carcass Disposal Program

A large percentage of complaint-based calls in MVC and provincially (Government of Alberta 2010) were related to livestock boneyards and dead livestock on the landscape. A carcass collection program has been used by the Blackfoot Challenge Watershed Group in Montana, and by the Drywood Yarrow Conservation Partnership in southwestern Alberta as a means of removing one of the major attractants. Its success has been measured by a significant decrease in both the number of complaints by ranchers, and the need to trap and remove bears.

6.6.4   Non-natural Attractants

6.6.4.1   Barbecues

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

6.6.4.2   Beehives

Beehives are a non-natural attractant commonly targeted by bears (Gunson 1977). There are a few honeybee apiaries around Sundre and surrounding areas. Options for making beehives bear-proof is to surround the beehives with a bear-proof electric fence or placing beehives on raised platforms that bears can't climb.

6.6.4.3   Bird Feeders

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. Bird feeders use should be restricted to winter months only.

6.6.4.4   Campgrounds

There are a number of public campgrounds and day use areas located within MVC. Often these campgrounds and day use areas are positioned in or adjacent to riparian areas which may be used as movement corridors for bears. They also are a source of non-natural attractants including garbage, poorly stored food, and cooking residue. Campgrounds should use bear-proof receptacles and bear-proof dumpsters for garbage and recycling disposal.

6.6.4.5   Composting

If conducted properly, composting should not be an attractant to bears. Composting of lawn clippings and leaves is acceptable but organic kitchen material (e.g., meats, fish, oil, milk products, overripe fruits and vegetables) should be restricted to indoor composters.

6.6.4.6   Fruit Trees

Fruit trees can be a significant attractant to bears. Landowners should pick fruit daily before it is ripe and also pick up any windfalls. If a landowner doesn't want the fruit, volunteers can pick the fruit and donate it to local food banks, or cut down unwanted trees and if desired, replace them with non-fruit-bearing varieties.

6.6.4.7   Garbage

Residential waste has been a primary attractant associated with human-bear conflicts in the community. Acreage owners, farms and ranches means of disposing garbage includes burning in a burn barrel, hauling to the MVC Waste Transfer Station, and MVC commercial dumpsters. Dumpsters are emptied as needed on a dumpster by dumpster basis and, in most instances, are not bear-proof (Figure 33). Residents should be encouraged to utilize bear-proof or bear-resistant waste containment systems for their personal household use. Alternatively, garbage and other attractants should be stored indoors or in a secure out-building.

Figure 33. Non-bear proof garbage bins, Mountain View County, central Alberta

6.6.4.8   Livestock Operations

Bears are attracted to livestock, livestock feed, carcasses, and birthing areas. Locating attractants (e.g., crops, calving and lambing areas) away from natural cover and movement corridors can be helpful in reducing conflicts. Electric fencing can be used to deter bears from birthing areas (e.g., calving, lambing) or chicken coops. Grain and other feed should be housed in bear-proof structures or containers. Dead livestock should be disposed of by participating in a community carcass pick-up and removal program, or placing in a fenced- off community carcass collection site. Burying of carcasses is not recommended in areas where grizzly bears occur such as the western portion of MVC.

6.6.4.9   Pet Food

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

6.6.5   Compliance

Many recommendations and direct actions necessary to manage bears and people is only possible with shared stewardship and co-operation from the public. Without public and community support for proactive management, human-bear conflicts will continue. Education is the key to compliance. Ideally, education should highlight Mountain View BearSmart Society's goals and provide information about activities and practices that assist in minimizing human-bear conflicts. MVC residents must be encouraged to report bear sightings on a more regular basis. Accurate and timely reporting of bear sightings increase public awareness of bear activity and may help to reduce human-bear conflicts.

7.   SUMMARY

Quality bear habitat is generally considered to contain significant mixed forest cover (>80% forest canopy) consisting of a variety of tree and shrub species of varying ages which provides security and shelter and a variety of natural food sources. Large tracks of undeveloped land occur in MVC and extensive cover and bush allows bears to travel into the interior of the county. Undeveloped habitat with its extensive network of walking trails, oil and gas access roads, seismic cutlines and logging roads affords bears close proximity to humans.

Habitat suitability for black bears was primarily driven by the availability of forest cover. Black bear habitat was best on the western edge of the county and suitability decreased around towns (i.e., Sundre) and on an east-west gradient and was predominantly poor to very-poor east of the Little Red Deer River. Habitat suitability for grizzly bears within MVC was driven primarily by the amount of human disturbance on the landscape. The area to the west of Highway 22 was identified as the best habitat for grizzly bears in MVC however, there were patches of moderate to good habitat identified throughout the county.

Areas with high potential for human-bear conflict within the Sundre area were identified through mapping AESRD Bear Occurrence reports, 1999-2011. Bear occurrence reports represent those areas where bears are reported and are not necessarily representative of bear use of MVC's surrounding area. Black bears comprised 67% of historic occurrences and grizzly bears 30%. The majority of the bear occurrence complaints occurred in August and September coinciding with the ripening of fruit on trees and a number of berry species. Thirteen non-natural attractants were reported through the bear occurrence reports. Garbage accounted for 26.3% of the occurrence reports, followed by attraction to bird feeders (16.5%), and carcasses (15.1%). AESRD Fish and Wildlife Officers respond to all human-bear complaints. Approximately 6% of the occurrence reports resulted in bears being captured and relocated, and bears were destroyed in approximately 6% of the occurrences. Of the 23 bears that were destroyed, 21 were black bears and 2 were grizzly bears. Garbage was the main non-natural attractant (45%) in the instances where bears were relocated or destroyed.

A questionnaire was developed and residents residing west of Highway 22 were interviewed, with effort concentrated in areas having the highest bear incident reports (based on mapped locations of bear occurrences in the Sundre area for the years 1999-2009). Acreage with a dwelling accounted for 61% (105) of those interviewed, farms and ranches for 38% (64) and there was one commercial operation. Average years on a farm/ranch was 24.3 years (range 1-84) compared to 14 years (range 1-65) for acreage dwellers. Most acreage owners and farms and ranches rated their property and MVC as good or excellent bear habitat. Good to excellent ratings were based on the presence of natural habitat, cover and shelter, berries, and proximity to water. Other criteria included hay fields, garbage dumps, livestock and beehives. Poor or no habitat ratings were based on lack of food or cover, too many people, or too busy an area.

Bears were observed on 76% of the acreages, farms and ranches. Black bears were reported more often than grizzly bears (70% vs 19%), and the frequency of sightings was primarily infrequent (52%) or occasional (37%). Bear activity was noted for 122 of the 140 bear incidences reported. The majority of the incidences were bears passing through (50%). Where human-bear conflicts occurred, most black bear incidences were related to garbage (15.7%) and bird feed (7.9%) while most grizzly bear incidences were related to livestock. The majority of those interviewed had more than 1 natural attractant (buffaloberry, dandelion, clover, insects, dead wildlife) at their location. Non-natural attractants included garbage, human food, barbecues, bird feeders, ornamental fruit trees, compost, and pet food. Barbecues, compost and garbage occurred at higher frequencies on acreages while burn barrels, vegetable gardens, and pet foods occurred at higher frequencies on farms and ranches. Horses and cattle were the two primary livestock attractants, and were recorded on 50% of the farms/ranches. Horses were also recorded on 24% of the acreages. A noted agricultural attractant to bears within MVC is the disposal of domestic animal carcasses. The most common practice was to burn, bury or leave the carcasses out in the pastures.

Seventy-five percent of the 169 acreages and farms/ranches interviewed felt that black bears have aesthetic, ecological or economic value and should remain part of our natural heritage. Forty-three percent felt that black bear populations should be maintained.

Sixty-six percent of the 169 acreages and farms/ranches interviewed felt that grizzly bears have aesthetic, ecological or economic value and should remain part of our natural heritage. Grizzly bears instilled greater feelings of uneasiness and fear (77%) compared to black bears (48%). More respondents felt that grizzly bear populations should be decreased compared to black bears (19% vs 11%) and fewer felt that grizzly bear populations should be maintained or increased compared to black bear populations (35% vs 47%). All bears can be tolerated in national and provincial parks and backcountry areas, and bears are least tolerated in rural communities, campgrounds, and urban areas/tourist centres.

Over 50% of the acreage owners and farms and ranches were not willing to participate in a community BearSmart program, however, they were willing to participate in a bear notification system and to share bear sightings and activity with the community. When asked what management actions they would recommend to minimize human-bear conflicts, almost half of the landowners interviewed (47.9%) recommended education as a management action.

Organized or formal education processes being conducted within MVC that facilitate the adoption of a BearSmart community include Bear Awareness Week, regular Bear Awareness articles in the local newspapers, and Bear Awareness presentations in the local schools. Options to minimize human-bear conflicts are suggested.

7.1   Data Gaps

Areas selected were based on professional opinion and bear occurrence reports. Undoubtedly, other potential areas of human-bear conflict exist within MVC but were not assessed. Every effort should be made to survey other areas where, based on natural habitat potential, the likelihood of bears being present is high.

Bear occurrence reports represent those areas where bears are reported and are not necessarily representative of bear use of MVC's surrounding area. A detailed habitat assessment was not conducted in the MVC and no information was available on specific food habits of bears in the county. Existing conditions on bear habitat was based on information from the broader natural subregions. Information on bear foods was available from studies done in the Eastern Slopes (Hamer and Herrero 1987, 1991; Hamer *et al.* 1991, Holcroft and Herrero 1984, 1991; Russell *et al.* 1978, Stenhouse and Graham 2005).

Public input and political will are needed to establish policies for addressing human-bear conflict and bear management. The differing perceptions, values, needs, and demands of the stakeholders must be identified and understood to create an effective, long-term and humane resolution that benefits the relevant stakeholders and does not adversely affect the wild bear population.

8. Recommendations

- The development of communication materials that highlight the goals of Mountain View BearSmart and provide the community with specific voluntary actions to assist reducing human-bear conflict. This should include suggestions on how to reduce attractants around the home and community.
- Work with Mountain View Regional Waste Management Commission to modify commercial dumpsters to make them bear-proof.
- The development and distribution of materials targeted at campground users that promote sustainable bear management practices, such as food storage and disposal as well as information on how to respond to bear sightings would assist in reducing human-bear conflicts.
- Develop programs to address fruit tree issue within MVC. Some suggestions include a volunteer pick program with fruit made into products that can be distributed through the food bank and a nursery swap where you can replace your existing attractant plants for others.
- Involve land users and stakeholders in implementation of the Community Bear Smart program, including improved communication with ranchers.
- Build a partnership between local government and various stakeholders (e.g., oil and gas, forestry, fish and game, etc.) to increase community awareness of human-bear conflict issues.
- Investigate bylaws used in other communities to address attractant issues including garbage, ornamental plants, bird feeders and livestock.
- Because habitat use for grizzly bears varies by time of year (Nielsen *et al*. 2004, Munro *et al*. 2006), a detailed habitat inventory should be conducted to identify specific bear foods in MVC during the pre-berry and berry season. A detailed analysis of habitat potential will enable the community to determine the likelihood of a bear using particular areas and manage these areas during future development.
- Radio collar and monitor bears using habitats in MVC to evaluate human-bear conflicts and conflict sites.
- Create guidelines for new developments in MVC to facilitate Mountain View BearSmart initiatives. Working with developers during the planning stage can help mitigate bear attractants.
- Investigate the feasibility of implementing a carcass collection program or composting facility to dispose of carcasses.
- Develop and implement a Human-Bear Management Plan, Phase II of a BearSmart Community Program that spells out responsibilities and options for resolving conflicts and ensuring the plan is reflected in MVC's planning and decision-making documents.
- Provide an annual report that summarizes the progress of the BearSmart Community Program, evaluates the success and/or failures of recommendations, and provides direction of the program for the following year.

8.1 Monitoring Program

A monitoring program should be developed to measure the effectiveness of the recommendations and guidelines put forth to minimize human-bear conflicts, and to evaluate the effectiveness and success of the bear safety education program (Gore *et al*. 2006, Dunn *et al*. 2008). Data sources would include AESRD ENFOR bear occurrence reports, community bear sighting data, mapping of AESRD and community bear occurrence reports, and updating the inventory of natural and non-natural attractants in MVC. Measures of success include:

- 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,
- a decrease in the number of bears relocated,
- a decrease in the number of bears destroyed,
- a decrease in property damage,
- a decrease in resources expended in dealing with human-bear conflicts, and
- an increase in the number of groups requesting BearSmart presentations.

9. CONCLUSIONS

The main challenge in Mountain View County (MVC) comes from the natural bear food sources in and around the community. There are also a number of non-natural attractants in MVC that are attracting bears into the community. The main sources of attractants in MVC, as identified in the ENFOR database and from interviews of MVC residents are garbage, bird feeders and carcasses. While garbage and bird feeders make up the majority of non-natural attractant issues, carcasses and livestock have caused problems in the past and will likely to be an issue in the future unless addressed. Fruit trees are scattered throughout MVC. This attractant could be addressed by picking the fruit at the opportune time or by removing and replacing fruit trees with other tree species.

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. 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.

Numerous rivers and creeks within MVC are important movement corridors for grizzly bears and other carnivores. BearSmart communities need to be cognizant of the key areas. There are a number of new developments at various stages of implementation occurring outside the existing communities that have the potential to increase human-bear conflict through the development of trails, disposal of garbage, increase in natural and non-natural attractants and proximity to important bear habitat and movement areas. New developments placed in movement areas have the potential to develop into new high risk area for human-bear conflict. This issue can be addressed by working with or supporting the municipality's efforts that plan for development and wildlife movement.

Communities need to decide if and how they will co-exist with bears. Conflicting messages that arose from this survey are that people think bears are important to nature, but there are parameters to the space they share, and fears associated with living with them. There is a difference between the romantic attraction to living in bear country and the reality of one in the back yard which equates to "fear" and "complaints to local wildlife officials". Also, people seem to want to live in peaceful co-existence but there seems to be little willingness to get involved with the BearSmart Community Program. Without public and community support for proactive management, human-bear conflicts will continue. The issues relating to human-bear conflict should be addressed through a combination of approaches including education, policies that reduce source attractants, and enforcement (to ensure compliance of the legislation). Given the high number of non-natural attractants in MVC, the implementation of a BearSmart program has the potential to greatly reduce human-bear incidences. Ideally, this will also result in reduced Fish and Wildlife enforcement responses and bear mortality.

In order for a BearSmart program to succeed, a strong leader and core group of experienced, dedicated staff is required over the long-term. While volunteers play a key role in many of the programs, paid staff is required to implement the plan successfully and ensure its overall effectiveness. The success will also require involvement and representation by engaged and committed members of the community, private developers, and various levels of local government (provincial, county and municipal).

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APPENDIX A

Photographs of the most important shrubs and forbs utilized by bears.

Sweet Vetch *(Hedysarum* spp.*)*

Bearberry *(Arctostaphylos uva-ursi)*

Pea vines (*Lathyrus* spp.*)*

Clover (*Trifolium* spp.*)*

Milk-Vetch (*Astragalus* spp.*)*

Dandelion *(Taraxacum officinale)*
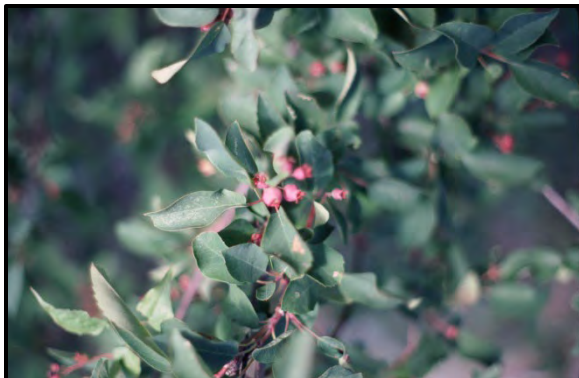
Sarsparilla (*Aurelia nudicaulis)*

Cow Parsnip (*Heracleum lanatum)*

Horsetail (*Equisetum* spp.*)*

Crowberry (*Empetrum nigrum)*

Saskatoon (*Amelanchier alnifolia)*

Buffaloberry *(Shepherdia canadensis)*

Low Bush Cranberry *(Vaccinium vitis-idaea)*

Blueberry *(Vaccinium* spp.*)*

Strawberry (*Fragaria virginiana)*

Elderberry (*Sambucus racomosa)*

APPENDIX B

Bear foods that commonly occur throughout Mountain View County and their seasonal use and intensity.

Latin Name	Common Name	Spring	Summer	Fall
Trees				
Populus tremuloides	Trembling aspen	High		
Shrubs and dwarf shrubs		**Low**	**High**	**Medium**
Amelanchier alnifolia	Saskatoon		High	Medium
Arctostaphylos uva-ursi	Kinnikinnik	Low-medium		
Cornus stolonifera	Red-osier dogwood		High	Medium
Empetrum nigrum	Crowberry	Low	Medium	Low
Juniperus communis	Common juniper			Low
Lonicera involucrata	Bracted honeysuckle		High	Low
Oploplanax horridus	Devil's club		High	Low-med.
Ribes lacustre	Black currant		Medium	Medium
Ribes oxycantholdes	Wild gooseberry		Low	Low
Rosa acicularis	Prickly rose	Low		Low-med.
Rubus acaulis	Dewberry			
Rubus idaeus	Wild red raspberry		Low	Low
Rubus parviflorus	Thimbleberry		Medium	Low
Salix spp.	Willow species	Low	Low	
Sambucus racomosa	Red elderberry		Low	Low
Shepherdia canadensis	Canada buffaloberry (soapberry)		High	Medium
Vaccinium membranaceum	Black or Mountain huckleberry		High	Medium
Vaccinium myrtilloides	Velvet-leaved blueberry		High	Medium
Vaccinium oxycoccos	Bog cranberry	Low	Medium	Low
Vaccinium scoparium	Grouseberry			Low
Vaccinium vitis-idaea	Lingonberry (Low bush cranberry)		Low	Low
Viburnum edule	Highbush cranberry		High	Medium
Herbs and Forbs		**High**	**Medium**	**Low**
Aster spp.	Aster species	Medium	Low	Low
Astragalus spp.	Milk vetch species	Medium		Medium
Aurelia nudicaulis	Wild Sarsaprilla			
Epilobium angustifolium	Fireweed			
Equisetum spp.	Horsetail species	High	Medium	
Fragaria virginiana	Wild strawberry		Low	
Hedysarum borelae	Northern sweet-vetch			
Heracleum lanatum	Cow parsnip	High	Medium	Low
Lathyrus spp.	Pea vine species	Low		Low
Pedicularis spp.	Lousewort species	High	Low	
Petasites sagittatus	Arrow-leaved coltsfoot	Low		
Rubus pubescens	Dewberry		Low	
Senecio triangularis	Arrow-leaved groundsel		Low	
Taraxacum officinale	Common dandelion	High	Low	Medium

Trifolium repens	White clover	High	High	Low
Trifolium pratense	Red clover	High	Medium	Low
Urtica dioica	Stinging nettle	Medium	Low	
Gramminoids (Grasses)		**High**	**Medium**	**Low**
Bromus spp.	Brome species	High	Low	
Carex spp.	Sedge species	Medium		
Deschampsia caespitosa	Tufted hair grass	Low	Low	
Poa spp.	Bluegrass species	High	Medium	
Other Sources				
Formicidae	Ants	Low	High	Low
Vespidae	Wasps		Low	
Castomomus commersoni	Common white sucker	Low		
Castor canadensis	Beaver	Medium		
Ungulate species	Carcasses	High	Low	High
Ungulate species	Calves	High	Low	Medium
Ursus arctos	Grizzly bear	Opportunistic	Low	
Ursus americanus	Black bear	Opportunistic		Low
Human Influenced Foods				
Alfalfa		Medium	Low	
Oats			Medium	High
Carcasses	Domestic cow	Opportunistic		
Carcasses	Hunter Killed Ungulate species	Opportunistic		
Gut piles	Hunter Killed Ungulate species	Opportunistic		Medium
Fruit trees (planted)		Low	High	High
Garbage		High	Medium	High

Appendix C

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Aerial View of that portion of Mountain View County west of Highway #22