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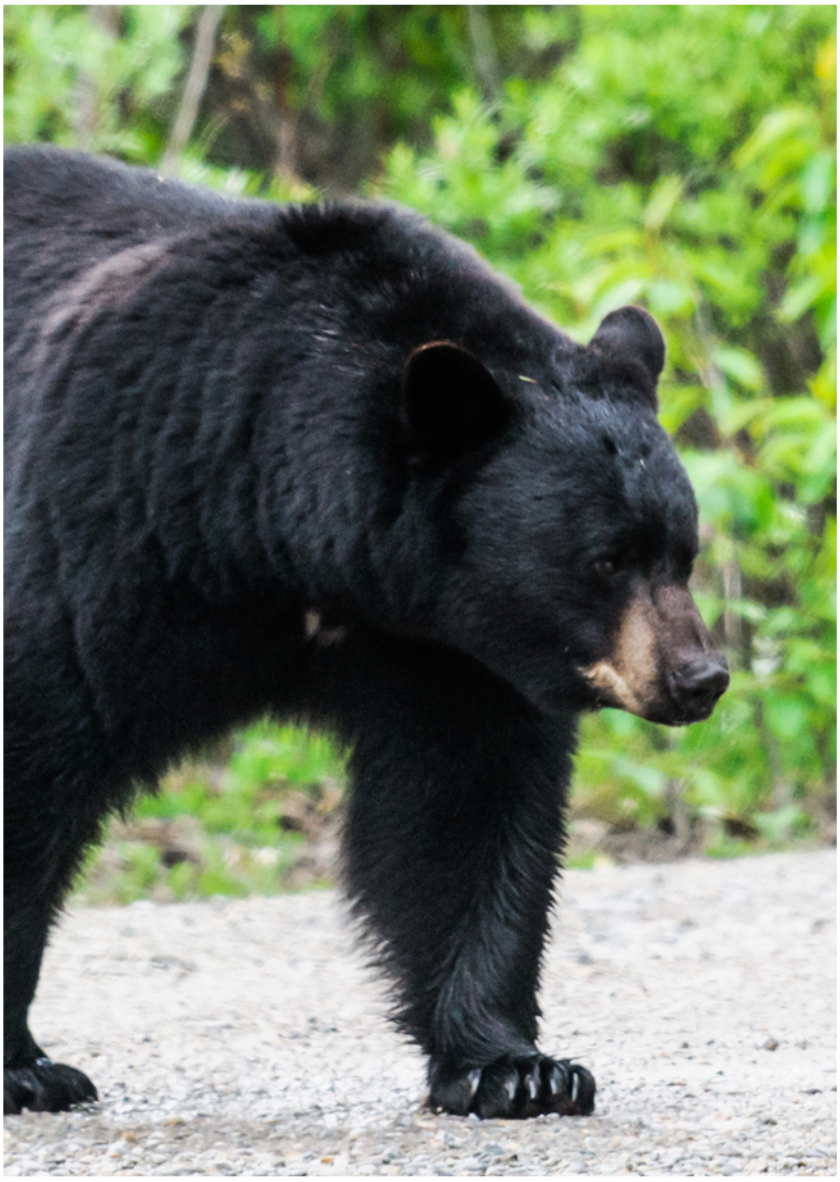

Management Plan for Black Bears in Alberta

Wildlife Management Planning

Alberta Environment & Parks
Wildlife Management Branch
Edmonton, Alberta

Alberta Government

Preface

This plan represents the Department's goals, objectives, and management strategies for the management of black bears in Alberta. It will periodically be reviewed and updated as necessary. Implementation will be subject to priorities established during the budgeting process. This plan includes historical information up to the fall of 2012.

Note: for the purposes of this publication, except where specifically noted, information is presented in a format that corresponds to calendar years.

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1.0 Introduction

Public interest in black bears (*Ursus americanus*) and their management is high across North America. In Alberta, black bears are appreciated for their aesthetic value and the consumptive and non-consumptive recreational opportunities they provide. As with most carnivores, management of black bears involves the management of people, and incorporating public values into management plans is essential. Human tolerance of black bears varies across the landscape. In some cases tolerance of black bears is high, such as in parks where people find bear sightings to be a highly memorable experience with the opportunity to view and photograph them, or in wild-lands where people hunt black bears. However, public tolerance can be low in population centers and agricultural areas where black bears are involved in conflicts with residents, causing property damage and in some cases public safety concerns. Securing attractants from bears is the most effective way to prevent conflicts, but these measures are often considered expensive and require an ongoing commitment to implement which creates substantial management challenges for government agencies responsible for ensuring that black bear populations remain abundant, while also minimizing negative interactions with the public.

Alberta's first Black Bear Management Plan (Gunson 1993) was based on a series of research projects that were conducted in portions of Alberta during the 1970s and 80s, supplemented with information from other jurisdictions. This document was used to guide black bear management in the province for two decades with basic management strategies changing relatively little during that period. However, a growing human population and increased use of the landscape require a review of black bear management strategies in Alberta. This document incorporates the latest information on black bear biology and status in Alberta into a series of updated management objectives and strategies for the species.

Extensive consultations with stakeholders, public opinion surveys, and discussion with other jurisdictions have all contributed to the development of this revised Black Bear Management Plan for Alberta. The plan reviews the biology of black bears, as well as their history and management in Alberta. It also summarizes the current status and use of the species in the province. Finally, it outlines goals, objectives and management strategies for the future conservation and use of black bears in Alberta.

2.0. Background

2.1 Biology

2.1.1 Habitat

Black bears are distributed widely across North America. Although extirpated from large portions of their former range, today black bears inhabit forested regions with low human densities from the arctic tree line south to Florida and northern Mexico (Pelton 2003, Garshelis et al. 2008). Black bears are omnivorous habitat generalists that have adapted to living in a variety of forest types throughout their range living at elevations from sea level to 3500 m, including dry Mexican scrub forests, cypress swamps in the southeastern United States, Alaskan rainforests, Labrador tundra, and a variety of deciduous and coniferous forests in between (Garshelis et al. 2008).

In Alberta, black bears have been extirpated from the southern farmland regions and they generally avoid areas of high human density. Black bear range currently encompasses approximately 74% of the province where they inhabit most forested areas and occur in five of Alberta's six natural regions including the Rocky Mountains, Foothills, Parkland, Boreal Forest, and Canadian Shield. Within these natural regions, black bears are most common in heterogeneous forests throughout the boreal forest, mountain, and foothill regions.

2.1.1.1 Home range characteristics

Black bears are considered a landscape species, in that they utilize a large home range encompassing many different habitats within that home range (Gaines et al. 2005, Moyer et al. 2008). Within their annual home range, black bears acquire the resources needed to survive and reproduce. Black bears generally structure their home ranges according to the distribution and abundance of foods throughout the year (Larivière 2001). Black bears tend to avoid extensive open areas and prefer heterogeneous forests with a mosaic of cover and clearings or early successional habitat, and a diversity of vegetation types (Herrero 1979, Rogers and Allen 1987). In mountainous regions, home ranges of black bears may be constrained by major topographical features, with the perimeters aligning with ridge tops and valleys (Powell and Mitchell 1998).

Although they prefer areas with low human densities, black bears have adapted to utilize forested habitats that are interspersed among a variety of land-use activities. A bears range can

overlap with areas that have been altered by industrial development, including roads, pipelines, and well pads. While these features may cause temporary disruption of use, black bears generally benefit from enhanced habitat quality created by forest openings and the growth of early successional vegetation (Jalkotzy et al. 1997). In the Swan Hills, Alberta, Nagy and Russell (1978) speculated that re-vegetated roads and pipeline rights-of-way contributed to the range expansion of black bears in the area. Black bears may also incorporate linear features into their home ranges as travel corridors (Jalkotzy et al. 1997).

Habitat connectivity is important for black bears as they travel large distances over diverse landscapes (Lyons et al. 2003). Black bears generally avoid extensive open areas in agricultural or prairie landscapes; however, they will incorporate areas of high human activity such as farms, ranches, and small rural communities into their home ranges if they are in close proximity to forest cover (Obbard et al. 2010, Klenner 1987, Kindall and Van Manen 2005, Moyer et al. 2008). In areas characterized by a mosaic of forest and developed lands, black bears will restrict their movements primarily to wooded areas, such as ravines, shelter belts, and river valleys (Klenner 1987). However, they will make incursions into areas where attractants are present, including residential areas and agricultural fields (Jones and Pelton 2003, Obbard et al. 2010).

2.1.1.2 Home Range Size

Black bear home range size varies considerably throughout the species' geographic range. Factors such as gender, age, and the overall ability of an area to meet an individual's annual needs influence home range size (Pelton 2003, Powell et al. 1997, Moyer et al. 2007). Home ranges are larger in areas or years of low food abundance when bears must range widely in search of food (Oli et al. 2002, Larivière 2001, Powell et al. 1997, Pelchat and Ruff 1986). For example, in the boreal mixed-wood forest of northeastern Alberta, the mean size of areas occupied by male and female bears, respectively, was larger in 1976 when food was scarce (102 km^2 and 39 km^2), than in 1975 when food was abundant (65 km^2 and 19 km^2, Pelchat and Ruff 1986). Space use by black bears can also vary temporally due to seasonal fluctuations in food availability, with less area used in the spring and early summer when food is in greater supply, and more used during late summer and fall with more extensive foraging (Wooding and Hardisky 1994, Pelchat and Ruff 1986).

Data to asses black bear home range size is limited for Alberta but based on what is available, annual home ranges of females and males respectively, were estimated to average 20 km^2 and 119 km^2 at Cold Lake (Young and Ruff 1982) and 123 km^2 (n=4) and 151 km^2 (n=9) at Swan Hills (Nagy and Russell 1978). In two additional Alberta studies, the average home ranges of female black bears

with cubs were smaller than unencumbered females, reported as 7.5 km^2 (n=4) at Cold Lake (Fuller and Keith 1980) and 11 km^2 (n=2) at South Wapiti (Horejsi and Raine 1983). In Banff National Park the large size of the annual home ranges of black bears were attributed to low population density and limited data, averaging 73 km^2 for females (n=5) and 218 km^2 for males (n=3) (Raine and Kansas 1988). Similarly, in northeastern Alberta home range size was compared between a lower density population, 58 km^2 for females (n=12) and 3782 km^2 for males (n=7), and a higher density population, 27.5 km^2 for females (n=8), and 123.5 km^2 for males (n=6) (Czetwertynski et al. 2007). Population density has been shown to be negatively correlated with home range size in black bear populations outside of Alberta as well (Oli et al. 2002).

2.1.1.3 Movements

Black bears are generally most active at dawn and dusk, although significant activity occurs during daylight hours (Pelton 2003). Movements of black bears changes seasonally in response to changes in food supply and the breeding season (Larivière 2001, Powell et al. 1997). Several studies have documented long distance movements of bears to concentrated food sources (up to 200 km; Rogers 1987b), especially in late summer and fall when bears need to increase their body fat in preparation for hibernation (Larivière 2001, Noyce and Garshelis 2011). While some long-distance black bear movements have occurred in response to extreme food shortages, such as drought or mast failure, most occur because rich food resources are available outside of their home ranges, including green-up sites, spawning areas, berry patches, and landfills (cited in Gunson 1993).

Adult males travel farther per day than do adult females (Noyce and Garshelis 2011, Larivière 2001). Subadults that are in the process of selecting and establishing a home range tend to wander over larger areas, a period called “floating”, compared to residents that are already established, and consequently this often leads to greater mortality for subadults (Pacas and Pacquet 1994, Klenner 1987, Costello 2010). Reproductive status may affect movements of females due to a lack of mobility of cubs in their first several months of life (Powell et al. 1997, Lindzey and Meslow 1977).

2.1.1.4 Habitat Use within Home Ranges

Prime black bear habitat is characterised as relatively inaccessible terrain, thick understory vegetation, with abundant sources of food in the form of shrub or tree-borne soft or hard mast (fruit and nuts, Pelton 2003). Black bears generally prefer contiguous tracts of heterogeneous forests interspersed with clearings or early successional habitat (Herrero 1979, Rogers and Allen 1987); however, they are very adaptable and will exploit a wide variety of habitats in order to

acquire the resources needed for survival and reproduction (Davis et al. 2006, Pelton 2003, Larivière 2001).

Seasonal changes in black bear habitat use appear to be driven by variation in food availability (Pelchat and Ruff 1986, Young and Beecham 1986, Costello and Sage 1994, Wooding and Hardisky 1994, Davis et al. 2006, Schooley et al. 1994a). In the boreal forest of Alberta, black bears utilise habitats according to the availability of abundant foods, especially of berries (*Vaccinium* spp., Pelchat and Ruff 1986, Fuller and Keith 1980). Similarly, in Banff National Park black bears utilise low elevation sites during spring and early summer when buffaloberries are abundant, and move to higher elevation sites during late summer-fall to feed on other maturing fruit during the post-buffaloberry season (Raine and Kansas 1990).

In the boreal forest of Alberta, black bears appear to select for well-drained upland mixed woods, avoiding bogs and fens (Latham et al. 2011, Fuller and Keith 1980, Young and Ruff 1982). Other studies have demonstrated black bear preference for dense mixed-wood forest habitat with varying degrees of canopy closure which provide a diversity of fruit bearing shrubs, compared to pure coniferous stands or bogs which generally have low plant productivity (Obbard et al. 2010, Young and Beecham 1986, Jonkel and Cowan 1971, Brodeur et al. 2008, Costello and Sage 1994).

Habitat that provides cover for security and resting is also important, and includes areas with large trees with dense canopy closure, and a dense shrub understory (Young and Beecham 1986, Pelton 2003, Rogers 1993, Herrero 1972). To escape predators black bears will climb trees and generally require large (>20 inches dbh) trees with sturdy, creviced bark that cubs can safely climb (Powell et al 1997, Zapisocky et al. 1998). Large diameter trees are also used by adult females as refuges and resting places for young cubs (Rogers 1993, Obbard et al. 2010).

Disturbed habitats such as recently logged or burned forests are important for black bears since openings in the forest canopy provide regenerating vegetation characterised by high plant diversity, including many fruit producing species (Larivière 2001, Costello and Sage 1994, Mosnier et al. 2008, Davis et al. 2006, Lindzey and Meslow 1977, Obbard and Kolenosky 1994). In environments with low productivity such as the boreal forest, high-density fruit patches are especially critical to black bears for energy acquisition and to meet minimum protein requirements (Pritchard and Robbins 1990, Welch et al.1997, Brodeur et al. 2008, Mosnier et al. 2008). While black bears tend to avoid clearcuts (Young and Beecham 1986, Jonkel and Cowan 1971), or very recent (<5 years) regenerating forests (Brodeur et al. 2008), they will select older regenerating forests, generally between 5 and 24 years old (Brodeur et al. 2008, Mosnier et al. 2008, Jonkel and Cowan 1971,

Costello and Sage 1994, Lindzey and Meslow 1977). Other disturbed habitats selected by black bears include areas near low-traffic roads, pipelines, seismic lines, and oil and gas wells, where the growth of early successional vegetation is promoted from exposed mineral soils and direct seeding (Davis et al. 2006, Fecske et al. 2002, Mosnier et al. 2008). In northern Alberta black bears often select habitat with various industrial features including roads, pipelines, and seismic lines which are associated with a high abundance of forage (Latham et al. 2011, Czetwertynski et al. 2007).

Black bears also commonly use livestock pastures, croplands, and low-density settled areas where anthropogenic foods are available (Obbard et al. 2010, Klenner 1987, Young and Ruff 1982). While black bears generally do not select these habitats at the population level, some individuals will use these habitat features if they are available within their home range (Obbard et al. 2010). Indeed, bear habitat adjacent to agricultural crops and other anthropogenic food sources can enhance suitability for black bears, especially during the late summer and fall as they prepare for winter denning, or during times of food scarcity. The ability of black bears to utilise a variety of habitats reflects their adaptability to anthropogenic landscape change, and enables them to thrive in areas of human-wildland interface.

2.1.1.5 Denning

Winter hibernation is an essential component of the black bear life cycle, allowing them to survive periods of low food availability and adverse weather conditions (Rogers 1987b, Baldwin and Bender 2007). During this period of dormancy, metabolic rates are reduced substantially, stored energy reserves are used, and bears do not eat, drink, defecate, or urinate (Pelton 2003). Females also give birth to cubs in dens and provide early maternal care over winter. Dens therefore play an important role in the survival and reproduction of black bears and site selection is key (Davis et al. 2012).

The length of denning varies among geographic regions and habitat conditions (Gaines 2003). In Alberta, den entry dates of black bears have been reported to occur between late September to early November (Fuller and Keith 1980, Tietje and Ruff 1980), which is similar to those in other locations with similar climate and habitat (Klenner and Kroeker 1990, Kolenosky and Strathearn 1987, Beecham et al. 1983). Fall food supply appears to be one of the most important factors influencing den entrance, with bears denning earlier during years of food scarcity (Tietje and Ruff 1980, Alt et al. 1980, Schwartz et al. 1987), and delaying entry during years of high food abundance (Kolenosky and Strathearn 1987, Schooley et al. 1994b, Gaines 2003, Klenner and Kroeker 1990). In East Central Alberta, annual variation in den entry was attributed to the abundance of blueberries

that persisted in the fall (Tietje and Ruff 1980). Physical condition (Klenner and Kroeker 1990) and overall cumulative effects of weather, including snow accumulation (Jonkel and Cowan 1971, Lindzey and Meslow 1976, Gaines 2003, Schwartz et al. 1987) have also been reported as stimuli for den entry.

Emergence from dens occurs during spring (April-May) and appears to be influenced by snow melt (Schooley et al. 1994b, Schwartz et al. 1987), temperature (Kolenosky and Strathearn 1987, Lindzey and Meslow 1976, O'Pezio et al. 1983), and physical condition (Lindzey and Meslow 1976). In Alberta, emergence from dens has been reported to occur during the first two weeks of April (Tietje and Ruff 1980), similar to the dates reported in other northern and western regions (Schooley et al. 1994b, Beecham et al. 1983, Kolenosky and Stathearn 1987, Gaines 2003, Aune 1994). Denning chronology also varies among gender and age groups. Pregnant females or females with cubs typically enter dens earlier and emerge later than other black bears, followed by other adult females, subadults, and finally males (Tietje and Ruff 1980, Schooley et al. 1994b, Smith et al. 1994, Garrison et al. 2012).

The location and structural characteristics of black bear dens vary greatly among geographic regions (Larivière 2001). In northern regions where large diameter trees are uncommon and protection from extreme cold temperatures is more critical, black bears tend to use excavated ground dens more frequently, taking advantage of heavy snowfall for concealment and insulation (Pelton 2003, Kolenosky and Strathearn 1987, Tietje and Ruff 1980, Smith et al. 1994, Klenner and Kroeker 1990). Available studies of black bear denning habitat in the boreal forest suggest that bears usually select den sites in mature conifer or mixed-wood forests, although some deciduous forest are used (Tietje and Ruff 1980, Fuller and Keith 1980, Nagy et al. 1989, Kolensoky and Strathearn 1987, Schwartz et al. 1987, Bertram and Vivion 2002, Ruttan 2002). Burrow type dens are typically excavated under upturned root masses or trunks of fallen trees, into hillsides, or into relatively level ground (Fuller and Keith 1980, Tietje and Ruff 1980, Kolensoky and Strathearn 1987, Klenner and Kroeker 1990, Beecham et al. 1983, Schwartz et al. 1987, Bertram and Vivion 2002). They may be surrounded by thick undergrowth that obscures entrances and enhances seclusion (Kolenosky and Stathearn 1987), and entrances lead to a single chamber that is lined with vegetation (Fuller and Keith 1980). Occasionally black bears will enlarge burrows of foxes, coyotes, or other animals (Ruttan 2002).

Black bears will sometimes use previously occupied dens if there are fewer suitable den sites available or if a site was successfully used during the last winter and is still structurally sound (Gaines 2003, Linnel et al. 2000). In a review of studies on black bear response to disturbance, Linnel

et al. (2000) concluded that black bears will readily den within 1-2 km of human activity (e.g. roads, habitation, industrial activity), however, responses vary for activity less than 1 km, and especially within 200 m, with some bears tolerating activity right up to the den. Black bears may be more likely to den in areas where human disturbance is predictable (Linnel et al. 2000), traffic volume is low (Brody and Pelton 1989) or human use is low (Reynolds-Hogland and Mitchell 2007). Adult females with cubs may select more protective den sites further from roads compared to adult females without cubs (Reynolds-Hogland and Mitchell 2007).

2.1.2 Population Dynamics

Population dynamics of black bears are primarily a function of reproduction and mortality, with dispersal playing a smaller role than with some other large carnivore species (Pelton 2003). Several studies have examined black bear population dynamics throughout North America, for both hunted and unhunted populations, including in Alberta (Czetwertynski et al. 2007, Hebblewhite et al. 2003, Nagy et al. 1989, Ruff 1978, Nagy and Russell 1978, Gunson and Cole 1977, Kemp 1972, Young and Ruff 1982, Sargeant and Ruff 2001).

2.1.2.1 Reproduction

Productivity (number of young born/year) of a black bear population appears to be largely density-independent, and is primarily a function of habitat quality and nutritional condition of reproducing females, as well as the number of adult females in the population (Elowe and Dodge 1989, Beecham 1980, Kolenosky 1990). Thus, black bear populations exhibit great regional and yearly variation in reproductive rates, and understanding local reproductive rates is fundamental for management, especially as hunting pressure and other mortality factors increases (Kolenosky 1990).

Black bears are polygamous and will have several mates during a lifetime. Male black bears do not exhibit territoriality but have large, overlapping home ranges that encompass the home ranges of several females (Powell et al. 1997). Male black bears search widely for receptive females with larger or older males generally having better success because of higher encounter rates and the ability to prevent rival smaller males from mating through direct competition (Kovach and Powell 2003, Costello and Creel 2009). Adult male bears may kill offspring fathered by others in order to promote future breeding opportunities, although this likely has a relatively minor impact on overall population dynamics (Miller et al. 2003, Czetwertynski et al. 2007). Black bears are also promiscuous, since both sexes will mate with multiple partners over a short period (Larivière 2001). Throughout its range, including in Alberta, the breeding season for black bears is in summer, and

typically peaks in June and July (Nagy et al. 1989). Adult females remain in estrus throughout the season until they are bred or until their ovarian follicles begin to degenerate (Pelton 2003). Female black bears have asynchronous estrous, allowing one male to breed several females within his home range.

Female black bears reach sexual maturity between 2 and 8 years of age (Larivière 2001), depending on habitat quality and food supply (Rogers 1976, Elowe and Dodge 1989, Kasbohm et al. 1995, Kasbohm et al. 1996, Pelton 2003). In one study of black bears utilising an agricultural zone in northwestern Alberta, Gunson and Cole (1977) observed two 2-year-old females (n=5) with corpora lutea and four females (n=11) that were either lactating or with young cubs at age three. There is not much data on age of first reproduction in Alberta, however at Conklin and Cold Lake respectively the median age of first reproduction was and five and seven years (n=30, both populations, Czetwertynski et al. 2007).

Female black bears exhibit delayed implantation which occurs in mid-November to early December, therefore actual gestation lasts approximately 60-70 days (Larivière 2001). Litter size is usually two but three or four are not uncommon, and litters of five cubs have been reported (Larivière 2001, Jonkel and Cowan 1971, Malcolm et al. 2007, Kasworm and Thier 1994). Variation in litter size is influenced by the age, weight, and maternal condition in early winter (Kolensoky 1990, Samson and Huot 1995, Larivière 2001, Czetwertynski et al. 2007). For females in poor condition, pseudopregnancy, implantation failure, and fetal resorption may occur (Hellgren et al. 1990, cited in Larivière 2001). In Alberta, average litter size has been reported as 2.2 (n=5) at Swan Hills (Nagy and Russell 1978), 2.3 (n=4) in the Berland-Wildhay study area (Nagy et al. 1989), 2.4 (n=16) in the Peace River region (Gunson and Cole 1977), 1.9 (n=15) in the Bow Valley (Hebblewhite et al. 2003), and between 1 and 3 (n=42) at both Conklin and Cold Lake, with a reported correlation between female mass and litter size (Czetwertynski et al. 2007).

Females give birth in their dens during January or February, and cubs are born with their eyes and ears closed and no hair, weighing 200-300 grams (Larivière 2001, Pelton 2003). The weight, growth, and survival of cubs are positively related to maternal weight (Noyce and Garshelis 1994), and the interbirth interval depends on cub survival and physical condition of the female (Jonkel and Cowen 1971). Lactation suppresses estrus while the female has dependent cubs. Cubs become independent sometime during their second summer. Females typically breed every other year but will breed in consecutive years if they lose their entire litter before late summer (Larivière 2001, Pelton 2003). Years of poor food quality can cause widespread reproductive failure and initiate

synchrony in cub production within a population, leading to annual cycles of high and low cub production (Pelton 2003, Bridges et al. 2011, Ternent 2006).

Noyce and Garshelis (1994) reported that with declining nutrition, life history parameters for black bears in Minnesota responded in the following sequence: litter size declined, age at first reproduction increased, juvenile survival decreased, 1st-year cub survival decreased, and litter frequency decreased. Population growth in black bears is most sensitive to survival of adult females (Beston 2011, Brongo et al. 2005).

2.1.2.2 Mortality and Survival

Black bears are long lived species and in Alberta a few individuals have been reported to survive past 20 years of age, with most living into the 10-20 year range when they are not harvested (Larivière 2001, Gunson 1993, Hebblewhite et al. 2003, Kolenosky and Stathearn 1987). Natural causes of black bear mortality include disease, starvation, and predation by bobcats, coyotes, wolves, grizzly bears, or other black bears (Pelton 2003, Larivière 2001, Obbard and Howe 2008). However, in most landscapes natural sources of mortality likely have little impact on adult survival, as the majority of mortality is usually human-caused including trapping, hunting, poaching, vehicle collisions, and management removal (Pelton 2003, Larivière 2001).

Males are more vulnerable to human-caused mortality than females because of their larger home ranges and because hunters select for them (Koehler and Pierce 2005, Kasworm and Thier 1994, Hellgren and Vaughan 1989, Czetwertynski et al. 2007). Mortality rates are highest among young bears after they leave their mother, and especially for males since they disperse from their natal areas as yearlings or 2-year-olds, whereas females tend to stay in their natal areas (Kolenosky 1986, Pelton 2003, Obbard and Howe 2008). At Cold Lake, Alberta, Kemp (1972) reported that yearlings and subadults (2-3 years old) experienced the lowest survival rates at 63.3% and 62.5%, respectively, increasing to 87.5% once bears reached maturity. Similarly, yearling and subadult survival was reported, respectively, as 67% and 64% in Banff National Park, and increased to 84% for adults (Hebblewhite et al. 2003).

Cub survival is an important demographic parameter to black bear population ecology (Ryan 1997). Causes of cub mortality are not well known, but are mainly attributed to malnutrition or infanticide (Baldwin and Bender 2009). Cub survival is influenced by the size, condition, and experience of the mother, with cubs of first time mothers experiencing higher mortality rates than cubs of older females (Baldwin and Bender 2009, Noyce and Garshelis 1994, Alt 1982, Ryan 1997).

Total mortality of litters is common in black bears (LeCount 1987, Alt 1982, Ryan 1997). Czetwertynski et al. (2007) reported that 6 (13%) of the 47 litters of cubs observed over four winters at Cold Lake, Alberta were completely lost. Some cubs may be orphaned and starve if their mothers are killed (Hristienko et al. 2004); however, since most jurisdictions in North America with spring hunting seasons prohibit the killing of cubs or females with cubs, the incidence of orphaning is presumed to be negligible (<2%) compared to cub mortality from natural causes (Hristienko and McDonald 2007).

The vulnerability of black bears to human caused mortality will vary depending on habitat security and the degree of access (Czetwertynski et al. 2007). Hunting is a dominant cause of mortality for black bears in most areas, including Alberta (Kolenosky 1986, Kasworm and Thier 1994, Hellgren and Vaughan 1989, Koehler and Pierce 2005, Powell et al. 1996, Beringer et al. 1998). Between 2001 and 2005, Czetwertynski et al. (2007) reported that 89% of bear mortality in the Conklin area of northeastern Alberta was due to spring hunting. Other sources of human-caused mortality in black bear populations include illegal hunting (Powell et al. 1996, Beringer et al. 1998) and management control in response to conflict with humans (Koehler and Pierce 2005, Obbard and Howe 2008).

Processes that regulate black bear populations remain poorly understood and controversial. Some authors suggest that adult males regulate bear populations through intraspecific predation and infanticide (Bunnell and Tait 1981, LeCount 1987, McLellan 1993, Clark and Smith 1994, Taylor 1994). Therefore populations that are reduced through hunting pressure can potentially compensate for some harvest mortality through increased reproduction or survival (Sargeant and Ruff 2001, Czetwertynski et al. 2007). However recent research suggests that density-dependent effects on vital rates of bears has the largest influence on populations that are near carrying capacity, and survival and reproduction rates will vary in black bear populations below carrying capacity because of factors unrelated to harvesting pressure (Miller et al. 2003, Czetwertynski et al. 2007, Obbard and Howe 2008). Furthermore, density-dependent effects can be confounded with effects of habitat quality, which has a large influence on reproduction (Beecham 1980, Garshelis 1994, Elowe and Dodge 1989, Rogers 1987b). Several authors suggest that harvest mortality is at least partially additive to other forms of mortality (Powell et al. 1996, Beringer et al. 1998, Sargeant and Ruff 2001, Obbard and Howe 2008, Beecham 1980).

2.1.2.3 Dispersal and Source-Sink Dynamics

Dispersal plays an important role in establishing and maintaining black bear populations (Lee and Vaughan 2003). Rates of dispersal are generally male-biased, with most male bears dispersing from their natal area whereas most females settle in or adjacent to it (Elowe and Dodge 1989, Schwartz and Franzmann 1992, Costello 2010), and may be influenced by population density (Costello 2008, Roy et al. 2012). Male bears may gain advantages by dispersing, including reduced mate and resource competition, and inbreeding avoidance, while females benefit from acquiring resources for successful reproduction within a home range that is familiar (Costello 2010, Lee and Vaughan 2003). Straight-line dispersal distances have been reported as 3–15 km for females and 13–219 km for males (Beck 1991, Elowe and Dodge 1989, Rogers 1987a; cited in Costello 2010, Lee and Vaughan 2003).

In populations experiencing high mortality, immigration from nearby source populations can aid in population stability and recovery (Beston 2011). In Banff National Park, Hebblewhite et al. (2003) suggested that immigration of bears may have been offsetting mortality and therefore contributing to population stability. Management can also induce important spatial variation in black bear populations. For example, sanctuaries for black bears were established in North Carolina in 1971 to protect breeding females and to provide dispersing bears for recreational hunting, thereby serving as source populations (Powell et al. 1996, Beringer et al. 1998). Similarly, immigration of subadult males played an important role in maintaining black bear populations experiencing heavy harvest pressure in Idaho (Beecham 1980) and Cold Lake, Alberta (Kemp 1976, Young and Ruff 1982).

2.1.3 Food Habits

Black bears are opportunistic omnivores with varied diets consisting mostly of vegetation. Throughout the year, black bears select for food items that are high in nutrients and low in cellulose (Rogers 1987b), feeding primarily on buds, new growth of grasses and forbs, flowers, fruits, and nuts (Garshelis et al. 2008). A small proportion of their diet consists of animal matter, which is primarily in the form of colonial insects such as ants and wasps, with most vertebrates consumed in the form of carrion (Pelton 2003, Larivière 2001).

Black bears must meet all of their nutritional needs for the entire year in a relatively short period, and therefore must adapt their foraging strategies by focusing on food patches that provide the highest return in calories (Mosnier et al. 2008, Noyce and Garshelis 2011). Spring is a period of relative food scarcity and black bears generally lose weight during this period, primarily relying on succulent grasses and forbs that are available, and regaining some of their weight during summer when a variety of berry crops become available which are high in energy (Pelton 2003). The late

summer and fall is a critical period for black bears to increase fat reserves in preparation for hibernation, and extensive foraging and movements may occur, with black bears taking advantage of available foods primarily in the form of hard and soft mast (Pelton 2003).

Food habits of black bears in the mixed-wood boreal forest at Cold Lake, Alberta have been described by Parker (1973), Ruff (1978), and Pelchat and Ruff (1986). During the spring black bears fed primarily on vetchling grasses (*Lathyrus* spp.), catkins of aspen and balsam poplar (*Populus* spp.), horsetails (*Equisetum* spp.) and common dandelions (*Taraxacum officinale*). Animal matter consisted mainly of fish and insects, with insects occurring in 58% of scats but accounting for less than 1% dry weight. In early summer the consumption of vetchling increased dramatically, while the use of other green vegetation declined, and insect consumption remained frequent. From mid-July through August, berries were heavily utilised especially wild sarsaparilla (*Aralia nudicaulis*) and blueberries (*Vaccinium* spp.). Common bearberry (*Arctostaphylos uva-ursi*), beaked hazelnut (*Corylus cornuta*), rose (*Rosa* spp.), currants (*Ribes* spp.) and vetchling were common occurrences in the fall. Black bears also exhibited a dramatic shift in food use from year to year depending on food availability (Pelchat and Ruff 1982, Ruff 1978, Gunson 1993).

The diets of black bears were also examined in the Sheep River area of Kananaskis Country, Alberta, by Holcroft (1986) and Holcroft and Herrero (1991). The primary foods consumed by black bears were forbs, bearberries, horsetail, and mammals in spring; forbs, cow parsnip (*Heracleum lanatum*), ants (*Formicidae*), and buffaloberries (*Shepherdia Canadensis*) in the early summer; wild red raspberries (*Rubus idaeus*), buffaloberries and ants in late summer; and bearberries, bog cranberries (*Vaccinium vitis-idaea*), wasps, mammals, and forbs in fall. The dominant green vegetation included Pea Vine (*Lathyrus ochroleucus*), wild vetch (*Vicia americanus*), pink and yellow hedysarum (*Hedysarum alpinum* and *H. sulphurescens*, respectively), and dandelion. Black bears also demonstrated a preference for specific phenological stages of plants throughout the year, such as early growth stages of horsetail, grasses and most forbs, and middle growth stages of cow parsnip. Yearly variation in food habits of black bears was also observed, with changes in the consumption of mammals and certain forb species from year to year, and the increased consumption of wasps during years of high abundance (Holcroft and Herrero 1991).

Although they are generally not active predators, black bears will feed on vertebrates if the opportunity arises, including mice, voles, squirrels, beavers, muskrats, and birds (Larivière 2001). In less productive environments, black bears may rely more on animal matter as a source of protein, preying on neonate ungulates and consuming winter-killed carrion or small mammals more frequently (Baldwin and Bender 2007, Raine and Kansas 1990). Indeed, many studies have

documented black bears as effective predators of ungulates, including calves of caribou (*Rangifer tarandus*), elk (*Cervus elaphus*), and moose (*Alces alces*), as well as fawns of white-tailed deer (*Odocoileus virginianus*) and mule deer (*Odocoileus hemionus*) (Latham et al. 2011, Larivière 2001). Bear predation on ungulate neonates is most likely to occur during the first 4-6 weeks of life (Ballard et al 1981, Latham et al. 2011). Black bears will also occasionally kill livestock, including cattle, sheep, and swine (Gunson 1993, Horstman and Gunson 1982, Collinge 2008).

Black bears adjust their foraging strategies as opportunity and need present themselves (Pelchat and Ruff 1986). Localised failure in berry production, or regional scarcity of key fall foods means black bears have to travel extensively in search of food and may wander outside their normal range and into areas used by humans, including landfills and residential areas (Garshelis et al. 2008, Obbard et al. 2010, Rogers 1976). Black bears are drawn to concentrated food sources, and will readily consume various anthropogenic foods if the opportunity arises, including garbage, birdseed, agricultural crops, orchards, honey and brood in apiaries (Garshelis et al. 2008, Schooley et al. 1994a, Rogers 1976, Elowe and Dodge 1989). The consumption of anthropogenic foods by black bears in Alberta has been reported in several studies (Pacas and Paquet 1994, Holcroft and Herrero 1991, Raine and Kansas 1990, Honeyman 2007). Black bears often show a preference for unnatural foods because they are generally high in fat and protein content (Pelton 2003); several studies have demonstrated a relationship between the consumption of human foods and an increase in size, condition, and productivity of black bears (Rogers 1987, Baldwin and Bender 2009).

2.2 Historic and Current Status in Alberta

2.2.1 Numbers and Distribution

Black bears occupy all major forested habitats in Alberta. These include all five Boreal ecoregions: Mixedwood, Foothills, Uplands, Northlands and Subarctic, as well as the Subalpine and Montane ecoregions associated with the Rocky Mountains (Strong and Leggat 1981). Although black bears historically occurred in abundance in the Aspen Parkland Ecoregion (Soper 1964, Banfield 1977), numbers there have been reduced by agriculture and settlement. The current range of the black bear in Alberta encompasses about 488,000 km^2, or about 74 percent of the land area of the province.

There have been no formal estimates of black bear population size or density within Alberta since the publication of the earlier version of this plan in 1993. Although some research on black bear population dynamics has occurred since that time in northeastern Alberta (Czetwertynski 2008)

and in the Bow Valley (Hebblewhite et al. 2003), no density estimates were calculated. Therefore, there is little information with which to update the provincial black bear population estimate of 40,000 animals from 1993. Further, overall patterns of landscape change in Alberta during the past 2 decades may have had conflicting influences on black bear population size. Expansion of agriculture, forestry activity, and oil and gas operations have opened up mature forests and created an abundance of edge habitat, which has likely increased overall food production for black bears. However, increasing road access and overall human use of the landscape may have increased rates of human-caused mortality. Without further information, it is impossible to disentangle these factors and surmise the overall trend of black bear populations in the province.

In the absence of more recent information, black bear density estimates for different habitat regions in Alberta that were developed in the 1970s and 80s remain in place (Table 2.1). Anecdotal information from staff and the public indicate that as a whole, black bears populations are doing well in Alberta, and may have increased in some areas. In other parts of the province, particularly along the east slopes, there is some concern that local population declines may have occurred.

Table 2.1. Estimated density of black bears in habitat regions in Alberta.

Habitat Region	Data Sources	Estimated Density (bears/100km^2)
Montane	N/A	10
Subalpine	Mamo et al. 1984 Raine and Kansas 1988	10
Boreal Mixedwood	Fuller and Keith 1980 Young and Ruff 1982 Horejsi and Raine 1983	15
Boreal Foothills	Nagy and Russell 1978 Mamo et al. 1984	10
Boreal Upland	Nagy et al. 1989	5
Boreal Northlands	N/A	5
Boreal Subarctic	N/A	5

2.2.2 Hunting

2.2.2.1 Hunting regulations

Hunting regulations for black bears have varied through time, reflecting changing public attitudes towards bears and recognition of their value as a big game species (Table 2.2). Black bears have always been hunted under the authority of a general licence, and the annual bag limit has varied from one to four bears. Black bears have been hunted during separate spring and fall seasons since at least 1953, with dates varying slightly across years and areas of the province.

Table 2.2. Summary of hunting regulation changes pertaining to black bears in Alberta.

Year	*Management Change*
1927	***Bag limit of 2 bears. Bears under one year of age and females with cubs could not be taken.***
1928	***Hunting season closed from 15 June to 1 September.***
1929	***Classified as Big Game. Hunting not permitted east of Range 27, West of 4th Meridian.***
1936	***Bag limit reduced to 1 bear/year, except in southwest Alberta where bears were unprotected.***
1944	***All hunting restrictions including bag limits and protection of females and cubs removed.***
1947	***Black bear hunting in the Forest Reserve north of Crowsnest Pass prohibited.***
1953	***Spring bear licences introduced for both residents and non-residents. Bears could be hunted in the fall under the authority of a Big Game, Moose, or Elk Licence. Annual bag limit of 2 bears established. Females with cubs protected from hunting.***
1971	***A black bear licence was required for both the spring and fall hunting seasons.***
1987	***Baiting for the purpose of hunting black bears allowed for the first time. Permitted only in certain WMUs in the foothills and boreal forest.***

1988	***Separate licences required for the spring and fall***
1989	***Baiting permitted in WMUs 334 and 336***
1992	***The spring and fall black bear hunting licences were replaced by a black bear licence and a supplemental black bear licence. Baiting prohibited in the southern portion of WMU 520. Baiting prohibited within 1 mile of parks, occupied dwellings, recreation areas, and some industrial sites. Hunters required to post signs around each bait.***
1993	***Baiting permitted within 1 mile of occupied dwellings with written permission.***
2010	***Baiting prohibited in portions of WMUs 320, 324, and 526. Start of the spring hunting season aligned to April 1 in most WMUs. End of the spring hunting season aligned to May 31 or June 15th in most WMUs.***
2011	***Baiting closure in the southern portion of WMU 544 eliminated. Start of the fall general hunting season aligned to September 1st in most WMUs.***

2.2.2.2 Hunting season dates

For many years the start of black bear fall hunting seasons coincided with the opening of antlered big game seasons. However, over time, increasing complexity of ungulate seasons led to standardization of the start date of the fall black bear season to September 1st in most WMUs. Later start dates in Kananaskis Country reflect a desire to avoid conflicts between recreationalists and hunters on the Labour Day long weekend. Spring hunting seasons start on April 1st and end on May 31st or June 15th in most locations, except for Kananaskis country where the season closes on May 15th in order to avoid conflicts on the May long weekend (Table 2.3).

Table 2.3. Black bear hunting season dates in Alberta.

Type	Season	WMUs
	Archery Only General	

Fall	Aug. 25 – Aug. 31	Sept. 1 – Nov. 30	326-330, 339-347, 349-360, 412-446, 511-544
	Sept. 1 – Nov. 30		212
	Sept. 8 – Nov. 30		410
		Sept. 1 – Nov. 30	200-208, 214-260, 300-324, 332-338, 348, 400, 402, 500-510, 841
		Sept. 8 – Nov. 30	404 – 408
Spring	Apr. 1 – May 31		212, 410
		Apr. 1 – May 15	404-408, 841
		Apr. 1 – May 31	200-208, 214-260, 300-342, 348, 400, 402, 429, 500-510
		Apr. 1 – June 15	344-347, 349-360, 412-428, 430-446, 511-544

2.2.2.3 Bag Limits

Black bear annual bag limits for licenced hunters have varied from one to four bears since 1927, except from 1944 to 1952 when no bag limits were in place (Table 2.4). Since 1992, a second black bear could be hunted in WMUs 224, 250, 258, 260, 320-360, 429, 445, 500-544, and 841. These limits do not apply to private land, where black bears can be hunted year-round without a licence and with no bag limit.

Table 2.4. Black bear annual bag limits in Alberta, by year, 1927-2012.

Period	Annual Bag Limit
1927-1935	2
1936-1943	1
1944-1952	None
1953-1961	2

1962-1967	4
1968-1970	4
1971-1975	1
1976-1987	2
1988-1991	4
1992-2012	2[i]

[i] *The second bear could be hunted only in certain WMUs*

2.2.2.4 Licence Cost

The cost of a resident black bear licence has remained relatively affordable, ranging in price from $5 - $20 (Table 2.5). Resident licence fees have risen slowly since 1988, but have not kept pace with inflation. As is customary, licence fees for non-resident and non-resident aliens have always been higher than the fee for Alberta residents.

Table 2.5. Cost of black bear hunting licences in Alberta, by year, 1953-2013.

Licence Years	Cost		
	Resident	**Non-Resident**	**Non-Resident Alien**
1953-1979	5.00	25.00	25.00
1980-1986	10.00	50.00	100.00
1987	20.00	100.00	150.00
1988-1989	10.00	50.00	75.00
1990	11.00	51.00	76.00
1991	12.10	56.59	85.14
1992-1993	12.15	57.20	85.75
1994-1995	12.90	60.65	90.89
1996	13.80	64.90	97.25
1997	13.80	64.90	81.20
1998-2007	13.25	60.59	75.89

2008-2013	15.65	63.61	79.62

2.2.2.5 Licence administration and sales

The administration of black bear hunting licences has varied considerably since first introduced in 1953. In some years, a separate black bear licence was only required during the spring, and at other times, separate spring and fall licences could be purchased. More recently, each licence has been valid for both the spring season and the following fall season. Resident licences have always been administered separately from non-resident licences, and separate licences for non-resident and non-resident alien hunters have been in place since 1980. Currently Alberta Environment and Parks (the Department) administers a total of six different types of licences for black bears (Table 2.6).

Table 2.6. Types of black bear hunting licences available in Alberta, 2013.

Licence Type	Cost	Notes
Resident Black Bear	$15.65	Valid in any WMU with an open black bear season
Resident Supplemental Black Bear	$15.45	Valid only in WMUs where the bag limit is 2 bears
Non-resident Black Bear Special Licence	$63.61	Must be purchased through an outfitter-guide. Valid in only one WMU. Valid for 2 bears in WMUs where the bag limit is 2 bears.
Non-resident Black Bear	$63.61	Hunter must be accompanied by a hunter host.
Non-resident Supplemental Black Bear	$63.61	Hunter must be accompanied by a hunter host. Valid only in WMUs where the bag limit is 2 bears
Non-resident Alien Black Bear Special Licence	$79.62	Hunter must be accompanied by a hunter host or purchase through an outfitter-guide. When purchased through an outfitter guide, valid in

only one WMU. Valid for 2 bears in WMUs where the bag limit is 2 bears.

Black bear hunting licence sales peaked at approximately 15,000/year in the late 1970s and early 1980s, and declined steadily through the late 1990s. Licence sales to resident hunters have increased over the past decade, with approximately 12,000 licences sold each year since 2008. In contrast, limits on the number of black bear outfitter allocations have resulted in relatively stable licence sales of approximately 1,700/yr to non-resident and non-resident alien hunters over the past ~15 years (Fig. 2.1). The number of licences sold to non-residents has declined slightly since 2008, likely due to a weakened U.S. economy and higher exchange rate since that time.

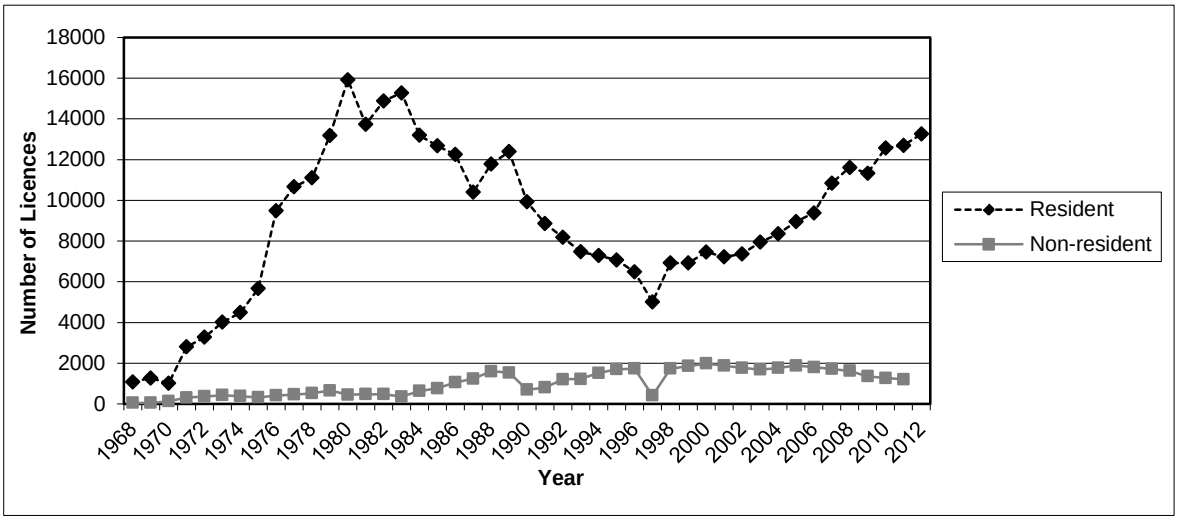

Figure. 2.1. Number of black bear hunting licences sold to resident and non-resident hunters in Alberta from 1968-2012.

2.2.2.6 Hunting techniques

Hunting black bears with bait and/or dogs is allowed in several jurisdictions in North America. Although controversial, these techniques can have several advantages over other techniques, including 1) increased harvest of black bears where that is the objective, 2) improved selection for size and colour, 3) allowing hunters to avoid harvesting females with cubs, 4) improved selection for ethical shot opportunities, 5) improve the success of bow hunting, and 6) improve the viability of outfitting for non-resident black bear hunters (Gunson 1993). The use of dogs to hunt black bears has not been allowed in Alberta in modern times, however the use of bait was legalized beginning in 1987. Baiting has not been allowed in Prairies or Parkland WMUs, because of concerns that this hunting technique is not compatible with high levels of residential development and other uses of the landscape. Baiting is also prohibited in WMUs or portions of WMUs with resident populations of

grizzly bears. Baiting is currently allowed in most WMUs in the Boreal forest, as well as some Foothills WMUs (Figure 2.2).

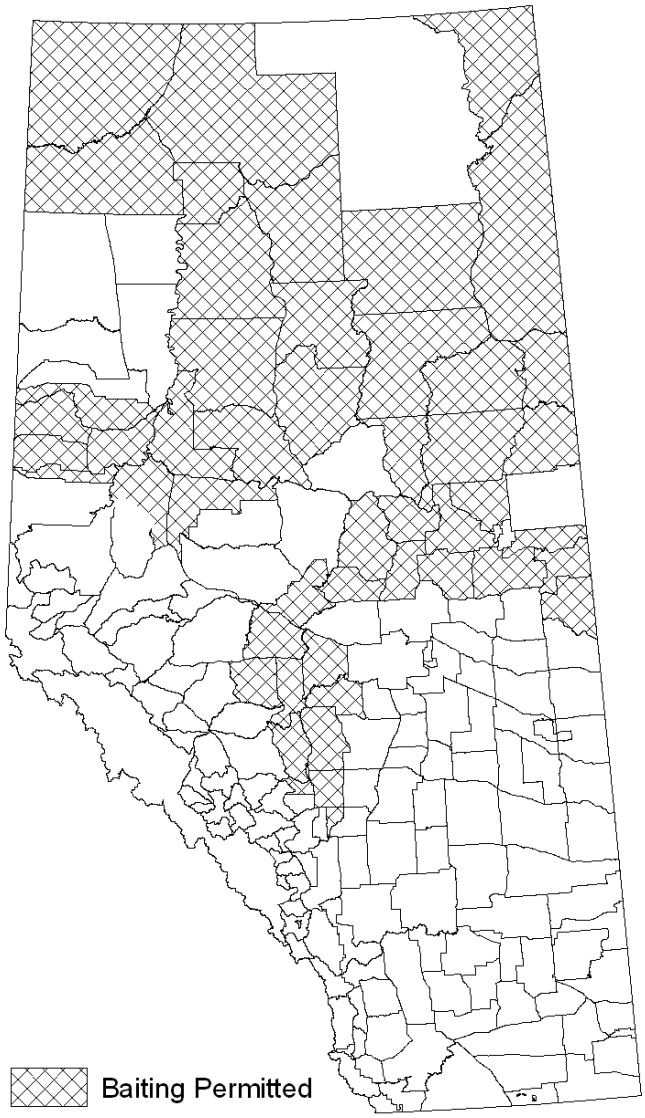

Figure 2.2. Locations where the use of bait is permitted for the purpose of hunting black bears in Alberta, 2013.

Since baiting was first allowed in Alberta 25 years ago, hunters, wildlife managers, and the public have identified several concerns, including 1) littering, 2) crowding of baits and hunters in preferred habitats, 3) proximity of baits to residences, industrial sites, and other facilities, 4) illegal use of black bear baits (primarily grain) to hunt ungulates in the fall, and 5) conflicting messaging that encourages the public not to feed bears in order to prevent conflicts. Some of these concerns were addressed through regulation changes that occurred in 1992 (e.g. baiting is currently prohibited within 1 mile of a residence, provincial park, and some industrial sites), but others remain valid. The Department also periodically receives significant amounts of correspondence from the general public indicating displeasure for baiting. The majority of this concern relates to perceptions that baiting is unethical, or results in food-conditioned bears that are more likely to come into conflict with humans.

2.2.2.7 Harvest

Black bear harvest by licenced hunters has been estimated using several different approaches over time, including mail questionnaires, taxidermist records, and telephone questionnaires (Gunson 1993). More recently, resident hunter harvest has been estimated with an annual game harvest survey, which has been administered as a voluntary online questionnaire since 2009.

Harvest by guided non-residents has been determined from outfitter/guide activity reports since 1990. From 2009-2012, licenced harvest by residents averaged 1656 bears/year, while harvest by guided non-resident and non-resident alien hunters averaged 1149 bears/year. These harvest rates are similar to those estimated in the late 1980s and early 1990s (Gunson 1993).

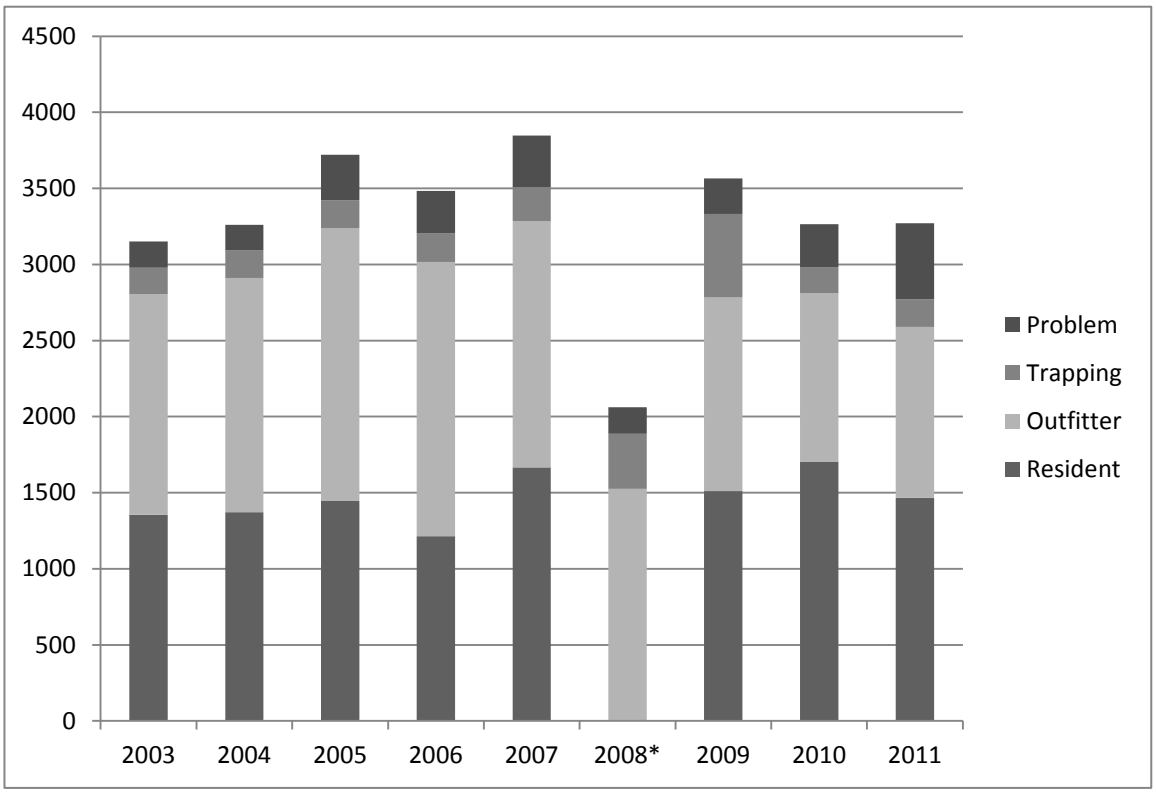

Figure 2.3. Estimated black bear harvest in Alberta by resident and guided non-resident hunters, number of bears harvested by trappers, and number of bears killed by government staff in response to conflict, 2003-2011. *The resident game harvest survey was not conducted in 2008, therefore no data on resident hunting are available for that year.

Harvest Distribution

The majority of licenced black bear harvest by both resident and non-resident hunters occurs in northern Alberta, however a significant portion of resident hunter harvest also occurs along the eastern slopes (Figures 2.4 and 2.5). Resident hunter harvest is distributed relatively evenly across the foothills and boreal regions, with a substantial portion (8%) also occurring in the mountains. In contrast, the majority (88%) of non-resident harvest occurs in the boreal forest, with very little harvest from the mountains or parkland (Table 2.7). Differences in harvest distribution between resident and non-resident hunters are likely related primarily to the distribution of outfitter

allocations, which generally are issued in higher numbers in WMUs where harvest by resident hunters is low.

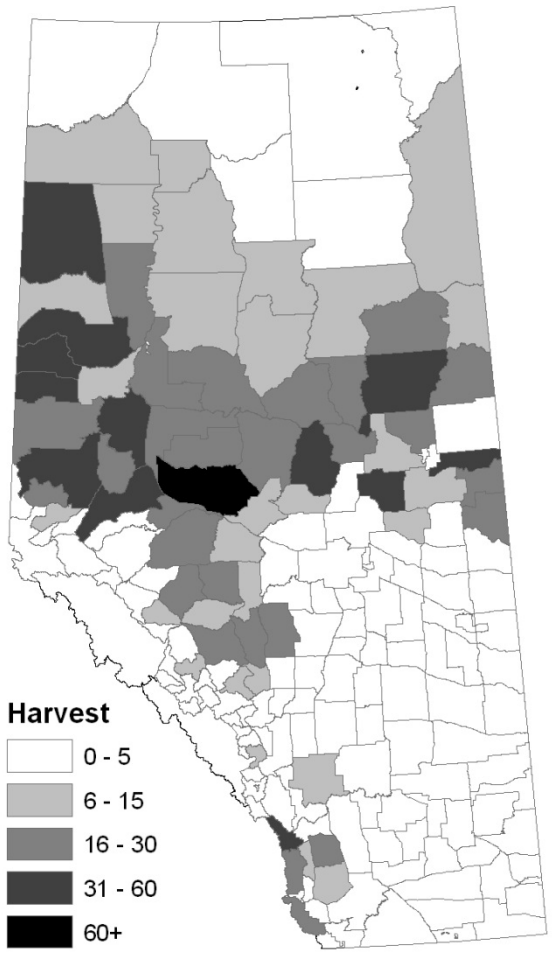

Figure 2.4. Average annual resident hunter harvest of black bears in WMUs in Alberta from 2009-2012

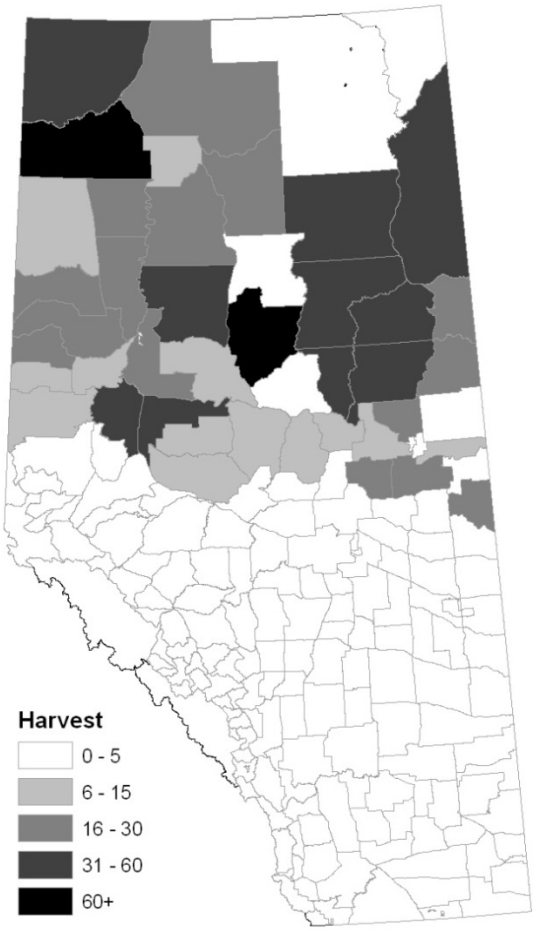

Figure 2.5. Average annual non-resident hunter harvest of black bears in WMUs in Alberta from 2009-2012

Table 2.7. Average black bear harvest, hunter success rates and hunter days per animal harvested in habitat regions in Alberta from 2009-2012.

Region	Residency[1]	% of Harvest	Success Rate	Hunter Days/Animal
Parkland	Resident	2.1	0.20	53.5
	Non-resident	0.1	0.55	
Region	Residency[1]	% of Harvest	Success Rate	Hunter Days/Animal
Foothills	Resident	43.5	0.14	59.2
	Non-resident	12.2	0.42	
Mountains	Resident	7.6	0.09	87.8
	Non-resident	0.02	0.06	
Boreal	Resident	46.8	0.24	49.9
	Non-resident	87.5	0.57	
Total	Resident	100	0.25	49.9
	Non-resident	100	0.54	

[1]For residents, success rates are based on the estimated number of people who hunted, not the number of licences sold. For non-residents, success rates are based on the number of licences sold, which is equivalent to the number who hunted. For the purpose of this table in WMUs where the licence was valid for 2 bears, the number of licences was doubled.

Sex Ratio of the Harvest

Sex ratio of harvested black bears can be influenced by a number of factors, including hunting technique, experience of the hunter, whether hunting occurs during the spring or fall season, and whether the hunter pursues black bears on a dedicated hunt or opportunistically when searching for other species. In general, it is suspected that spring hunting will result in a higher percentage of males in the harvest, since most adult female bears will be accompanied by offspring at that time of the year, and therefore avoided by hunters. Reduced movement rates of females with young cubs may also make these bears less likely to encounter bait sites. Finally, the use of bait may also allow

hunters to be more selective, increasing the likelihood that they kill a male bear; however, the Department does not currently collect information on whether harvest occurs during the spring or fall (except for guided non-residents), or whether hunters use bait.

Since 2009, data from the game harvest survey indicate that 66.5% of black bears killed by licenced resident hunters were male, whereas 78.9% of bears killed by outfitted non-resident hunters were male (Table 2.8). For resident hunters, the percentage of the harvest that consisted of male bears was slightly higher in WMUs where baiting was permitted. For non-residents, sex ratios were virtually identical whether baiting was permitted or not. It is not known what factors may contribute to differences in sex ratios of bears killed by resident vs. non-resident hunters. However, because most non-resident hunters likely pursue black bears on a dedicated hunt in the spring, they may be more selective than resident hunters that are more likely to pursue black bears incidentally while hunting other species.

Table 2.8. Sex ratio of black bears killed by hunters in Alberta from 2009-2012.

Residency	Baiting Permitted?	Percent Male
Resident	Yes	68.1
	No	64.5
	Total	66.5
Non-resident	Yes	78.6
	No	81.6
	Total	78.9
Total		71.4

2.2.2.8 Hunting success rates

Success of black bear hunters depends on a number of factors, including the hunting technique (e.g. hunting over bait vs. spot and stalk), abundance of natural foods, and openness of the habitat. In general guided non-resident hunters have significantly higher success rates than resident hunters

(Table 2.7), probably because most non-resident hunters hunt over bait on dedicated bear hunts, whereas more resident hunters likely kill black bears on an incidental basis.

2.2.3 Non Hunting Mortality

The only official records of black bear mortality other than hunting that are maintained in Alberta are related to problem bears that are euthanized by government staff, and information on bear harvests by owners of Registered Fur Management Areas. Data on bears euthanized as problem wildlife are recorded in the ENFOR database. A total of 2,827 bears were killed as problem wildlife from 1999-2012, with an average of 210.6 euthanized/year (range: 52-501).

Trappers report black bear harvests on Fur Affidavits, which are submitted annually and cover the period from September 1 – August 31. From 1985 to 2011, trappers reported killing an average of 179.4 (range: 59-548) black bears/year. These affidavits are subject to significant data entry errors by the trapper, as black bears are identified using a code on the form which may be confused with other furbearer species (e.g. beaver). Further, staff manpower limitations have prevented any substantial proofing of this database over the years. Therefore, these data should be viewed with caution.

Number of bears dying each year in Alberta of natural causes, vehicle or railway strikes, killed without hunting licences on private land, and by other human causes is unknown.

2.2.4 Relationships with other Wildlife

Interactions between black bears and other wildlife species are poorly understood in Alberta. Grizzly bear researchers have observed that areas with relatively high grizzly bear densities typically contain few numbers of black bears (G. Stenhouse, personal communication), potentially indicating interference or exploitation competition. This issue could be explored further through analysis of black bear DNA samples that have been collected and archived during grizzly bear population surveys.

Black bears are known to be significant predators of ungulate neonates in some jurisdictions, but there has been no concerted effort to determine the extent of this issue in Alberta; however, Robichaud (2009) documented that black bears in west-central Alberta may gain a significant portion of their diet from terrestrial protein sources, including ungulates (28 ± 6% of diet). Therefore, given apparent high densities of black bears in some parts of Alberta, they may play a substantial role in the population dynamics of some ungulate species.

2.2.5 Commercial Use Management

2.2.5.1 Traffic in Parts

Prior to 1987, the sale of bear parts in Alberta was restricted to the hide. Licenced trappers, licenced recreational hunters, and landowners could sell bear hides to certain commercial outlets. In 1987, the Wildlife Regulation exempted black bears and their parts from the transport, export, and traffic restrictions under the Wildlife Act. This change was made to allow for the use of additional products of black bears that were already harvested. It was not intended to promote an increased harvest of black bears, although there is some evidence that bears were killed solely for parts used in trafficking. This policy was changed, effective December 1, 1989, when traffic in bear parts, other than hides and attached claws, was eliminated by an amendment to the Wildlife Regulation. The export permit requirement was also reinstated at that time.

2.2.5.2 Non-resident hunting

Recreational hunting of black bears by non-residents has been encouraged by government, and because of relatively low interest by residents, a higher portion of the harvest has been allocated to non-resident hunters than for other big game species. Initiatives by the outfitting industry, including advertising and personal appearances in foreign countries, have successfully increased hunting of black bears by non-resident aliens (Fig. 2.1)

Black bears harvested by guided resident and non-resident hunters have been recorded on mandatory Outfitter-Guide Activity Reports since 1990. Estimates of non-resident black bear harvest prior to this time were based on mail questionnaires (Wishart and Erickson 1970, Adamowicz and Phillips (1981) and indicated a harvest of less than 50 bears/year.

2.2.5.3 Harvest by Registered Trappers

Any licensed registered trapper, whose registered fur management area occurs north of the Red Deer River, may harvest up to six black bears per year in that area during the open recreational hunting season. This special quota was initiated in 1974, with the intent of encouraging the harvest of black bears by trappers, especially in areas were bear-human conflicts were common. The quota

was two black bears/trapper/year during 1974-75, four during 1976-1984, and six during 1985-present. The legal method of harvest is by shooting only, and all regulations pertaining to the use of bait for the purposes hunting black bears apply.

2.2.7 Data Collection Guidelines

Information collected on black bears in Alberta includes annual estimates of resident hunter harvest, annual harvest reporting by trappers, annual harvest reporting by non-resident and non-resident alien hunters, number of bears euthanized by agency personnel, and number of conflicts and sightings reported to the provincial government.

Harvest by resident hunters is estimated through the online game harvest survey, which is a voluntary questionnaire sent out to all licensed hunters with an email address associated with their RELM account. Survey information is used to estimate number of bears harvested, sex ratio of the harvest, and hunter effort within each WMU. Since the game harvest survey was first initiated in 2009, number of responses has averaged 3,331 for the general black bear licence, and 414 for the supplemental black bear licence. This corresponds to 31% and 28% of hunters that purchased each licence type, respectively.

Trappers are required to complete a Fur Affidavit on an annual basis, on which they record the number of each furbearer species harvested on their trapline during the period from September 1 to August 31st. These Affidavits are filled out in Fish and Wildlife district offices, and hard copies are submitted to Edmonton headquarters for entry into the database.

Number of black bears harvested by guided resident and non-resident hunters is recorded through mandatory outfitter activity reports, must be filled out at the end of each calendar year. These reports include the number of days that each hunter pursued bears, whether they were successful, and the sex of harvested bears.

Number of euthanized problem bears, as well as black bear conflicts and sightings that are reported by the public, are recorded in the ENFOR database by Fish and Wildlife officers and conservation officers. This database has numerous limitations, including limited capability to enforce data standards and lack of data fields for bear attractant or animal behaviour. Some occurrences are duplicated when a single situation is recorded by each staff member that was involved. As a consequence, it is difficult to accurately determine the number and locations of each type of occurrence without reading and categorizing each record according to a standardized format

for human-wildlife conflicts. This post-hoc analysis is manpower-prohibitive for black bears at the provincial scale, where several thousand occurrences are recorded each year.

2.2.8 Economic Aspects

Although no estimates of the economic activity generated by black bears exist in Alberta, it may be significant in some areas. Black bear viewing is a popular activity, particularly in the mountain national parks, although the number of people that visit these areas specifically to view black bears is unknown. In addition, economic activity generated by both resident and non-resident black bear hunting may be significant to some rural communities in northern Alberta.

In contrast, black bears can cause significant damage to crops and other property in some years, particularly when natural food production is low. Human-bear conflicts can result in considerable costs to private citizens, and to provincial government agencies that respond. Costs to manage and secure attractants (such as electric fencing around bee yards) in order to prevent property damage can also be significant for agricultural producers and operators of campgrounds and other recreational facilities within black bear range.

2.3 Human-Black Bear Conflict

2.3.1 Public Views on Black Bears

Public perceptions and attitudes towards bears have been shaped by centuries of coexistence and have evolved over time (Schwartz et al. 2003). Bears played an important role in the legends, beliefs, and lives of early peoples (Schwartz et al. 2003). Bears symbolized harmony between nature and people, were revered for their power, and appreciated for the many similarities they shared with humans (Schwartz et al. 2003, Kellert et al. 1996). Aboriginal peoples had respect for and kinship with bears, carving their images in totem poles and holding elaborate ceremonies to honour bears that were killed (Van Tighem 1997, Schwartz et al. 2003). With European colonisation these views shifted, and the reverence that was once held for bears was replaced with fear, exploitation, and subordination (Schwartz et al. 2003, Kellert et al. 1996). Early settlers in North America viewed large predators as a threat to life and property, and consequently bears were eradicated from much of their range through direct persecution, and indirectly through habitat destruction (Schwartz et al. 2003, Hristienko and McDonald 2007). However, during the 20th century, bears became valued as a game species with the recognition of their need for protection, and more recently bears also became recognised for their inherent intrinsic value and their ecological role (Hristienko and McDonald 2007, Schwartz et al. 2003).

Although perceptions and attitudes toward black bears are generally positive today there is still much variation in public opinions. This is reflected in the many contradictory images of bears portrayed in North American culture, ranging from loveable characters, to aggressive and dangerous killers, to iconic symbols of the wilderness, all of which play a role in shaping how people perceive bears (Van Tighem 1997, Kellert et al. 1996). Attitudes towards large predators in general, including bears, are shaped by people's basic valuation of wildlife (Kellert 1994, Kellert et al. 1996, Decker and Purdy 1988), their knowledge and understanding of a species (Bath 1989, Kellert et al. 1996, Naughton-Treves et al. 2003), their actual or perceived interactions with a species (Kellert et al. 1996, Garshelis et al. 1999, Majic et al. 2011, Kaczensky et al. 2004, Bowman et al. 2001, Vitterso et al. 1999), socio-demographic factors (Bath and Buchanan 1989, Deruiter and Donnelly 2002, Morzillo et al. 2010, Kleiven et al. 2004), and contextual or situation specific factors (Don Carlos et al. 2009, Majic et al. 2011, Zinn 1998). Studies have found that people with more positive and conservation-oriented views towards bears are generally younger, more educated, with higher incomes, and living in urban areas (Campbell and Lancaster 2010, Majic et al. 2012, Kellert et al. 1994, Morzillo et al. 2010). Increased knowledge of a species, and threatened species status also generally result in a more positive attitude towards large carnivores (Morzillo et al. 2010, Bowman et al. 2001, Kaczensky et al 2004, Kellert et al. 1994).

Peoples' past experience with black bears will influence their attitudes toward them. Those who have had a positive experience, such as having observed a bear in the wild, will be more tolerant towards bears compared with those who have had a negative experience such as damage to crops or livestock (Majic et al. 2011, Garshelis et al. 1999, Bowman et al. 2001). Perceived threat to personal safety or property also has a strong negative influence on attitudes towards black bears; those more concerned about potential problems black bears may pose will be less likely to support their presence (Morzillo et al. 2010, Majic et al. 2011, Kaczensky et al. 2004).

Attitudes toward black bears will also vary depending on the context or situation, such as the acceptability of some type of management action taken (e.g. reintroduction, trapping, lethal control) (Majic et al. 2011, Merkle et al. 2011, Zajac et al. 2012). Tolerance among different stakeholders may also be a reflection of broader issues, such as the level of trust in their wildlife agency concerning how black bears are managed, and the perceived level of personal control (Kellert et al. 1994, Zajac et al. 2012, Garshelis et al. 1999, Kleiven et al. 2004). If the public feels marginalised by the wildlife management authority, they are less likely to tolerate black bears, however if stakeholders are involved in the decision making process for wildlife management and have a sense of personal control over the risks associated with black bears, they will be more

tolerant towards bears (Naughton-Treves & Treves 2005, Treves 2009, Bjerke et al. 2000, Majic et al. 2011). Similarly, people are more tolerant of wildlife causing damage if they have a sense of owning or benefiting from them (Treves 2009, Bowman et al. 2001). Specialised hunting programs that target depredating black bears can empower landowners, give them a sense of bears' economic and aesthetic value, and demonstrate that the agency responsible for bear management is concerned with their wellbeing (Garshelis et al. 1999, Bowman et al. 2001, Clark et al. 1991).

2.3.2 The Root Causes of Conflict

Human-black bear conflicts have an extensive history throughout North America and have increased significantly in recent years (Hristienko and McDonald 2007, Spencer et al. 2007). This is primarily due to a growing human population and further encroachment into natural habitat through rural and industrial development and recreational use, combined with black bear populations that are growing and expanding in many regions (Garshelis et al. 2008, Hristienko and McDonald et al. 2007). Conflicts arise where humans and black bears share the same landscape and resources, and interactions between the two results in costs to humans, black bears, or both. If the frequency and intensity of human-black bear interactions increases, it can potentially pose a threat to human safety and property, and as a result, black bears are often destroyed (Davis et al. 2002).

Human-black bear conflicts can be real or perceived, and can have ecological, economic, behavioural, safety, psychological, or social impacts (Gore et al. 2006). In Alberta, conflict between humans and black bears can involve damage to agricultural activities, such as bee hives, livestock, granaries, and standing cereal and seed crops; public safety concerns in residential areas, parks, landfills, airbases, campgrounds, and other wilderness areas, and safety concerns at industrial or forestry camps, trappers' cabins, and other developments in remote areas (Gunson 1979). Most conflicts with black bears result from the increased availability of anthropogenic attractants (e.g., residential garbage, bird/pet feed) and the ability of black bears to alter foraging patterns to exploit these food sources (Beckmann and Berger 2003, Beckmann and Lackey 2008, Don Carlos et al. 2009). Indeed, in a recent survey of black bear managers in North America, 69% of managers ranked "garbage/food attractants" as the most common type of conflict in their respective jurisdictions (Spencer et al. 2007).

Understanding black bear behaviour is key to understanding human-black bear conflict. As opportunistic feeders, black bears will exploit whatever food is easiest to obtain and will give them the greatest return in calories. Bears must eat tremendous amounts of food to accumulate the large fat reserves needed for hibernation; hence they prefer richer, fatty foods when available. During

periods of natural food scarcity, bears are forced to search widely for alternate foods, and due to their adaptability bears will readily alter their movements outside natural habitat where anthropogenic food is available. Areas of human activity provide a concentration of rich food sources, such as landfills, garbage, fruit trees, grains, and other non-natural foods that are high in calories, easily digestible, and require little energy to obtain. Black bears are also extremely curious and investigative by nature, an adaptive characteristic that helps them to discover the most nutritious foods (Herrero 1985). They often obtain food by scavenging and they have an acute sense of smell which helps them to find different food sources, including new ones. Finally, black bears are very intelligent and are effective learners, which allow them to discover how to access structures that contain anthropogenic food sources, including containers, vehicles, or buildings (Government of Alberta 2011).

One of the underlying issues that contributes to the development of conflict is when black bears become habituated to humans and conditioned to human foods (Herrero 1985). Human habituated black bears have learned to tolerate humans in close proximity without responding naturally by fleeing, a result of repeat exposure to humans without any negative consequences (Government of Alberta 2011). Black bears that are food-conditioned have learned to associate humans or particular smells with positive feedback in the form of a food reward, and they subsequently develop unnatural behaviour by continuing to seek food in human use areas (Herrero 1985, Government of Alberta 2011). This learned behaviour can be passed on from a mother to her cubs (Madison 2008). The degree to which black bears are habituated to humans varies among individuals and their past experiences with people. Black bears that are both habituated to humans and food-conditioned have a greater likelihood of coming into conflict with humans. Black bears that show little or no fear of humans pose the greatest risk to human safety, and as a result, these bears are frequently killed by management agencies (Herrero et al. 2005).

Another more serious form of conflict occurs when black bears attack humans, resulting in either injury or death. These events are extremely rare, and in North America there are millions of interactions between people and black bears each year without any injury to a person (Herrero et al. 2011). During 1900-2009, there were a total of 63 people killed in 59 incidents by black bears in North America, seven of which occurred in Alberta (Herrero et al 2011). The number of fatal attacks also increased over time, with 86% of all known attacks occurring since 1960, most likely due to human population growth and the subsequent increase in commercial and recreational activities, combined with an increasing black bear population. Fatal attacks occurred in both the front and back country, suggesting that some bears had prior experience with humans and others did not, and

most importantly, people's food or garbage was implicated in 38% of all fatal bear attacks (Herrero et al 2011). In Alberta, there were 13 injuries by black bears during the period 1960-1998, of which 5 were fatal, and 92% occurred on provincial lands (Herrero and Higgins 2003).

In most encounters between humans and black bears, bears will flee, and if a female is protecting her cubs, they will either flee or climb a tree. However black bears may exhibit defensive behaviour when they feel threatened or stressed, and likely in situations where they are defending their cubs, a food source, or their personal space (Government of Alberta 2011). With defensive behaviour a black bear will direct threats at the intruder, including changes in body posture, vocalizations, and short charges, and this behaviour rarely leads to an attack provided the bear is given the personal space it requires to feel safe (Herrero et al 2011; Government of Alberta 2011). Most attacks on people are the result of predatory behaviour, in which black bears are aware of human presence and approach showing little or no signs of stress and may stalk or attack a person. Most predatory attacks are carried out by male black bears (Herrero et al. 2011 Government of Alberta 2011).

2.3.3 Methods to Reduce Conflict and Increase Tolerance

In the past, approaches to resolving human-black bear conflict were largely reactive in nature, and focused on reducing overall black bear numbers or killing individual black bears thought to be causing a problem (Treves and Karanth 2003, Spencer et al. 2007). However, these approaches were ineffective in providing a long term solution, since the root cause of the problem wasn't being addressed (Hristienko and McDonald 2007, Don Carlos et al. 2009). Today, wildlife management agencies and some communities are taking a more integrated and proactive approach towards resolving human-black bear conflict, with a focus on preventing human-black bear interactions and changing public attitudes and behaviours (Baruch-Mordo et al. 2009, Spencer et al. 2007).

The Alberta BearSmart Program was developed by the Alberta government in 2006 with the aim of reducing human-black bear conflicts and to improve public stewardship in Alberta by providing strategic information and education materials to the public, stakeholders and government agency staff dealing with bears (Government of Alberta 2011). The primary objectives of the program are to: 1) keep people safe, 2) help bear populations survive, and; 3) reduce property damage and costs. Human-black bear conflict can arise under a variety of settings and there is no single solution to resolving the issue, therefore an integrated approach needs to be taken which includes both preventative and responsive management (Madison 2008, Gore et al. 2006, Protected Areas Conservation 2002).

Responsive Management

Most wildlife agencies respond to human-black bear conflict where human safety or property damage is a concern, by visiting the site and determining the appropriate action to take (Spencer et al. 2007). Depending on the behaviour of the bear and the degree of threat to public safety, managers can provide education and advice, deter the bear through hazing, trap and relocate the bear, or destroy the bear (Treves and Karanth 2003, Spencer et al. 2007, Government of Alberta2011). Aversive conditioning is a technique used to modify a black bear's behaviour through the delivery of negative stimuli in an effort to stop or prevent unwanted behaviour, with the primary objective of preventing it from becoming habituated to humans or human foods (Beckmann et al. 2004, Mazur 2010). There are a number of non-lethal deterrents that can be effectively used, including noise deterrents which provide a negative auditory and visual experience (air horn, bangers, screamers, 12-gauge crackers and whistle crackers), and physical deterrents which provide a painful stimuli (12-gauge bean bags, rubber slugs, rubber buckshot, and pepper spray) (Protected Areas Conservation 2002, Government of Alberta 2011).

Due to the limited range (3-5 m) of bear spray, it may not be practical as a technique for active aversive conditioning, however the proper use of bear spray is the best method to fend off an aggressive black bear (Government of Alberta 2011, Protected Areas Conservation 2002). The use of bear spray is effective in deterring black bears in most cases, but may not work as well for female black bears with cubs or habituated black bears (Herrero and Higgins 1998, Smith et al. 2008). Bear spray residue can also act as an attractant to a site after its use in aversive conditioning (Smith et al. 2008, Mazur 2010). Nausea inducing chemicals concealed in bait have been used to create conditioned taste aversion, and is most successful in preventing black bears from eating specific foods that are difficult to secure (Mazur 2010, Ternent and Garshelis 1999, Homstol 2011). Specially trained dogs (e.g. Karelian bear dogs) which shepherd black bears by barking and chasing them away from conflict areas may be used in aversive conditioning, and often in combination with other tools such as noise and physical deterrents (Government of Alberta 2011). Most wildlife agencies in North America (64%) reported the use of aversive conditioning as a tool to deter black bears involved in conflict (Spencer et al. 2007). The effectiveness of aversive conditioning will vary greatly from bear to bear, however it will be most successful on black bears that have not become conditioned to human foods, therefore an effort should be made to deter black bears before or shortly after they first obtain human foods (Madison 2008, Mazur 2010, Beckman et al. 2004).

Relocation (translocation) of bears involves capturing a black bear and releasing it in a safer or more suitable area, away from potential conflicts with humans (Get Bear Smart Society). Relocation

is an option preferred by the public for resolving human-black bear conflicts, and although the majority of wildlife agencies in North America have reported using it, only 15% indicated that it was an effective management tool (Spencer et al. 2007). Relocation of individual bears is expensive and time-consuming, and finding unoccupied areas where bears can be released is difficult. Adult bears often return to their former home ranges, especially if the attractant has not been removed, however the majority of juvenile male bears disperse when relocated as most haven't established a home range yet (Landriault et al. 2006, Hristienko and McDonald 2007). The recommended relocation distance to minimize the likelihood of a bear returning is between 60 and 100 km (straight line distance) (Rogers 1986, Landriault 1998, Hristienko and McDonald 2007). To increase the likelihood of success in black bear relocations, a suitable release site constituting similar habitat quality and a low-density of black bears should be established ahead of time, only black bears in good physical condition with a reasonable chance of survival should be considered, and where applicable entire family groups should be relocated (Protected Areas Conservation 2002). Black bears that have shown aggressive behaviour or that have become food conditioned should not be relocated, and most importantly, the anthropogenic attractants at the original capture site should be removed. To monitor the effectiveness of relocations, each relocated black bear should be marked to monitor their movements and survival (Protected Areas Conservation 2002, Spencer et al. 2007).

Destruction of black bears is only used as a last resort, and generally for public safety concerns. Of the wildlife management agencies in North America that used relocation as a management tool, 41% reported following a 2 or 3 strike policy, whereby if relocated black bears returned to the original conflict site or entered a conflict situation elsewhere a second or third time, they were euthanized (Spencer et al. 2007). Black bears can also be euthanized in a protected area if a bear is acting aggressively, is food-conditioned, is in poor physical condition or too young to be relocated humanely, or if there is no suitable release site available for relocation (Protected Areas Conservation 2002). Some wildlife agencies may also issue kill permits or use hunters in response to human-bear conflict (Spencer et al. 2007).

The reporting and monitoring of black bears that are involved in conflicts is an essential component of human-black bear conflict management, to determine the effectiveness of different management techniques used, and to identify patterns (bear characteristics) and variables (site characteristics) contributing to conflict. Marking "problem" black bears and maintaining a database to monitor their behaviour can provide valuable long-term data, however, only 50% of all wildlife

agencies in North America reported that they maintained a database of conflict black bears (Spencer et al. 2007).

Preventative Management

Preventative management focuses on preventing human-black bear conflicts from occurring in the first place, thereby minimising the potential for human injury, property damage, and black bear mortality. The key to preventing human-black bear conflicts from occurring is to eliminate access to human food and garbage so that black bears do not become human-food conditioned (McCarthy and Seavoy 1994, Spencer et al. 2007, Witmer and Whittaker 2001). This requires responsible attractant and waste management at the individual, community, and regional level (Government of Alberta 2011). In some cases electric fences can be used to exclude black bears, including from long term industrial or forestry worksite camps, landfills, transfer stations, and garbage or food storage areas. Regional land-use planning, and the design and management of green spaces in communities that are located near black bear habitat can play a role in preventing black bears from being attracted to communities and facilitate their safe movement through wildlife corridors (Protected Areas Conservation 2002). People working in the agricultural industry, including livestock producers, grain producers, and beekeepers can also implement specific strategies to minimise human-black bear conflicts and potential property damage. An integrated approach through good husbandry practices and close monitoring will be the most successful, including the removal of bear attractants (i.e. crops, calving areas, boneyards, feed storage areas, and beehives) from forest edges or black bear travel routes (Government of Alberta 2011), the use of electric fences (Witmer and Whittaker 2001, Treves and Karanth 2003), guard dogs (Green and Woodruff 1989, Smith et al. 2000), and mechanical bear deterrents (Treves and Karanth 2003, Government of Alberta 2011). Nonlethal deterrents have the greatest potential if multiple techniques are deployed simultaneously and modified periodically to avoid habituation (Treves and Karanth 2003). Compensation programs for economic losses can also be used to minimise human-black bear conflict and increase tolerance. These programs are generally supported by the public and agricultural producers, but are a less preferred method with wildlife agencies most likely due to the costs involved and because they fail to address the root cause of the problem (Hristienko and McDonald 2007, Whittaker and Burns 2001, Witmer and Whittaker 2001).

Education and outreach programs are an essential component in the prevention of human-black bear conflict and are widely used in most black bear management programs (Dunn et al. 2008, Spencer et al. 2007, Gore et al. 2006). Education programs can be designed to target different audiences, including people living, working, or recreating in black bear country, and they help to

raise awareness (Madison 2008), change people's attitudes (Don Carlos et al. 2009, Campbell 2012), and modify behaviour (Baruch-Munro et al. 2011). Specifically, education programs can aim to enhance the public's understanding of black bear ecology and behaviour (Dunn et al. 2008), promote strategies to reduce the likelihood of human-black bear conflict (Madison 2008), recommend actions people can take during a black bear encounter (Government of Alberta 2011), and encourage tolerance and respect towards black bears and their natural behaviour (Get BearSmart Society). Education programs will be the most successful if the public gains an understanding of the role that they play in creating "problem" bears that have become habituated to humans and conditioned to their food sources, and the potential negative consequences their actions can have for black bears (Spencer et al. 2007). Depending on the target audience, a variety of education sources and materials can be used including radio and TV, news and press releases, social media, workshops and presentations, brochures and signage, and on-site education. Evaluation is also an essential part of education programs to assess their effectiveness in increasing knowledge, modifying human behaviour, and reducing conflict (Baruch-Mordo et al. 2011, Gore et al. 2006).

Education programs may be limited in their ability to foster change in human behaviour alone and may need to be combined with enforcement (Beckmann et al. 2004, Baruch-Mordo et al. 2011). For example, the implementation of a BearSmart and Bear Aware Education Program was found to have little effect in changing residents' behaviour in Manitoba (Campbell 2012) and in New York (Gore et al. 2008), respectively. Similarly, Peine (2001) found that the passage of wildlife ordinances alone failed to reduce the availability of attractants, and therefore human-bear conflicts, in several North American communities (Baruch-Mordo et al. 2011). There are a variety of legal tools that can be used such as bylaws, regulations, and penalties that target neglectful behaviour or irresponsible attractant management, including intentional and unintentional feeding of bears that may inadvertently attract them and cause conflict (Beckmann et al. 2004, Protected Areas Conservation 2002). A study in Aspen, Colorado found that only proactive enforcement (i.e. dispensing warning notices) was effective in changing human behaviour, rather than education or enforcement in the form of daily patrolling alone (Baruch-Mordo et al. 2011). Anecdotal information suggests that the combination of enforcement and public education was also found to be effective in reducing the number of human-black bear conflicts in Yosemite National Park, Nevada, and Juneau, Alaska (Beckmann et al. 2004). Less than half (47%) of wildlife agencies in North America indicated that they had a statute, policy, or law that allowed fines for irresponsible attractant management, and most agencies would prefer to use this method rather than using aversive conditioning or relocation when responding to human-bear conflict situations (Spencer et al. 2007).

Outreach programs that involve the public in the planning and decision making process can also help to increase tolerance and minimise the potential for conflict with black bears. Participatory planning with a range of interest groups and a diversity of values early in the development of human-black bear conflict will lead to more widely acceptable strategies over the long-term, and is essential for maintaining a balance between the needs and goals of humans and the requirements of black bears (Witmer and Whittaker 2001, Treves et al. 2009, Don Carlos et al. 2009).

2.3.4 Human – Black Bear Conflicts in Alberta

Beginning in 1999, black bear sightings and black bear-human conflicts have been recorded by Fish and Wildlife officers and conservation officers in the ENFOR database. Occurrences are recorded as one of several categories, including sightings, human conflict, property damage, livestock kill, and nuisance. These data have several limitations, including a lack of clear standardization for assigning occurrences to categories, and duplication of occurrences when several phone calls are received about the same bear. Further, the occurrences are more frequent in areas of higher human habitation and are not necessarily indicative of high black bear densities. The majority of occurrences are unverified, and an unknown percentage is likely related to species misidentification by the complainant. While inconsistencies in categorization prevent detailed analyses of trends in conflict type, the overall number of reported sightings and conflicts has increased through time (Figure 2.6). Relatively low numbers of reported occurrences in 1999 and 2000 may have been related to officer unfamiliarity with the ENFOR system during its first years of operation. Since 2001, number of reported sightings and conflicts have averaged 2168/year, requiring an average of 7796 hours/year of response time.

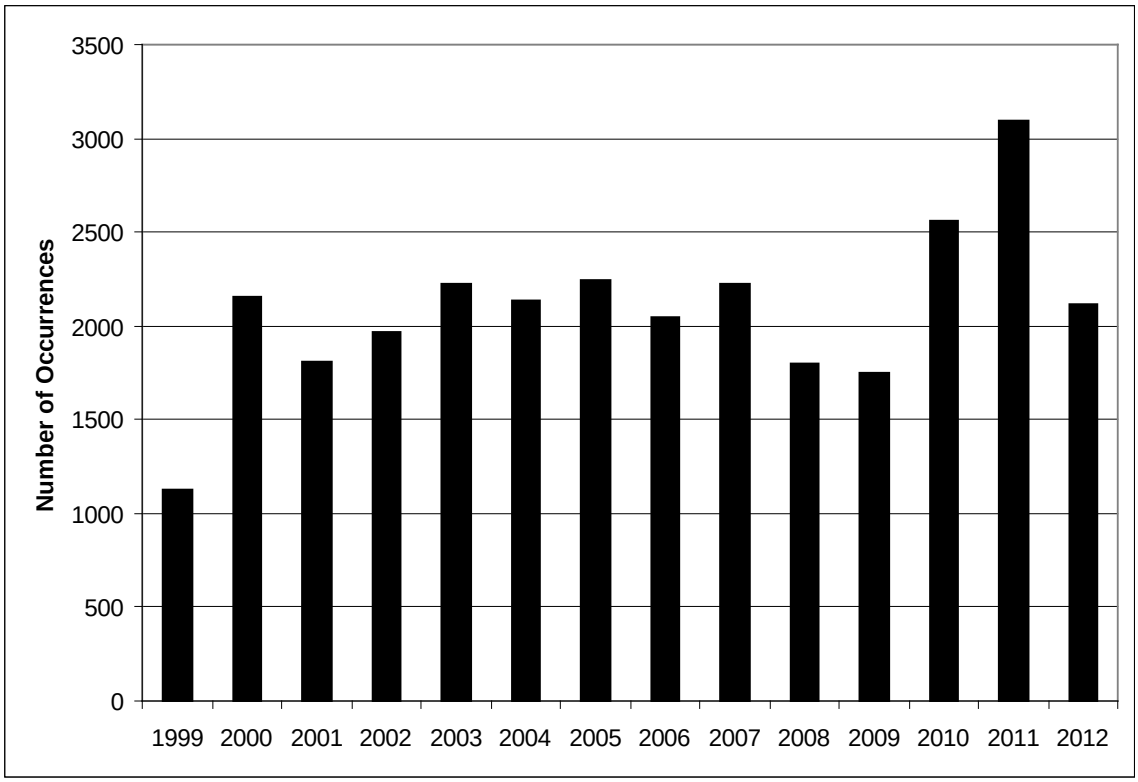

Figure 2.6. Number of black bear occurrences recorded in the ENFOR database in Alberta from 1999-2012.

Spatial locations where black bear sightings and conflicts occur are typically recorded at the level of the WMU, although a legal land description or GPS coordinates are sometimes included. Black bear occurrences have been recorded throughout the foothills and parkland regions and in many WMUs in the prairies, mountains, and boreal regions. High numbers of occurrences were recorded in WMUs surrounding major population centres that have high human populations, particularly Calgary, Edmonton, and Grande Prairie (Figure 2.7). Despite the presence of healthy black bear populations in many mountain WMUs, number of reported occurrences is low due to a relatively small human presence.

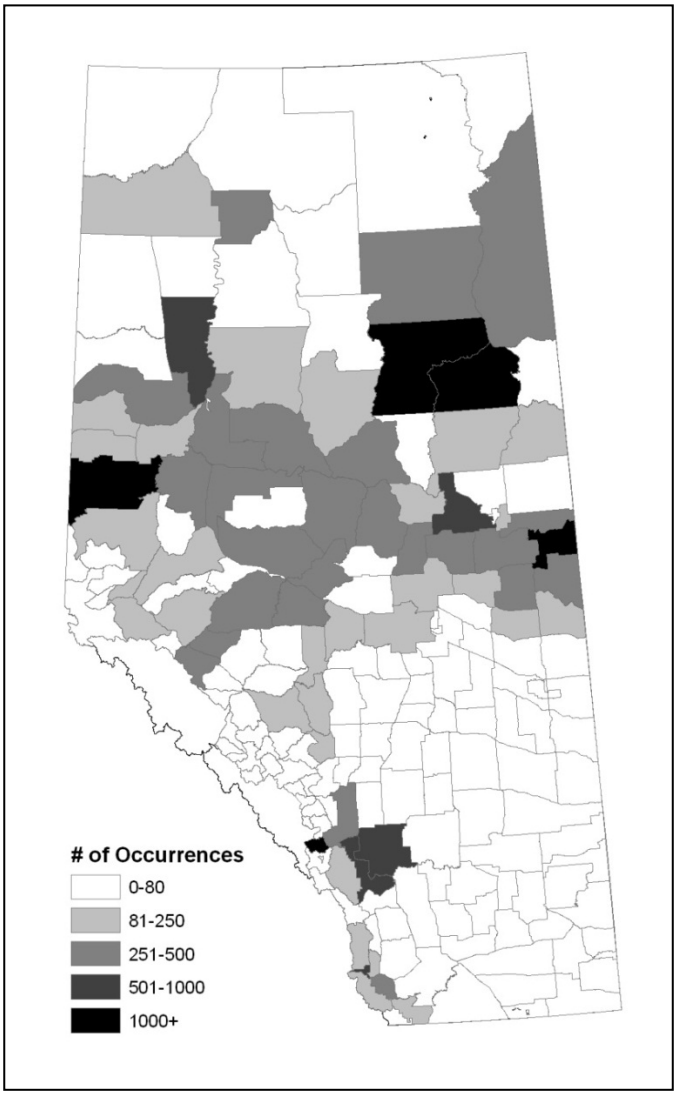

Figure 2.7. Number of black bear occurrences recorded in WMUs in Alberta from 1999-2012.

Detailed analyses of ENFOR occurrence records have been undertaken in several regions of Alberta as part of bear hazard assessments developed for the BearSmart Program. These efforts have included careful screening of occurrences to determine the type of conflict, main attractant, and response. In some cases, responding officers have been interviewed in order to provide greater clarity and detail on historic records. Unsecured or improperly stored garbage is consistently the most significant contributor to bear conflicts in most regions of Alberta (Table 2.9). Other major causes of bear conflicts include bird seed, natural and ornamental vegetation (including fruit trees), and the broad suite of attractants that occur at industrial sites and campgrounds.

Table 2.9. Summary of attractants causing bear conflicts in different regions of Alberta. Attractants are listed in ranked order of their contribution to bear conflicts in each region.

Region	Data Source	Primary Attractants
Crowsnest Pass	Miistakis Institute (2006)	Garbage, Ornamental plants, bird feed
Bragg Creek	Aspen Wildlife and Environmental Services and Karelian Bear Sheperding Institute of Canada (2010).	Garbage, bird seed, livestock feed
Bow Valley	Honeyman (2007)	Natural vegetation, garbage, golf course vegetation
Southwest Alberta	Urmson and Morehouse (2012)	Garbage, vegetation, bird seed
Mountain View County	Fraser and Bicknell (2011)	Garbage, bird seed, livestock carcasses
Smoky	Lee et al. (2011)	Garbage, bee yards, livestock feed
Evansburg	Goski and Hobson (2010)	Garbage, bee yards, fruit trees
Edson	Goski and Hobson (2010)	Garbage, industrial sites, campgrounds
Hinton	Goski and Hobson (2010)	Garbage, industrial sites, golf courses
Grande Cache	Goski and Hobson (2010)	Campground, industrial sites, garbage
Wabasca-Desmarais	MacPherson et al. (2012a)	Garbage, BBQ, natural vegetation
Grouard	MacPherson et al. (2012b)	Garbage, natural vegetation, pet food
Red Earth Creek	MacPherson et al. (2012c)	Garbage, BBQ, natural vegetation

Response to black bear-human conflicts is currently directed by the *Black Bear Response Guide*, which outlines the circumstances under which black bears of various age classes should be captured and relocated and/or euthanized. In general, black bears may be captured and relocated in situations where the investigating officer determines there is a potential public safety threat, or where a black bear has attacked pets or livestock. Black bears that make unprovoked contact with humans are euthanized. Since 2000, records indicate that an average of 210.6 black bears per year (range 52 - 501) have been euthanized by the Department, and an average of 88 black bears (range

of 39 to 151) are captured and relocated each year (Figure 2.8). The number of bears killed as problem wildlife per year is highly correlated with the number of black bear sightings and conflicts recorded in ENFOR (r = 0.77). Most relocations occur in response to a black bear that has become habituated to humans, or conditioned to search for food near humans.

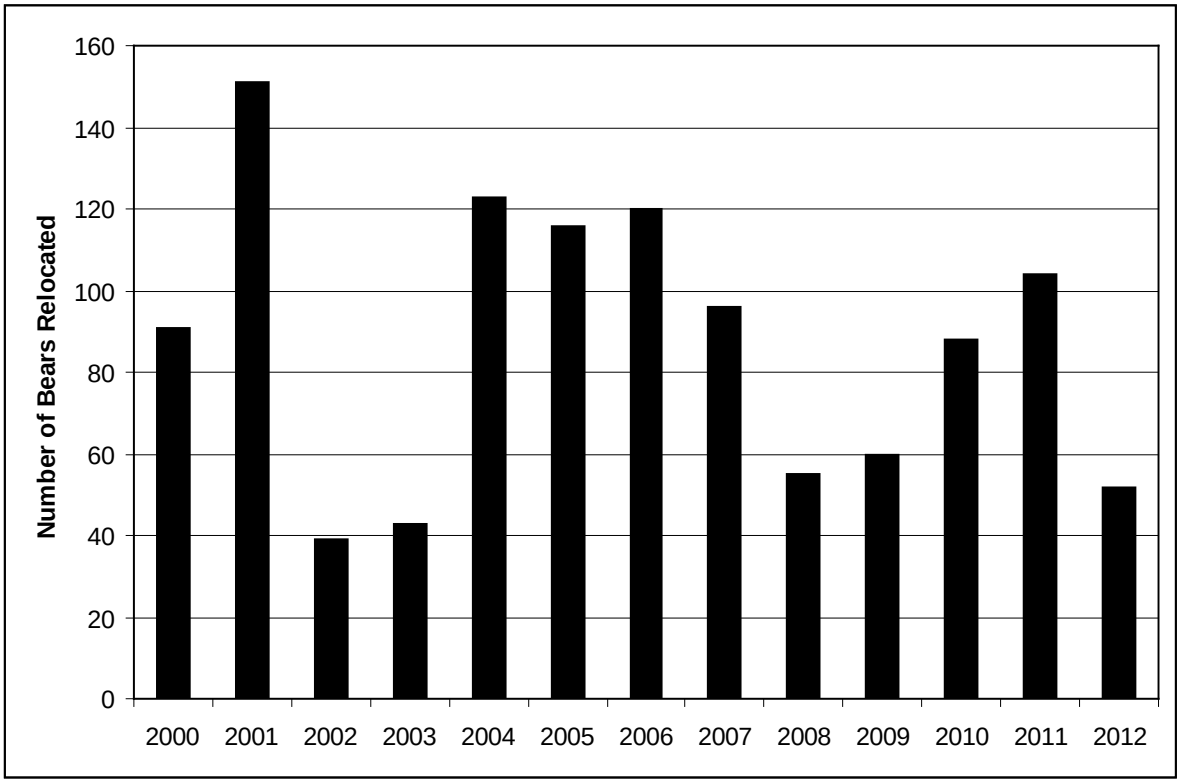

Figure 2.8. Number of black bears relocated in response to human-bear conflicts in Alberta from 2000-2012.

In cases of suspected livestock depredation, Fish and Wildlife officers investigate the occurrence to determine whether predators actually killed the animal, and which predator species was involved. Losses of cattle, swine, sheep, or goats that are determined to be due to black bears are eligible for compensation, according to guidelines established within the Wildlife Predator Livestock Compensation Program. From 2003-2012 the Department received an average of 10.6 (range: 7 – 15) claims/year related to black bears, with an average of $6,341.81 (range: $3,292.80 - $14,022.02) paid each year in compensation. During this time period, black bears accounted for 6% of all claims received through this program.

2.4 Summary and Management Challenges

Black bears are widely distributed across all forested regions of Alberta. There have been no population estimates conducted since the 1980s, however anecdotal information indicates that the provincial population is relatively abundant. Habitat changes caused by industrial development and agricultural expansion may have increased carrying capacity for black bears, however increasing access and a low tolerance for black bears in some areas may have also resulted in increased levels of human-caused mortalities. As such,current trends in black bear population size are unknown.

Human-black bear conflicts are a significant issue in many areas of Alberta, resulting in substantial amounts of property damage, public safety concerns, and bear mortalities. Few regulations exist to control the management of bear attractants, and unsecured garbage contributes to a large number of bear conflicts in most areas. Regulations permit black bears to be killed year round, without a licence and without limit on private land, however the significance of this mortality source to black bear population dynamics in different parts of Alberta is unknown.

Black bear hunting regulations have remained relatively liberal, with both spring and fall hunting seasons, multiple-bear bag limits in some areas, and no limits on the number of licences sold. Interest in black bear hunting by residents has historically been low, however licence sales have been increasing for the past several years. A successful black bear outfitting industry has resulted in relatively high harvests by non-residents, particularly in the boreal forest of northern Alberta. Recent research in northeastern Alberta indicated that black bear harvest rates were sustainable. This has not been confirmed in other regions, although anecdotal information from hunters, outfitters, and field staff indicate that harvests are not threatening bear populations in most areas.

In the future, important black bear management challenges will include managing human-bear conflicts as human populations rise and industrial activity continues to expand across northern Alberta, promoting landowner tolerance for bears on private land, and managing human harvests in the absence of accurate population data.

3.0 Management Plan

3.1 Policy Framework

Wildlife resources in Alberta are administered according to policies outlined in The Fish and Wildlife Policy for Alberta (Alberta Fish and Wildlife 1982). These policies, summarized in the following statements, provide general direction for establishing goals and objectives for black bear management in the province.

3.1.1 Resource Protection

a) **"1)**…The primary consideration of the Government is to ensure that wildlife populations are protected from severe decline and that viable populations are maintained…"

3.1.2 Resource Allocation

a) **"2)(a)** The wildlife resource, as a Crown resource, will be utilized in a manner which contributes the most benefit to the citizens of Alberta."
b) **"2(e)** Wildlife will be allocated through a defined process whereby specific resources are deployed to specified uses in order to achieve stated public benefits."
c) **"11)** The Division may allocate live wildlife for various uses such as game farming, game ranching, education or science and zoological displays, in conformity with other aspects of the Wildlife Policy."
d) **"17)** Wildlife must be allocated among different primary users in response to government policy. Until such time as supply and demand can be better rationalised, the following interim allocation guidelines will prevail on order of priority:
e) **(b)** Resident recreational use of game will have precedence over non-resident use. Wildlife stocks not fully allocated or utilized to higher priority uses may be allocated commercially to non-residents."
f) **"18)** The allocation of wildlife stocks to the different primary uses does not imply that other uses cannot occur within areas where such uses are entitled."

3.1.3 Recreational Use

a) "8) A variety of wildlife recreational opportunities, in addition to hunting, will be available for the benefit and enjoyment of Albertans."
b) "21) A variety of hunting opportunities will be available for the recreational benefit and enjoyment of Albertans…"

3.1.4 Commercial Use

a) "22) The Division will encourage an environment that promotes the growth of the tourist industry…"

3.1.5 Protection of Private Property

a) "4) The Government, through the Division, will assist in preventing or controlling wildlife from damaging property and endangering human life."
b) "5) Responsibility for damage in any form caused by wildlife will be shared in relationship to what people can reasonably do for themselves and to the amount of any additional damage beyond that which would normally be expected to occur in an area."

3.2 Management Plan Goals and Objectives

3.2.1 Resource Protection and Population Management

Goal: To ensure the black bear population is protected from significant decline and that viable self-sustaining populations are maintained.

Objectives:
a) Protect black bear habitat from loss and disturbance from agricultural, recreational and industrial activities.
b) Reduce rates of human-black bear conflicts, particularly those caused by unsecured attractants.
c) Regulate human-caused mortality so that it does not exceed 20 percent of the estimated provincial population.

3.2.2 Resource Allocation

Goal: To maximize benefits to Albertans through the allocation of the black bear resource amongst aesthetic, recreational, commercial, and other users.

Objectives:

a) Provide Albertans and visitors to Alberta the opportunity to view, photograph and otherwise enjoy black bears.
b) Provide the opportunity for recreational hunters using to annually harvest a total of 12 percent of the provincial black bear population or a maximum of 4700 bears through both spring and fall seasons.
c) Provide the opportunity for fur trappers to harvest black bears by shooting.
d) Provide Albertans the opportunity to benefit from the outfitting and guiding of non-resident black bear hunters.

3.2.5 Protection of Life and Property

Goal: To minimize property damage and other hazards to humans caused by black bears.

Objectives:

a) Reduce black bear predation of livestock and pets through planned land management and agricultural development, and preventative livestock management.
b) In cases where black bears maul or kill livestock, capture and translocate offending black bears, where equipment and budgets are sufficient.
c) In cases of maulings or serious threat to humans, ensure the black bears involved are killed.
d) Reduce property damage caused by improper storage and disposal of garbage and human foods through public education programs, and the management of industrial and other commercial facilities in bear range.

3.2.6 Science and Education

Goal: To promote and encourage scientific and educational activity to enhance knowledge and appreciation of black bears.

Objectives:

a) Continue scientific research of black bear populations and ecological requirements (e.g. habitat use and requirements, population response to hunting).
b) Educate Albertans about black bears and approaches to prevent human-bear conflicts.

3.3 Management Strategies

3.3.1 Resource Protection

Black bears are habitat generalists, capable of surviving in virtually any landscape with an abundance of natural foods and forested security cover. A mixture of forest stand ages created by forestry activity and forest fires, coupled with edge habitats associated with the creation of roads and pipelines, will provide a wide diversity of black bear foods and promote an abundant bear population. Ongoing landscape changes in the province should largely benefit black bears, so long as human-bear conflicts and human-caused mortalities can be maintained at sustainable levels. Therefore, no specific habitat management activities are recommended for black bears at this time.

3.3.2 Data Collection

The Department will continue to collect information on black bear resident and non-resident hunter harvest, trapper harvest, and number of bears killed as problem wildlife. However, in the future the Department will undertake several initiatives to improve the quality and breadth of information collected on black bears in the province in order to improve management.

- The Game Harvest Survey may be enhanced to include additional questions pertaining to hunting method (e.g. over bait or spot and stalk), type of bait used, whether hunting effort and harvest occur during the spring or fall seasons, and whether resident hunters used the services of an outfitter.
- Methods to develop WMU-specific estimates of non-licence harvest on private land will be investigated. Voluntary reporting, perhaps through an online system, may be the only feasible approach to gather this information in the near-term. Eventually, the Department may consider requiring mandatory reporting through either an electronic or hardcopy form, similar to Defense of Life and Property reports used in some other jurisdictions.
- The Department will pursue collection of premolar tooth from a sample of bears killed as problem wildlife, through unlicensed means on private land, and by hunters. Over time a

sample of teeth from different regions in Alberta can be used to examine the age structure of the harvest, as well as reproductive information including age of first reproduction and inter-litter intervals. Eventually, it may be possible to develop targets for the age structure of the black bear harvest, providing a clear metric upon which harvest levels could be assessed.

- The Department will improve the current system that is used for recording black bear sighting and conflicts. The ENFOR database was not designed for human-wildlife conflict data, has limited data standards, and cannot be used to easily distinguish sightings from conflicts. In contrast, the Fish and Wildlife Management Information System (FWMIS) has been specifically designed to record information on wildlife sightings and conflicts, and includes data fields that allow distinction of conflict levels. Over time, the Department will begin recording black bear conflict data in FWMIS. Pursuing this option will require the development of simple, easy to use electronic forms that load information directly into the database.

3.3.3 Resource Allocation and Recreational Use

3.3.3.1 Management zones

Priorities for black bear management in Alberta will vary spatially according to the dominant land uses and density of human settlement. The province will be divided into three 'zones' for the purposes of black bear management. These zones include 1) Protected; 2) Hunting; and 3) Control (Figure 3.1). The protected zone, which includes Provincial Parks, National Parks, Wilderness Areas, and the Cold Lake Air Weapons Range will be managed with non-consumptive use as the priority and will not have hunting seasons. These areas will also serve as reference populations for black bear research, as rates of human-caused

Figure 3.1. Management zones for black bears in Alberta.

mortality will generally be minimal.

The hunting zone will include WMUs with significant amounts of forested public land, with some adjacent private land. This zone will cover the majority of current black bear range in the province, and will be managed to maintain a stable population of black bears while providing abundant hunting and viewing opportunities. It is expected that black bears will be permanent residents in the WMUs comprising this zone, and programs to resolve human-bear conflicts and permanently secure bear attractants will be focused in this area, as resources allow. Management tolerance for black bears that are involved in conflicts will be higher in this zone than in the control zone.

The control zone will include WMUs in the settled portion of the province, where agriculture and residential development are the primary land uses. In most cases black bears are not currently permanent occupants in these WMUs, although some bears may disperse into the area. Management priorities in this zone include the protection of public property. There is no expectation that bears will occupy this area on a long-term basis. Management tolerance for black bears that are involved in conflicts in this zone will be low, with the expectation that these animals will be relocated or euthanized. In general, there will not be Government efforts to secure attractants or implement conflict prevention in this zone.

3.3.3.2 Population objectives

Currently, black bear population objectives are set by Senior Area Wildlife Biologists at the scale of individual WMUs. These assessments are based on consultation with local residents and various stakeholder groups. However, in practice, objectives for black bear populations at this management scale have limited utility because it is difficult to determine current black bear numbers or to assess the effect of management actions on populations. Therefore, in recognition of the difficulty and expense of conducting regular black bear population assessments, in the future the Department will endeavour to develop formal targets for other metrics associated with black bear populations that can reasonably be assessed on a regular basis. These may include measures such as numbers of human-black bear conflicts, age distribution of harvested bears, or relative population trends based on indirect indices such as hunter success.

3.3.3.3 Harvest sustainability and allowable harvest rates

Although anecdotal information and some research indicate that black bear harvest rates are currently sustainable at the provincial level in Alberta, lack of detailed knowledge on variation in black bear density, population productivity, total rates of human-caused mortality, natural mortality

rates, and age structure of the harvest make it impossible to examine regional patterns in harvest sustainability. Therefore, the Department will pursue the use of alternative indirect metrics, such as the age structure of the bear harvest or catch-per-unit effort, to monitor the long term sustainability of the harvest. In particular, collecting a sample of teeth from female bears from different regions of the province will allow investigation of variation in reproductive metrics such as age of primiparity or inter-litter interval, which may influence the sustainability of different management regimes. Finally, ongoing grizzly bear DNA surveys, which also collect incidental information on black bears, may provide an opportunity to determine black bear population size and harvest rates in specific areas.

3.3.3.4 Season dates and bag limits

Current spring and fall hunting season dates (Table 2.3) will be maintained for the foreseeable future. The Department will continue to pursue standardized, consistent start and end dates to black bear hunting seasons, wherever practical. Hunting season duration may be reduced in circumstances where harvest is thought to be unsustainable and alternative measures to reduce harvest (reducing unlicensed take, rescinding supplemental licences, reducing outfitter allocations, restricting baiting, etc.) are insufficient.

Bag limits will be used to regulate the regional harvest of black bears. In some WMUs with abundant black bear populations, low hunter density, or where management goals include maintaining lower bear populations, a supplemental tag will be available allowing a hunter to harvest two black bears. In cases where a reduction in resident hunter harvest is desired, the bag limit will be reduced to one bear prior to considering shortening of hunt duration.

3.3.3.5 Hunting techniques

Baiting for the purpose of hunting black bears will continue in those WMUs within the 300 and 500 series where reproducing female grizzly bears are normally absent. Baiting will not be allowed in 100 or 200 series WMUs, where human settlement is typically more dense and baiting may draw bears into areas where they are more likely to cause conflicts. Currently baiting is permitted in WMUs 322, 330-338, 348, 358-360, 500-506, 209, 510, 512-520, 522, 523, 529-536, 539-544, and portions of WMUs 320, 324, 357, 507, 521, 526 and 528. In the future, expanding grizzly populations may lead to additional area restrictions on baiting. Baits will meet the following criteria:

i. dead and legally possessed;
ii. non-toxic and completely biodegradable;

iii. not placed within 1 km of an legally designated campsite, recreation area, park, industrial site, residential area or dwelling;
iv. posted on all access routes within 100 m and 200 m of the bait site in a weatherproof and conspicuous manner with the owner's name and the wildlife certificate or outfitter/guide number of the person responsible for the placement of bait;
v. placed out only during the open season for black bear in a WMU and the preceding two weeks
vi. cleaned up along with containers and debris within the period specified above.

Baiting is currently allowed during both the spring and fall hunting seasons. The Department may consider restricting baiting in the fall period to address significant enforcement concerns related to hunters illegally using black bear baits to attract ungulates. In the future, the Department may also place additional restrictions on the types or amount of bait that can be used, in order to address concerns that baiting may lead to human-food conditioning or alter bear population dynamics. The Department will also consider requiring registration of baiting locations at the local Fish and Wildlife office in order to assist with compliance enforcement and reduce conflicts between hunters. These issues will all require further consultation with Albertans, and in particular, specific stakeholder groups that would be most affected.

3.3.4.5 Protection of adult females with cubs of the year.

Female black bears accompanied by cubs of the year, and cubs of the year will be protected from harvest. Bears have relatively low reproductive rates, and most cubs less than one year of age require maternal care to survive.

3.3.4.6 Social acceptance of black bear hunting

Public acceptance of hunting black bears will be increased through an educational initiative to inform Albertans on the complexity of bear management, the role of a well-managed harvest in reducing human-bear conflicts, and the positive aspects of certain controversial bear hunting techniques (e.g. baiting). In addition, the Department will endeavour to measure and promote the utilization of black bear meat by hunters. This will include modifications to the Game Harvest Survey to include a question regarding meat consumption, as well as publishing techniques on how to utilize black bear meat and encouraging organizations (such as the AFGA and APOS) to promote the use of bear meat to their members.

3.3.4 Managing Commercial Use

3.3.4.1 Traffic in Bear Parts

Alberta will continue to prohibit the traffic in bear parts other than the hide with or without attached claws.

3.3.4.2 Non-resident Hunting

Recreational hunting of black bear by non-residents will continue. Unlike most big game species in Alberta, interest by residents in hunting black bears is relatively low across most of the province, which allows a higher percentage of the harvest to be allocated to non-residents. Harvest by non-residents will be compatible with resident demand and will be regulated by the "Outfitter-Guide Policy for Alberta." However, non-resident harvest will not exceed 30 percent of the total provincial allowable harvest.

3.3.4.3 Harvest by Registered Trappers

Harvest of black bears by Registered Trappers will continue in Alberta, and is expected to contribute only a small amount to the total provincial harvest. However, this use of the resource shall be considered secondary to both resident and non-resident hunting. In the future, if evidence indicates that black bear harvest needs to be reduced in some areas, harvest by trappers will be restricted before reductions to hunting opportunity are considered.

3.3.5 Managing Black Bear – Prey Relationships

Predation of neonate ungulates by black bears can be a significant mortality factor. Additional research is required in Alberta to quantify this mortality. In general, black bear populations will not be reduced for the purpose of increasing hunter harvest of ungulates. However, where black bear predation is identified as a limiting factor for Endangered or Threatened species, their populations may be temporarily reduced. Where practical, the Department will attempt to utilize public harvest to achieve bear population objectives, prior to implementing a government control program.

3.3.6 Managing Non-consumptive Use

Black bears are among the most easily observed large carnivores in Alberta, due to their relatively high abundance and ability to tolerate significant amounts of human presence. Because of the growing demand for viewing and other non-consumptive enjoyment of wildlife, certain black bear populations will be managed with this use as a priority. Populations of black bears in national parks, wilderness areas, provincial parks, Cold Lake Air Weapons Range, and certain WMUs in the

settled parts of the province are protected from recreational hunting. Non-consumptive use of black bears should not be significantly limited by recreational hunting.

3.3.7 Managing Non- Hunting Mortality

The majority of non-hunting human-caused black bear mortalities occur through unlicenced harvest on private land, and through government removal of bears associated with conflicts. Over time, the Department will endeavour to reduce both of these mortality types through a combination of educational programs and regulatory amendments.

A major commitment must be made to change public attitudes toward bears in order to reduce unlicensed mortalities. Positive attitudes towards bears must be fostered among all users of natural resources and wildlands, and most importantly, among rural residents and landowners. Continuation and enhancement of the educational components of the Alberta BearSmart Program will be used to inform Albertans of the life history of bears, their behaviour, and their ecological values (Government of Alberta 2010). Sharing methods to avoid conflicts with bears through the proper management of attractants will continue to be a primary focus of the program. The Government of Alberta, including its staff and facilities, should be required to adhere to all Alberta BearSmart recommendations. Over time, the Department will consider adjusting current regulations to require proper management of key bear attractants on public land. In particular, the Department will play a leadership role in improving the management and storage of human garbage, which is the main contributor to conflicts with black bears in most of the province.

Eventually, as positive public attitudes towards black bears increase and techniques to prevent bear conflicts see wider use among the general public, the Department may consider restricting the conditions under which black bears may be killed on private land. For example, it may be possible to require that unlicenced black bear harvest can occur only in defence of life or property.

3.3.8 Protection of Private Property

The Department will continue to respond to reports of black bears that have killed or threatened pets, livestock, or public safety. The Black Bear Response Guide will be used to determine the appropriate response in the event that capture of the offending animal is necessary.

Current regulations that allow hunting black bears on private land without a licence on a year-round basis will continue for the near future. This will give rural residents flexibility to immediately remove black bears that are threatening pets or livestock or creating public safety concerns. Fish

and Wildlife officers may also issue damage control licences to authorize landowners to utilize special techniques (such as dogs or traps) to remove black bears that have damaged property or are a threat to public safety, although in most cases government staff will take control action in these situations. Over time, if educational initiatives lead to improved management of bear attractants on private land and an increase in tolerance for black bears, the Department may consider restricting non-licence private-land harvest to situations where bears have caused property damage or threatening public safety.

3.3.9 Managing Scientific and Educational Use

The Department will encourage, and where possible support, research on black bears in Alberta. Although black bears are generally a well-studied species, very little recent research has been conducted in Alberta. In particular, information on regional patterns in black bear density, reproductive rates, and cause-specific mortality would support investigations of harvest sustainability. Priorities for black bear research in Alberta are as follows, in no particular order:

- Developing regional estimates of current, cause specific human-caused mortality rates
- Developing regional estimates of sustainable human-caused mortality rates
- Determining which types of educational initiatives are most effective at changing human behaviour and increasing tolerance of black bears
- Determining how black bear populations are likely to respond to changing land use practices
- Determining the contribution of black bear predation towards mortality of woodland caribou.

The Department will continue efforts to educate specific stakeholders, as well as the general public, about black bears and their management. The Alberta BearSmart Program (www.bearsmart.alberta.ca) will continue to be the primary mechanism via which information on black bears is distributed. A variety of media, including print brochures, the Departmental website, and social media (such as YouTube) will be utilized. Specific initiatives directed towards trappers, hunters, and landowners will be enhanced where possible. Wherever possible, educational programs should proceed as collaborative efforts with other organizations (e.g. Alberta Hunter Education Instructor's Association). Specifically, educational programs will provide detailed information on 1) black bear biology and habitat needs; 2) methods to secure potential attractants from bears; and 3) approaches to prevent and respond to encounters with bears. The Department will play a leadership role in demonstrating proper storage of bear attractants at government facilities, and require all contractors to follow Alberta BearSmart guidelines.

4.0 MANAGEMENT PLAN APPLICATION

4.1 PROVINCIAL SUMMARY

The primary challenges for management of black bears in Alberta are:

- Managing human-bear conflicts as human activity continues to expand within black bear range.
- Promoting increased tolerance for black bears in private land.
- Improving data collection for black bear conflicts and non-hunting mortalities.
- Managing black bear hunting in the absence of accurate population data.
- Encouraging research to provide more information on black bear population status.

4.2 REGIONAL PERSPECTIVES

4.2.1 Mountains and Foothills

Habitat for black bears is relatively secure in large areas of the mountains and foothills. However, higher elevation areas have a shorter growing season and are generally less productive than other habitats, resulting in lower carrying capacity for black bears. Further, expansion of acreages and industrial development throughout the foothills will likely increase rates of human-bear conflict and create additional access for hunters. High levels of recreational use by the public also result in significant numbers of human-bear conflicts each year, and this may increase in concert with a rise of Alberta's human population in the coming years. A concerted effort will be made to educate the increasing number of users of these regions on techniques to manage bear attractants and avoid encounters with bears. Ultimately, regulations that specify proper storage of bear attractants, as have been implemented in provincial parks, may be required. Finally, because of relatively high demand by resident hunters in these regions, there will be a priority for initiatives to investigate harvest rates and harvest sustainability.

4.2.2 Prairies and Parkland

An absence of forest cover likely means that black bears were never abundant on the prairies except along some riparian corridors; however, much of the Parkland region is comprised of excellent bear habitat and could support significant populations. Current regulations permit black bears to be killed without restriction on private land, which likely limits black bear numbers in most of this region. In the absence of a significant commitment on the part of residents to manage attractants, high levels of human habitation and agriculture would likely result in high rates of human-bear conflict if black bear populations were allowed to increase. Therefore, in the near term,

management efforts will focus on educational initiatives to increase public tolerance for black bears on private land.

4.2.3 Boreal Forest

Much of the boreal forest in Alberta is comprised of excellent black bear habitat, and previous research efforts indicate that density of black bears is probably highest in this region. Historically, relatively low human populations and low levels of road access resulted in secure conditions for black bears, but this may be changing as industrial activity increases. Significant challenges related to increasing human-black bear conflicts occur across much of the boreal forest, particularly in northeastern Alberta. Many of these conflicts are related to unsecured attractants at industrial facilities. Recent efforts to improve the management of these sites with respect to bear attractants will continue. Most non-resident black bear hunting occurs in the boreal forest, and because of relatively low interest by resident hunters, this activity will likely continue for the foreseeable future.

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