Managing for Grizzly Bears in the Foothills Model Forest: A Survey of Local and Edmonton Residents

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EXECUTIVE SUMMARY

Grizzly bears have been used by natural scientists as an indicator of biodiversity and ecosystem health. When managing for biodiversity, trade-offs may be required between conservation and human use of natural environments. In the Foothills Model Forest (FtMF) of west-central Alberta, primary resource industrial development and other human activity increase the likelihood of habitat loss and fragmentation and grizzly bear mortalities. A study was undertaken to address public preferences for grizzly bear management in the FtMF, to better understand the public's willingness to make trade-offs between economic and recreational activities and conservation of bears.

Mail surveys were administered in 2004 to three geographically defined samples: residents of Jasper (n = 388); residents of the FtMF and surrounding towns, but outside Jasper National Park (n = 660); and residents of Edmonton (n = 652). Surveys examined respondents' environmental value orientations, knowledge of grizzly bears, views of sustainability of grizzly bear populations in the FtMF and perceived risk factors, attitudes towards grizzly bears, management preferences, views of public involvement, and demographic information.

Highlights of the results include:

- The response rate on the mail survey was 67.0%.
- Jasper and FtMF residents were highly dependent on income from natural resource sectors, and were more likely than Edmonton respondents to indicate they had visited the FtMF, participate in wilderness related recreational activities, and belong to recreational or environmental organizations.

- All three groups, and Jasper residents in particular, expressed a pro-ecological value orientation.
- Jasper and FtMF residents were more likely to have seen a grizzly bear in the wild, and indicated much greater familiarity with grizzly bear research in the FtMF
- None of the groups were very knowledgeable about grizzly bears.
- A majority of all groups thought the grizzly bear population in the FtMF is somewhat or very sustainable.
- Industry, poaching and human use of grizzly habitat were rated as potential threats to the health and productivity of grizzly bear populations.
- Attitudes towards grizzly bears were positive in all three samples, with Jasper residents being the most positive.
- Respondents supported several grizzly bear management options. Support was highest for options relating to management and communications such as public education and bear proofing settlements, but there was also support for options which would require trade-offs in the form of restrictions on industrial development, access or hunting.
- There was disagreement among the samples on three management options: permanent closure of roads for off-road vehicle use, a permanent ban on grizzly bear hunting, and development of new mines in grizzly bear habitat. Support for each of these options was related to specific interest groups: off-road vehicle

users, random campers in the FtMF sample, hunters, and those dependent on mining in the FtMF sample.

- FtMF respondents are more optimistic about the sustainability of grizzly bear populations in the model forest, perceive less risk to grizzly bears from industrial activities, and are not as receptive to restrictions on public access and industrial expansion in grizzly bear habitat.
- All groups supported the public having a role in decision making about grizzly bear management, and indicated that Parks Canada, provincial government departments, environmental organizations, and local residents should have the most influence.

Management implications of these findings centre around the lack of knowledge about grizzly bears, predicting public support for management options, potential conflicts in grizzly bear management, and engaging the public in management decisions.

Biologists suggest that successful management of grizzly bear populations will require constraints on human disturbance of grizzly habitat. However, lack of knowledge suggests more attention must be paid to conveying the results of grizzly bear research to a broader public, in order for management options to be accepted. Pro-environmental value orientations and positive attitudes towards bears suggest Albertans would be receptive to information about grizzly bears.

Where there was disagreement about potential management options, awareness of how the opinions of groups with specific interests diverge will assist FtMF managers in developing mitigation to offset negative impacts if these management options are implemented.

While there was general agreement among the samples, there were also some notable differences, suggesting potential conflicts among stakeholders. Of the three samples, Jasper residents are generally more extreme in their attitudes (i.e., their ratings were generally more positive or more negative than the FtMF and Edmonton samples). This is important to gaining acceptance of grizzly bear conservation initiatives because individuals with extreme attitudes may be less receptive to alternative views and less likely to change their views. This suggests controversy over grizzly bear management may originate within the FtMF, between residents of Jasper and residents of other communities in the model forest.

Engaging the public in grizzly bear management decisions will be most effective by including local residents as equal partners in setting goals and priorities for grizzly bear management and extending influence beyond the traditional stakeholders such as extractive industries, hunters, and recreation users. While Edmonton and local respondents agreed that local residents should have influence, involving only local residents will present a challenge if consensus on management decisions is sought, because of the differences in attitudes and preferences between Jasper and other local residents. As well, Edmonton residents may disagree with the outcome if decisions appear to cater to specific interests in the model forest.

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INTRODUCTION

The Foothills Model Forest (FtMF) is a partnership of industry, federal and provincial governments, landowners, and others, formed with the goal of improving resource management in the foothills of the Rocky Mountains. Covering about 27,500 km^2, FtMF encompasses Jasper National Park, the Willmore Wilderness Park, the Forest Management Area of Weldwood of Canada Ltd., the town of Hinton, the existing Cardinal River coal mine, and the proposed Cheviot coal mine. In 1999, the FtMF Grizzly Bear Research Program was established to conduct research aimed at ensuring the sustainability of the grizzly bear (*Ursus arctos*) population in Alberta (FtMF 2004). The program's original study area covered 10,000 km^2 in west-central Alberta, from Highway 16 to the Brazeau River, home to an estimated 66 to 147 grizzly bears (FtMF 2003). In 2004, the research program expanded its study area to cover 77,248 km^2 of the eastern slopes from south of Grande Cache to the Montana border (Figure 1) (FtMF 2004). Areas of biological and ecological research have included the development of models to identify important grizzly habitat, models of grizzly bear movement across the landscape, techniques to monitor grizzly bear health, and use of DNA census techniques to monitor population levels.

Grizzly bears have been used by natural scientists as an indicator of biodiversity and ecosystem health. In essence, by maintaining environmental conditions favourable to grizzly bears, managers can achieve benefits for other species (Northern East Slopes Environmental Resources Committee 2000). However, managing for biodiversity is a complex and often contentious issue in natural resource management, as trade-offs may be required between protection and human use of natural environments (Watson et al. 2004). West-central Alberta,

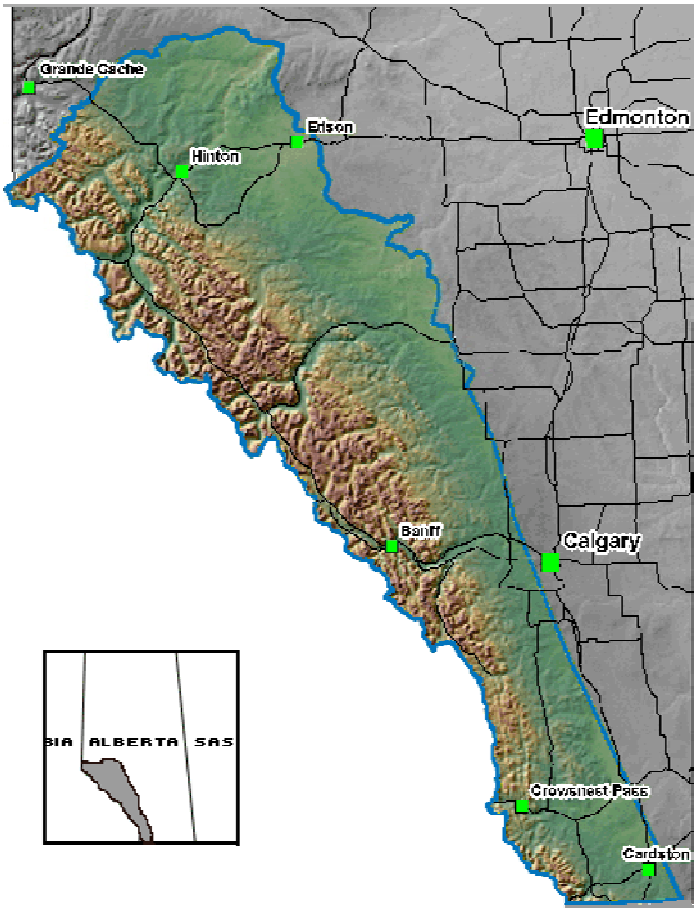

Figure 1. The current extent of the Foothills Model Forest Grizzly Bear Research Program
(from FtMF 2004)

including the FtMF, is considered to provide the greatest opportunity to increase grizzly bear populations in Alberta through intensive management and conservation programs (Stenhouse and Munro 2002). However, this area is also extensively used for human activities, including forestry, mining, oil and gas development, hunting, tourism and transportation corridors. As human activities and developments increase so does the likelihood of habitat loss and fragmentation and bear mortalities. Managing for a sustainable population of grizzlies in the FtMF may require society to make choices between these activities and conservation of bears.

Therefore, it is important for forest and wildlife managers to have knowledge of not only biological and ecological factors, but also the social acceptability of management options. It is knowledge of public preferences that is currently lacking from grizzly bear research and management in the Foothills Model Forest. For instance, most of the known grizzly bear mortality in the study area has been due to poaching, always near open roads (FtMF 2003). If it is found that limiting road development or public access to industrial roads reduces poaching, FtMF managers will also need to know if the public would support these options. In other words, the natural sciences will inform natural resource managers and policy makers on the ecological conditions necessary for conservation and the social sciences will inform them on what is acceptable to the public.

A study was undertaken in 2004 to address some of the social science research needs for grizzly bear conservation in the FtMF. As such, it helps bridge the gap between what is needed ecologically to achieve grizzly bear conservation and what is socially acceptable. The objectives of the study were to examine attitudes towards grizzly bears, knowledge of grizzly bears, preferences of the public regarding grizzly bear conservation in the FtMF and the factors influencing these preferences. This report presents a descriptive analysis of the study results.

Status of Grizzly Bears in Alberta

While approximately 6,000 grizzly bears once ranged across Alberta, grizzly populations dwindled with conversion of land to agriculture and unrestricted hunting (Kansas 2002). Although grizzlies were first given legal protection in 1927, hunting and poisoning continued (Alberta Sustainable Resource Development 2004). Since then, the scope of protection has

increased, for example, by eliminating the fall hunting season and increasing fines for poaching. While grizzly bears can still be hunted legally, the number of licenses issued was lowered to 73 in 2004 (Government of Alberta 2004). In 2004, the Alberta government also closed the hunt in part of the FtMF and other areas where mortality is highest, and shortened the spring hunting season by two weeks in most areas to protect females, who tend to emerge from hibernation later than males.

There are an estimated 675 grizzlies in Alberta, outside the national parks (Alberta Sustainable Resource Development 2004)[1], primarily in the Rocky Mountains and higher elevations of the foothills and boreal forest of western Alberta (Figure 2) (Kansas 2002). Another 215 grizzly bears are estimated in Waterton Lakes, Banff and Jasper national parks, for a province-wide population of 890. Since 1990, the goal of the provincial government has been to increase the grizzly population outside national parks to 1,000 animals (Kansas 2002).

The grizzly is classified by the Province of Alberta as a species that "may be at risk", primarily due to human-caused mortality as human population densities and access increase (Kansas 2002). The Alberta Government's Endangered Species Conservation Committee has recommended the status be upgraded to "at risk," because of the small breeding population, limited dispersal from adjacent jurisdictions, and the continuing threats of human-caused

[1] There is a great deal of uncertainty around estimates of the grizzly population in Alberta. For example, see Stenhouse et al. (2003), Kansas (2002) and Bow Valley Grizzly Bear Alliance (2003).

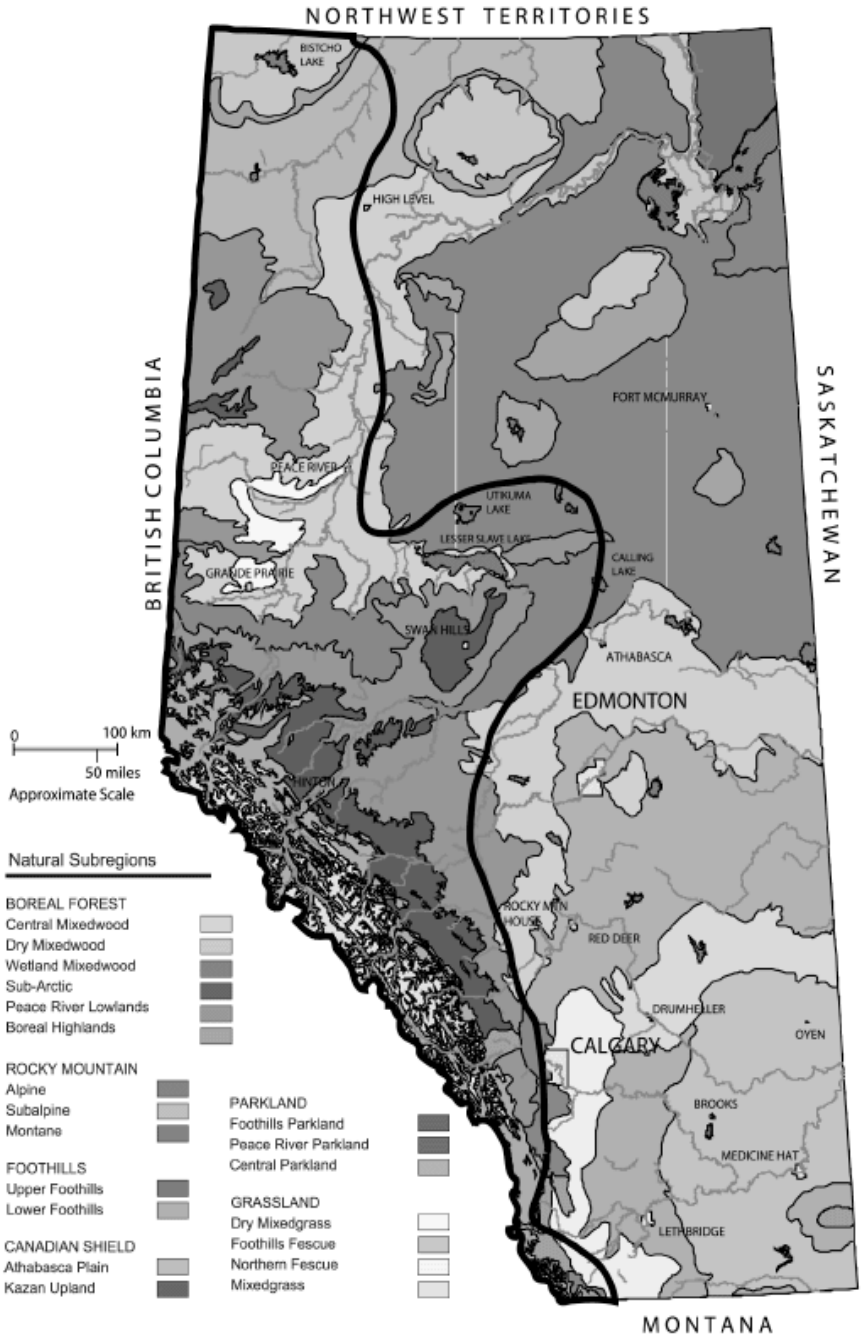

Figure 2. Present day grizzly bear distribution in Alberta, as indicated by the bold line (Kansas 2002).

mortality and habitat loss (Alberta Fish and Wildlife Division 2002). The Alberta government has maintained the current status because restrictions on grizzly bear hunting since 1980 are thought to be keeping the population relatively stable (Kansas 2002). Nationally, the Committee on the Status of Endangered Wildlife in Canada, the national organization responsible for determining the status of wildlife species, lists the grizzly bear's northwestern population as a species of special concern[2] while the prairie population is extirpated (COSEWIC 2003).

Grizzly Bear Biology and Management

Several aspects of grizzly bear biology have important implications for management of the species and frame the economic and social trade-offs in grizzly bear management. Grizzlies are primarily adapted to open environments such as grasslands and river shorelines (Alberta Sustainable Resource Development 2004). In mountainous regions, the best and most contiguous habitat is along valley floors (Parks Canada 2004). These habitat preferences have resulted in conflicts with humans. As noted above, grizzly populations fell as agriculture expanded and grizzly habitat was converted to farms. In mountainous areas, grizzly habitat needs bring them into proximity to roads, railways and other human activity along valley floors.

[2] The northwestern population includes the remaining grizzlies in Alberta, British Columbia, and the territories. A species of special concern, formerly described as "Vulnerable" from 1990 to 1999, or "Rare" prior to 1990, has characteristics that make it particularly sensitive to human activities or natural events. While the COSEWIC rating is used by the Canadian Endangered Species Conservation Council, it is the Government of Alberta rating that determines the level of protection on provincial crown lands.

Protecting grizzly habitat and populations, particularly near human communities, may require intensive management of recreation, industry, and settlements (McLellan et al. 1999).

In Alberta and neighbouring jurisdictions, human-caused mortality is the single largest cause of known grizzly deaths, and is closely tied to human access to grizzly habitat (Nielsen et al. 2004; Kansas 2002; McLellan et al. 1999). Examples include death from legal and illegal hunting, control by wildlife officers when bears and humans come into conflict, and highway and railway accidents. Enhanced grizzly bear conservation could result in further restrictions on legal hunting, increased enforcement of anti-poaching laws, preventative measures to control human-bear conflict (Nielsen et al. 2004; Augustyn 2001), and changes to transportation activities. Since mortality is related to human access to grizzly habitat, it may also be necessary to close industrial roads when industrial activity ends (McLellan and Shackleton 1988; McLellan 1990) or otherwise limit human access (Nielsen et al. 2004).

Grizzlies are omnivorous and move through their home range in response to seasonal changes and the location of preferred foods (Kansas 2002). The dietary needs of grizzlies result in very large annual home ranges. These can vary from a low of 165 km^2 for females to ten times that size or more for males (Kansas 2002; Stenhouse and Munro 2001). Large ranges make grizzlies valuable as an indicator species for the health of the environment and the cumulative effects of regional land use on natural ecosystems. However, many bears will cross jurisdictional boundaries through the year, making management coordination a challenge (Gibeau et al. 2001; Herrero et al. 2001).

In addition to quality habitat and connectivity, grizzlies need security areas, comprising about two thirds of their home ranges, where they can seek refuge from humans and human

activity (Parks Canada 2004). The presence of humans can cause bears to leave preferred food sources. Habituation to humans, particularly in adolescent bears and adult females, can increase the likelihood of a human-caused death. However, protecting or expanding security areas may require reductions or alterations to economic and recreational activity.

Habitat loss and fragmentation is a major threat to grizzly bear populations in Alberta (Alberta Fish and Wildlife Division 2002; Wild Canada 2004). Avoidance of roads and trails can affect the ability and willingness of bears to use high quality habitat or to maintain genetic continuity across populations, resulting in effective habitat loss, and population fragmentation (Kansas 2002; Gibeau et al. 2002; Archibald et al. 1987; McLellan and Shackleton 1988). Certain types of activity, such as motorized recreation and 24-hour activity, are more likely to disturb grizzlies (Kansas 2002). Fire suppression and the subsequent loss of meadow and open slope habitats negatively affect grizzly habitat as many preferred foods are associated with early stages of fire succession (Russell et al. 1979).

Some human activity can have a positive effect on grizzly habitat. Temporary habitat changes such as clearcutting can increase the diversity of plant and animal food sources, resulting in selection of clearcuts over surrounding areas (Nielsen and Boyce 2003). Nielsen and Boyce note, however, that while clearcuts can provide quality habitat, grizzly bears avoid these areas during the day, when the security of the area is likely to be disturbed by human activity.

It is important to note that female grizzly bears begin reproducing between four and eight years of age, and usually bear two cubs every three to four years (Alberta Sustainable Resource Development 2004). The late onset of reproductive ability, small litters, and long inter-birth

intervals lower the capability of grizzly bear populations to compensate for the loss of individual animals (Alberta Sustainable Resource Development 2004; Weaver et al. 1996).

Young grizzlies have limited dispersal from their natal range. This reduces opportunities for grizzly populations to move into suitable habitat when it becomes available, and reduces the functional connectivity between fragmented populations (Alberta Fish and Wildlife Division 2002; Weaver et al. 1996). These biological limits mean that reducing or controlling grizzly mortality, and high female mortality rates in particular, is vital to successful management (McLellan et al. 1999; Stenhouse et al. 2003).

Human Dimensions of Wildlife Management

In the 1970s, wildlife management agencies began the now widely accepted practice of integrating human dimensions into wildlife management decision making (Decker and Enck 1996). By developing a better understanding of stakeholders' perspectives on management issues, wildlife managers hope to make better and more widely accepted decisions. To traditional interest groups, such as hunters and farmers, have been added non-consumptive users, environmental groups, and others. The social sciences can help wildlife managers better understand these diverse stakeholders (Decker and Enck 1996). Information on public attitudes can also help managers determine the extent to which management practices will be accepted and supported (Bright and Manfredo 1995). As well, identification of differences, commonalities, and disputed facts can help managers provide information to increase the effectiveness of public participation in decision making (Patterson et al. 2003; Lauber et al. 2002). Finally, social scientists can help managers weigh the input of disparate stakeholders in

natural resource management issues, using information such as the size of the stakeholder population, and the nature and intensity of their interest (Decker and Enck 1996).

The importance of sound human dimensions research is magnified by the fact that wildlife managers may not be representative of the public or the stakeholders they are serving (Kaltenborn et al. 1999; Phillips et al. 1998). Some studies have found that resource managers differ from the public in their value orientations, attitudes, and management preferences (McFarlane and Boxall 2000).

There have been few studies of public knowledge of, attitudes towards, perceptions of risks to, and preferences for management of grizzly bears. Some studies do shed light on these topics in locations outside the FtMF or for other large carnivores. Wolves and other charismatic megafauna are close to bears in their role as a flagship species, their historic and cultural significance, and large home ranges such that their protection results in the protection of other species. However, these studies might not reflect the FtMF context for grizzly bear management. Attitudes towards animals are influenced by several factors, including characteristics of the animal, aspects of the animal/human relationship, and knowledge about the animal (Kellert 1996). Wolves, being carnivorous, may raise fears about their impact on livestock populations, which may not be a major concern when people think about grizzly bears. Many of the social science studies of wolves focus on the reintroduction of wolves to areas where they have been extirpated. Public attitudes, knowledge, etc. in such a situation will likely differ from an area where an existing species is being managed. Additionally, values and attitudes may differ across social and cultural contexts. For instance, Trinidadians and Dominicans have a more pro-environmental value orientation than Americans, but also believe

nature exists for human use, a dichotomy uncommon among Americans (Rauwald and Moore 2002). In other words, findings on attitudes or management preferences towards natural resource issues elsewhere may not be applicable to the Alberta context.

A Social-Psychological Framework

Research has suggests there is a public willingness to support pro-environmental programs, even when trade-offs are required that restrict development of agriculture, industry, and housing (e.g., Watson et al. 2004; Schreyer et al. 1989). Several efforts have been made to ascertain public preferences for management of grizzly bears and other large carnivores, and the determinants of these preferences (e.g., Kaczensky et al. 2004; Manfredo et al. 1998; Miller et al. 1998; Pate et al. 1996). Behavioural models suggest management preferences are linked to other social psychological and social structural variables by a cognitive hierarchy (McFarlane and Boxall 2003; Vaske and Donnelly 1999; Vaske et al. 2001; Fulton et al. 1996). While an in-depth discussion of these models is beyond the scope of this report, it is important to note that natural resource management preferences are influenced by value orientations, knowledge, attitudes, and demographic variables.

Value Orientations

Value orientations reflect basic beliefs about the environment and the relationship of humans to the environment (McFarlane and Boxall 2003; Dunlap et al. 2000). Though general in nature, value orientations influence attitudes and preferences about more specific environmental issues and provide consistency among a range of beliefs, attitudes and behaviours

(Dunlap et al. 2000; Fulton et al. 1996). Stakeholder groups may hold differing value orientations (e.g., McFarlane and Boxall 2000; Dunlap et al. 2000; Kaltenborn et al. 1998; Tarrant et al. 1997). For example, in British Columbia, the public and members of Greenpeace were more pro-environmental than commercial fishers (Edgell and Nowell 1989). These differences are important for natural resource managers because value orientations form the basis of attitudes and management preferences and may be an underlying source of conflict among stakeholders (e.g., McFarlane and Boxall 2003; Rauwald and Moore 2002; Vaske et al. 2001; Zinn et al. 1998).

The New Ecological Paradigm (NEP), which is used as an indicator of environmental value orientation in this study, has been used widely in studies of natural resource management issues and found to have predictive value (Dunlap et al. 2000). Dunlap et al. (2000) found that NEP scores correlated to the perceived seriousness of global and local environmental problems, support for pro-environmental policies, and pro-environmental behaviour. Higher NEP scores have also been correlated with more positive attitudes towards large carnivores (Kaltenborn et al. 1998) and with an increased willingness to pay for species conservation programs (Kotchen and Reiling 2000).

Attitudes

Attitudes can be represented as positive or negative evaluations of an attitude object (Vaske and Donnelly 1999). Attitudes are often cited as precursors to the formation of preferences and behaviour, differing attitudes can be a source of conflict among stakeholder

groups, and understanding stakeholder attitudes can provide guidance to public education programs.

Few studies have examined public attitudes towards grizzly bears. The one study found in the literature, showed land owners and hunters have very positive attitudes toward grizzly bears in Slovenia (Kaczensky et al. 2004). This occurred despite the fact that a recent policy of bear protection had resulted in a sharp increase in sheep predation in the study area. A larger literature on attitudes toward large carnivores such as wolves and black bears suggests that the public tends to have positive or neutral attitudes towards these potentially harmful species (Bath 1989; Brooks et al. 1999; Miller et al. 1998; Kaczensky et al. 2004; Pate et al. 1996). Among some stakeholder groups such as farmers and hunters, however, negative attitudes towards large carnivores are common, though not universal (Bath 1989; Brooks et al. 1999; Kaczensky et al. 2004; Kaltenborn et al. 1999; Kellert 1985; 1991). Negative attitudes among these groups may be attributed to the potential predator impacts on livestock and big game.

Attitudes may be affected by several factors such as by value orientation, knowledge, demographics, and socialization and cultural influences. People with more ecological-oriented values tend to have more positive attitudes towards conservationist management issues (McFarlane and Boxall 2003; Dunlap et al. 2000; Kellert 1985).

Although some studies suggest a positive relationship has been found between knowledge and attitudes, the relationship of knowledge and attitudes is complex (Bath 1989; Brooks et al. 1999). Kellert (1985) found that members of animal-related organizations, such as birdwatchers, backpackers, hunters, and environmentalists, tended to have more knowledge and a more positive attitude towards predators than the general public. It is often assumed from such

positive relationships that educating the public about natural resource management issues will result in greater understanding and reduced conflict between stakeholders and natural resource managers (McFarlane and Boxall 2003). However, Ericsson and Heberlein (2003) found that hunters living in rural areas of Sweden were most knowledgeable about restored wolves, but also had the most negative attitude. McFarlane and Boxall (2003) had similar findings among the Alberta public. Those with high levels of knowledge related to forest management had more negative attitudes toward the sustainability of forest management. In other cases, knowledge has little relation to attitudes (Kaczensky et al. 2004; Kellert 1991). Therefore, providing information to the public about wildlife management issues will not necessarily change attitudes (McFarlane and Boxall 2003; Ericsson and Heberlein 2003; Phillips et al. 1998; Kellert 1991).

Demographics, such as age, gender, education also influence attitudes (e.g., Bath 1989; Bath and Buchanan 1989; Czech et al. 2001; Kellert 1985). Women, younger individuals, and people with higher levels of education tend to have more positive attitudes towards contentious wildlife issues.

Social groups can influence member responses to natural resource management issues. These socialization influences can structure the mind-set of individuals such that members adopt the organizational values, beliefs, and norms. For example, environmental organizations represent alternative environmental views that are transmitted to their membership (Brulle 1996). Similarly, individuals employed in a natural resource sector are subjected to organizational standards, work to achieve common goals, and view natural resource issues in a manner consistent with organizational values and their professional interests (Dietz et al. 1989).

The cultural differences of residing in an urban or rural environment may also influence attitudes (e.g. Ericsson and Heberlein 2003; Bath 1989; Kaltenborn et al. 1999; Lohr et al. 1996). For example, rural residents tend to have more negative attitudes towards large carnivores (Ericsson and Heberlein 2003). However, urban-rural differences may be lessening as more urban residents move into rural areas and technology (such as the internet) provide rural residents with many urban-centred perspectives. Rural and urban residents in Alberta, for example, tend to share similar attitudes about forest management; both had a negative view of the sustainability of forest management (McFarlane and Boxall 2000).

In wildlife management issues, the characteristics of the species under consideration can impact on attitudes. More positive attitudes and increased support for costly management options have been found to be related to species characteristics such as attractiveness, higher taxonomic classification, and familiarity to respondents (Kellert 1996). This may be particularly relevant in examining attitudes towards grizzly bears which are a high profile species, adopted as a symbol of North American wilderness. In other words, given the cultural and symbolic meaning attached to grizzly bears, public attitudes are expected to be very positive.

Risk Perceptions

Perception of the severity of a threat, such as habitat loss, may be an important factor in public support for conservation policies (Czech and Krausman 1999). For example, studies that have found habitat loss to be perceived as a threat have also found support for programs to address habitat loss. Similarly, lack of support to ban hunting is associated with the perception

that hunting does not pose a significant threat (Cook and Cable 1996; Czech and Krausman 1999).

Few studies have examined public perceptions of the threats facing wildlife and other natural resources (e.g., Watson et al. 2004; McFarlane and Boxall 2000; Cook and Cable 1996; Czech and Krausman 1999). These studies suggest good public awareness of some threats, but low awareness of others. For example, the public correctly identified habitat loss due to development activities, such as urban growth, oil field development, and conversion of land to agriculture, as greater threats to wildlife than legal hunting, fishing or trapping (Cook and Cable 1996; Czech and Krausman 1999). On the other hand, naturally occurring insects and diseases have been identified as a major threat to biodiversity in British Columbia forests (Watson et al. 2004). There is also an apparent tendency to perceive one's own activities as less of a threat. For example, rural Kansans were less likely than urban residents to consider agricultural production a source of wildlife endangerment (Cook and Cable 1996). In Alberta, foresters rated the rate of logging, logging practices, and the amount of land allocated for timber harvesting as lower threats to forests than did public or environmentalists (McFarlane and Boxall 2000).

Management Preferences

Value orientation, knowledge, attitudes, and demographics all play a role in forming preferences for natural resource management. For instance, Czech and Krausman (1999) found that endangered species conservation was valued as highly by American respondents as property rights and economic growth, but less than ecosystem health, democracy and ensuring the availability of resources for posterity. Reflective of these values, respondents were not

supportive of hunting bans, but did support reduced consumption of resources, striving for a stable human population, and the elimination of subsidies for practices that degrade habitat, to help ensure species conservation. Kellert (1991) found existence and ecological value of wolves as the most compelling reason for supporting wolf restoration among Michigan residents. They supported management options such as new wilderness designations, large fines or prison terms for poaching, and restrictions on commercial logging, trapping, off-road vehicle use and coyote hunting. Support for wolf restoration, however, was often diminished when impacts on economic land use were likely, such as taxes on large scale development.

Knowledge has also been found to be related to management preferences. For example, those who correctly estimated the wolf population in Norway at less than 20 wolves, were less likely to want the wolf population extirpated or reduced; the proportion favouring these options increased as the population estimate increased (Bjerke et al. 1998).

Attitudes are often found to be important predictors of support for wildlife conservation programs (e.g., Kaczensky et al. 2004; Bath 1989). For example, Norwegian sheep farmers had more negative attitudes towards large carnivores than wildlife managers or research biologists. These farmers did not want carnivores in the wild and were more supportive of hunting them than were the other groups (Kaltenborn et al. 1999). In New Brunswick, a positive attitude towards wolves was related to increased support for the reintroduction of wolves to the province (Lohr et al. 1996).

In general, there are also relationships between natural resource management preferences and demographic variables such as gender, age, education, and residence (e.g., Schoenecker and Shaw 1997; Ericsson and Heberlein 2003; Watson et al. 2004). For example, opposition to

hunting of bears and cougars in Utah was higher among urban residents, women, people with higher education, those who had lived in the area for less time, non-hunters, and non-consumptive wildlife users (Teel et al. 2002).

Public Involvement in Wildlife Management

A key component of sustainable resource management on public lands is engaging the public in effective decision making and policy development. Effective public involvement should include input from a representative public, a two-way flow of information, flexibility, openness to new participants and new input, and open discussion (Beckley 1999). Parkins et al. (2001) cite several reasons for undertaking public involvement: 1. public involvement in wildlife management issues in Canada is important because wildlife is considered a public resource and as such is owned by the citizens; 2. controversial issues that involve difficult choices generally benefit from decision-making processes that result in more reasonable and acceptable decisions than those generated from special interest groups alone; 3. decisions regarding public resources are subject to public scrutiny and apt to fail without public support; and 4.public involvement processes generally bring a broader range of knowledge and expertise to bear on a management issue and thus can provide information that might otherwise be overlooked.

Defining the public (who to involve) and how to involve them are basic questions in developing public involvement processes. Often public involvement in natural resource management has suffered from an apathetic public or dominance from interest groups that not representative of the public (Parkins et al. 2001). Engaging a more representative public may

require the use of processes in which citizens views are taken seriously and impact management decisions.

Surveys of the public are one means to collect input. Although surveys can reach a large number and diverse range of people and provide an indication of knowledge of the issue, attitudes, and acceptance of management options, they do not foster discussion and deliberation, a key component to effective public involvement (Lauber and Knuth 1998; Parkins 2002). Public involvement that allows citizens the opportunity to discuss the issue and that takes into account their values and preferences are generally considered to be more effective mechanisms.

METHODS

The Sample

Samples representing three geographically defined populations were obtained by telephone solicitation. These included residents of Edmonton; residents of the FtMF and surrounding area (including Hinton, Edson, Grande Cache, Cadomin, Brule, and Robb) but living outside Jasper National Park; and residents of Jasper National Park. A 50:50 gender ratio was sought in all samples.

A random sample of 10,695 listed telephone numbers from the three populations were contacted in the telephone solicitation. Of these, there were 3,433 numbers where a qualified respondent could not be reached (for sample selection, the respondent had to be a resident of the household and 18 years of age or older), and 2,369 ineligible phone numbers (e.g. fax machine or business number). There were 4,893 numbers with a qualified person. Of these, 1,700 agreed

to participate in a mail survey on grizzly bear management in the FtMF (response rate of 34.7%). On average, it took 2.4 dials to reach each household called.

The sample included 388 Jasper residents, 660 FtMF residents, and 652 Edmonton residents. The Jasper sample consisted of 168 males and 220 females (56.7% female).

It is important to note that people between 45 and 64 years old and people with at least some university education were over-represented in all three samples. Preliminary tests suggested that education had the greatest effect on the survey results. Thus, data for several questions were weighted to increase the representivity of the results. For details, see Results, pages 34 to 36.

The Questionnaire

Data were collected by mail survey. The questionnaire was designed by the Social Science Research Group of the Canadian Forest Service, in consultation with the Provincial Grizzly Bear Recovery Team (Appendix A).

The survey began with a map and brief description of the FtMF. These were accompanied by the FtMF website address, so that interested respondents could get more information.

Section One of the questionnaire focussed on respondents' awareness of the grizzly bear research program in the FtMF, knowledge of grizzly bear biology and ecology, and attitudes towards grizzly bears in the FtMF. To assess awareness of the grizzly bear research program, respondents were asked how well informed they were about grizzly bear research in the FtMF, on a scale of 1 to 3, with 1 = not at all informed, 2 = somewhat informed, and 3 = very well

informed. Knowledge of grizzly bears was measured using ten true or false statements. A "not sure" response was also available for each statement. General views on the sustainability of the grizzly bear population in the FtMF was measured on a scale of 1 to 4, with 1 = very unsustainable and 4 = very sustainable. A "not sure" option was also available. Perceived threats to grizzly bears in the FtMF were assessed using nineteen potential threats. Each was rated from 1 to 5, with 1 = poses no risk and 5 = poses a great risk. A "no opinion" option was also available. Attitudes towards grizzly bears were rated using thirteen evaluative statements: eight positive (e.g. "Grizzly bears are important to the balance of nature") and five negative (e.g. "Grizzly bears are a nuisance"). For each, respondents indicated whether they agreed with the statement, on a scale of 1 to 5, with 1 = strongly disagree and 5 = strongly agree. A summed attitudinal score was created by reverse coding the negative statements and summing the scores for each respondent. Attitudinal scores ranged from a possible minimum of 13 to a possible maximum of 65, with higher scores reflecting a more positive attitude toward grizzly bears.

Section Two collected information on preferences for grizzly bear management. Respondents indicated whether they opposed or favoured twenty resource management options in the FtMF, on a scale of 1 to 5, with 1 = strongly oppose and 5 = strongly favour. Again, a "no opinion" option was available.

Section Three contained the New Ecological Paradigm (NEP) scale (Dunlap et al. 2000). The NEP consists of fifteen value statements rated on a scale of 1 to 5, with 1 = strongly disagree and 5 = strongly agree. Following the procedure of Dunlap et al. (2000), some statements were reverse coded to reflect a pro-ecological orientation. Possible scores ranged from 15 to 75. The higher the score on the stronger the ecological orientation.

Section Four contained questions pertaining to the role of the public in grizzly bear management decisions. Respondents were asked to indicate how much influence fifteen stakeholders should have in decision making, on a scale of 1 to 3, with 1 = no influence at all, 2 = some influence, and 3 = a great deal of influence. Respondents could also write in other stakeholders who may have been omitted from the list. They were then asked to indicate which of the fifteen groups should have the most and least influence in decision making. Next, they were asked to indicate which of five options was the most appropriate role for the public in grizzly bear management in the FtMF. Alternatively, respondents could write in another option.

Finally, Section Five asked familiarity with the FtMF, experience with grizzly bears, and demographic information. This included how often the respondent had visited the FtMF in the last five years, whether they had seen a grizzly bear in the wild, in which wilderness recreational activities they participate in a typical year, age, sex, education, membership in environmental or recreational organizations, and whether anyone in the household received their economic livelihood from various natural resource industries.

The questionnaire concluded with an open-ended question allowing respondents to provide additional comments on grizzly bear management, the FtMF, or other issues.

Survey Implementation

The questionnaire was tested on two groups: scientists and managers with knowledge of grizzly bears and grizzly bear management and two focus group sessions of Hinton residents with varied backgrounds and differing levels of knowledge about grizzly bears. Adjustments were then made to the initial design to clarify wording and address other concerns.

Following the procedure of Dillman (2000), the first mail out was sent on May 12, 2004 and included a cover letter, the questionnaire, and a postage paid return envelope. This was followed on May 21, 2004 with a reminder post card. A second complete survey package was mailed to non-respondents on June 10, 2004.

RESULTS

Survey Response

Of the 1,700 surveys mailed, 22 were returned to sender, reducing the effective sample to 1,678. By the cutoff date of August 5, 2004, 1,125 completed surveys had been received, for an overall response rate of 67.0%. (Another five surveys were received after this date, but not included in the analysis). Response rates for the samples were: Jasper 69.0% (*n* = 265), FtMF 68.5% (*n* = 447), and Edmonton 64.0% (*n* = 410).

Demographics

Males were slight majorities of the Edmonton and FtMF respondents, while females were 57.1% of the Jasper respondents (Table 1). This result was expected as the Jasper sample obtained from the telephone recruitment consisted of 56.7% females (see Methods, page 27).

Table 1. Gender

	Survey group					
	Jasper		FtMF		Edmonton	
Gender	n	%	n	%	n	%
Male	112	42.9	231	53	203	50.9
Female	149	57.1	205	47	196	49.1

Chi-square=6.9; DF=2; p=0.0317.

Mean ages of the three groups were similar, ranging between 44 and 46 (Table 2). However, there were significant differences between the age distributions of the three samples. The Edmonton sample was more widely distributed in age, with greater numbers in the 18-24 and 55 and over groups. The Jasper sample, had the most respondents in the 25-44 age groups, and the youngest sample overall. The FtMF sample had the most respondents in the 45-54 group and was slightly older than the other samples.

Table 2. Age

	Survey group					
	Jasper		FtMF		Edmonton	
Age Group	n	%	n	%	n	%
18-24	14	5.4	17	4	34	8.7
25-34	54	20.9	66	15.6	77	19.7
35-44	74	28.6	115	27.3	84	21.5
45-54	73	28.2	124	29.4	87	22.3
55-64	25	9.7	57	13.5	66	16.9
65 or older	19	7.3	43	10.2	42	10.8
Mean Age (Std Dev)[1]	259	43.5 (13.2)a	422	46.0 (13.3)a	390	44.9 (14.8)a

Chi-square=26.7; DF=10; p=0.0029.
[1] Any two means that do not share a letter are significantly different ($p<0.05$) according to Tukey's studentized range test.

The Jasper and Edmonton groups had very similar levels of education, while on average FtMF respondents had less education (Table 3). FtMF residents were almost twice as likely as the other groups to have no post-secondary education, and only half as likely to have a Bachelor degree or more. In each of the first four education levels (up to technical school or community college), there were more respondents in the FtMF sample than in the other groups. In contrast, more respondents from the Jasper and Edmonton samples had higher education levels (some university or more).

Table 3. Highest level of education

	Survey group					
	Jasper		FtMF		Edmonton	
Highest level of education	n	%	n	%	n	%
Grade 9 or less	2	0.8	14	3.3	4	1
Some high school	4	1.5	49	11.4	22	5.6
High school graduate	46	17.6	107	24.8	60	15.2
Technical school or community college	68	26	142	33	103	26
Some university	47	17.9	38	8.8	52	13.1
University degree (Bachelor)	66	25.2	59	13.7	89	22.5
Some graduate studies	12	4.6	5	1.2	17	4.3
Graduate university degree	17	6.5	17	3.9	49	12.4

Chi-square=100.4; DF=14; $p<.0001$.

To help evaluate whether the samples are representative of their communities, a comparison was done of gender, age, and education level between the samples and the 2001 Census (Table 4). For these comparisons, the figures for the samples were recalculated to exclude respondents under age 20 and the educational categories were merged to conform with 2001 Census categories.

Females were over-represented among the Jasper respondents. As well, people between the ages of 45 and 64 and people with at least some university were over-represented in each of the three samples. People under 35 and people with less education were under-represented. This may indicate that older, well-educated individuals are more interested in the issue of grizzly bear management or feel their opinions are of greater value than other members of the public.

Preliminary tests of the data suggested that of the significant differences from the census, education had the greatest effect on the survey results. Therefore, data for all questions related to the NEP, knowledge, attitudes, and management preferences were weighted for each sample to increase the representivity of the data (Tables 9 to 24). That is, responses from respondents with no university were weighted upwards by a factor of between 1.19 and 1.70; responses from respondents with some university were weighted downwards by a factor of between 0.43 and 0.51.

Table 4. Comparison of samples to 2001 Census

Census Category	Region; % of people aged 20 and over					
	Jasper[1]		FtMF[2]		Edmonton[3]	
	Census	Sample	Census	Sample	Census	Sample
Gender						
Male	52	43	51.4	54.4	48.6	51.4
Female	48	57	48.6	45.6	51.4	48.6
Chi-Square	8.34		1.5		1.2	
Age						
20-24	16.5	5	9	3.6	11.5	7.5
25-34	26.3	20.9	20.6	15.7	20.8	20
35-44	24.6	28.7	28	27.4	22.6	21.8
45-54	17.5	28.3	20.3	29.5	18.5	22.6
55-64	6.3	9.7	11.2	13.6	10.8	17.1
65+	8.8	7.4	11.1	10.2	15.7	10.9
Chi-Square	47.64		38.74		29.04	
Education						
Without High School Diploma	18.8	2.3	32.4	15	25.2	6.8
High School Graduate	16	17.1	14.9	24	10.7	13.7
Technical School or Community College	42	25.7	38.8	33.2	36.9	26.3
Some University	12.4	17.9	4.9	8.7	8	13.1
Bachelors Degree or more	11.2	37	8.7	19.1	19.1	40.2
Chi-Square	212.24		128.64		166.84	

[1] Jasper is approximated by census subdivision Jasper (census subdivision code 15 033).
[2] FtMF is approximated by census subdivisions Hinton (14 019), Edson (14 024), and Grande Cache (18 005).
[3] Edmonton is approximated by census subdivision Edmonton (11 061).
[4] Significant to a level of $p<.05$.

The FtMF sample was very dependent on income from natural resource sectors, including forestry, oil and gas, and mining, while the Jasper and Edmonton samples were much less so (Table 5). The Jasper sample was much more likely to earn income from the tourism industry or a natural resource agency. Although Edmonton residents were less likely to rely on income from primary industries, tourism, or natural resource agencies, nearly one in four did; the oil and gas industry was the most common source of natural resource sector income for Edmonton respondents.

Table 5. Dependence on natural resource sectors for economic livelihood

Industry	Survey group[1]							
	Jasper		FtMF		Edmonton			
	n	%	n	%	n	%	Chi-Square	p value
Forest industry	3	1.2	131	31	14	3.6	171.7	<.0001
Mining industry	3	1.2	56	13.2	10	2.6	53.4	<.0001
Oil and gas industry	7	2.8	110	26	52	13.4	67.2	<.0001
Agriculture	2	0.8	17	4	14	3.6	6.1	0.048
Tourism industry	143	56.1	24	5.7	9	2.3	381.9	<.0001
Natural resource agency	51	20	22	5.2	12	3.1	67.2	<.0001
Nobody in the household depends on them	77	30.2	157	37.1	300	77.5	185.3	<.0001

[1] Columns do not total 100% as respondents could answer in multiple categories.

Experience with the Foothills Model Forest

All three samples were likely to have visited the FtMF in the past five years (Table 6). For the Jasper and FtMF groups this was due in part to the high proportion of FtMF residents in

the samples. For instance, just over half of the FtMF sample indicated they are residents of the FtMF. This result was expected since the FtMF sample included residents of towns within the FtMF as well as Edson and Grande Cache, just outside the FtMF boundary. Only about 7% of the FtMF sample indicated they had not visited the FtMF in the last five years. Strangely, less than three-quarters of the Jasper sample indicated they are FtMF residents and 10.0% indicated they had not visited the FtMF. Since Jasper is within the FtMF, this may indicate uncertainty about FtMF boundaries, or may indicate many Jasper respondents identify foremost as park residents and do not identify with the FtMF. Most Edmonton residents had also visited the FtMF within the past five years, though about half had only done so between one and five times; 18.3% had not visited the FtMF in the past five years.

Table 6. Visits to Foothills Model Forest in the past five years

	Survey group					
	Jasper		FtMF		Edmonton	
Number of Visits	n	%	n	%	n	%
Never	26	10	29	6.7	73	18.3
1 to 5 times	26	10	73	16.8	194	48.7
6 to 10 times	4	1.5	32	7.4	67	16.8
More than 10 times	17	6.5	79	18.2	62	15.6
Resident of FtMF	187	71.9	222	51	2	0.5

Chi-square=446.3; DF=8; p<.0001.

Recreational Activities and Organizations

All samples indicated that in a typical year they are very active walkers and campers, but are less involved in other recreational activities such as hunting, fishing and using off-road vehicles in Alberta (Table 7). Nearly all the Jasper sample walk or hike in parks and protected areas while the FtMF sample is most active in several other activities, particularly hunting and using off-road vehicles. For example, nearly half (45.5%) of the FtMF group use off-road vehicles, while only about 10% of the other groups do so. FtMF residents are also more than three times more likely to hunt. All samples are equally likely to camp in serviced campgrounds, while FtMF residents are more likely than the other groups to random camp. The Edmonton sample is less likely than the other groups to participate in most of the activities, but are slightly more likely to participate in hunting and using off-road vehicles than Jasper respondents. Only between 1% and 9% of each group do not participate in any of the activities.

Table 7. Recreational activities

Recreational activity	Survey group[1]						Chi-Square	p value
	Jasper		FtMF		Edmonton			
	n	%	n	%	n	%		
Walk or hike in parks and protected areas	257	98.1	340	77.3	297	74.6	64.9	<.0001
Walk or hike on public land outside of parks	200	76.3	357	81.1	246	61.8	41.5	<.0001
Camp in serviced campgrounds	177	67.6	286	65	243	61.1	3.1	0.2102
Camp in areas without serviced campgrounds	128	48.9	248	56.4	106	26.6	78.6	<.0001
Hunt	21	8	130	29.6	33	8.3	86.5	<.0001
Fish	113	43.1	226	51.4	128	32.2	31.6	<.0001
Use off-road vehicles for recreation	25	9.5	200	45.5	44	11.1	175.2	<.0001
Does not take part in these activities	3	1.2	16	3.6	35	8.8	22.3	<.0001

[1] Columns do not total 100% as respondents could answer in multiple categories.

The Jasper sample was very active in recreational and environmental organizations. Over 30% of Jasper respondents belonged to at least one organization, and were most likely to belong to a natural history, environmental, or other outdoor recreation club (Table 8). About 15% of Edmonton respondents and 23% of FtMF respondents were involved in at least one organization.

FtMF respondents were more likely to belong to a hunting, fishing, or off-road vehicle organization, corresponding to their higher levels of involvement in these activities. No Edmonton or Jasper respondents indicated they belong to an off-road vehicle organization.

Table 8. Organizational memberships

Organization	Survey group[1]						Chi-Square	p value
	Jasper		FtMF		Edmonton			
	n	%	n	%	n	%		
Hunting or fishing organization	11	4.2	54	12.4	15	3.8	27.5	<.0001
Natural history or birdwatching club	22	8.5	9	2.1	7	1.8	25.2	<.0001
Off-road vehicle club	0	0	21	4.8	0	0	32.2	<.0001
Outdoor recreation club	35	13.5	31	7.1	18	4.6	17.8	<.0001
Environmental or conservation organization	51	19.6	24	5.5	33	8.4	37.9	<.0001
Does not belong to any of these	177	68.1	334	76.8	337	85.3	27.4	<.0001

[1] Columns do not total 100% as respondents could answer in multiple categories.

Human Dimensions of Grizzly Bear Management

New Ecological Paradigm Scale

All three samples expressed a pro-environmental orientation, according to the NEP scale (Table 9). For example, all three groups strongly agreed that humans are subject to the laws of nature, that plants and animals have as much right to exist as humans, and that the balance of nature is easily upset. They also disagreed that nature can cope with the impact of modern industrial nations, that humans were meant to rule over nature, and that humans will eventually learn enough to control nature. On the other hand, all samples agreed that "the earth has plenty of natural resources if we just learn how to develop them."

Mean NEP scores ranged from 53.5 for the FtMF sample to 58.7 for the Jasper sample. The Jasper and FtMF samples differed on all NEP statements except two. Both moderately disagreed with "humans have the right to modify the natural environment to suit their needs" and with "human ingenuity will ensure that we do NOT make the earth unlivable". On all of the other statements, the Jasper sample had a stronger ecological orientation than the FtMF sample. The Edmonton sample tended not to differ from one or both of the other samples.

Table 9. New Ecological Paradigm

Statement	Survey group[1,2]					
	Jasper		FtMF		Edmonton	
	n	Mean (Std Dev)	n	Mean (Std Dev)	n	Mean (Std Dev)
We are approaching the limit of the number of people the earth can support	260	3.5 (1.3)a	442	3.2 (1.2)b	401	3.2 (1.3)b
Humans have the right to modify the natural environment to suit their needs	260	2.3 (1.2)a	442	2.5 (1.2)a	399	2.4 (1.2)a
When humans interfere with nature it often produces disastrous consequences	259	4.2 (1.1)a	440	3.9 (1.1)b	401	4.1 (1.0)a
Human ingenuity will ensure that we do NOT make the earth unlivable	259	2.6 (1.2)a	438	2.8 (1.2)a	398	2.8 (1.3)a
Humans are severely abusing the environment	259	4.2 (1.1)a	441	3.9 (1.1)b	401	4.3 (0.9)a
The earth has plenty of natural resources if we just learn how to develop them	259	3.3 (1.4)a	440	3.8 (1.1)b	400	3.8 (1.2)b
Plants and animals have as much right as humans to exist	261	4.4 (1.0)a	445	4.1 (1.1)b	401	4.4 (0.9)a
The balance of nature is strong enough to cope with the impacts of modern industrial nations	259	1.8 (1.0)a	440	2.3 (1.1)c	402	2.0 (1.1)b
Despite our special abilities, humans are still subject to the laws of nature	260	4.4 (0.8)a	443	4.2 (0.9)b	400	4.4 (0.7)a

Statement	Survey group[1,2]					
	Jasper		FtMF		Edmonton	
	n	Mean (Std Dev)	n	Mean (Std Dev)	n	Mean (Std Dev)
The so-called "ecological crisis" facing humankind has been greatly exaggerated	260	2.2 (1.3)a	440	2.7 (1.2)b	402	2.3 (1.2)a
The earth is like a spaceship with very limited room and resources	260	3.8 (1.2)a	439	3.5 (1.1)b	399	3.6 (1.2)ab
Humans were meant to rule over the rest of nature	259	1.9 (1.1)a	442	2.4 (1.3)b	400	2.3 (1.4)b
The balance of nature is very delicate and easily upset	261	4.3 (0.8)a	442	4.0 (1.1)b	399	4.1 (1.1)ab
Humans will eventually learn enough about how nature works to be able to control it	259	2.2 (1.2)a	440	2.5 (1.2)b	400	2.4 (1.2)ab
If things continue on their present course, we will soon experience a major ecological catastrophe	259	3.9 (1.1)a	442	3.6 (1.2)b	403	3.9 (1.1)a
New Ecological Paradigm Score	245	58.7 (9.5)a	416	53.5 (9.2)c	376	56.2 (8.7)b

[1] Rated on a scale of 1 to 5 where 1 = strongly disagree and 5 = strongly agree.

[2] Any two means in a row that do not share a letter are significantly different ($p<0.05$) according to Tukey's studentized range test.

Familiarity with Grizzly Bear Research

None of the groups considered themselves very well informed about grizzly bear research in the FtMF (Table 10). This was especially true of the Edmonton sample; nearly two-thirds of that group indicated they were not at all informed. While majorities of the other groups indicated they were somewhat informed, fewer than 10% considered themselves very well informed.

Table 10. Familiarity with grizzly bear research in Foothills Model Forest

	Survey group					
	Jasper		FtMF		Edmonton	
Level of familiarity	n	%	n	%	n	%
Not at all informed	70	26.4	140	32.1	260	63.2
Somewhat informed	178	66.6	259	59.3	146	35.4
Very well informed	19	7	37	8.6	6	1.4

Chi-square=128.0; DF=4; $p<.0001$.

Experience and Knowledge of Grizzly Bears

Jasper and FtMF respondents were far more likely to have seen a grizzly bear in the wild. While more than half of the Edmonton sample had seen a grizzly in the wild, over 85% of the other groups had done so (Table 11). The high frequency of sightings among model forest residents may be related to their proximity to grizzly habitat and greater involvement in many outdoor recreational activities (Table 7).

Table 11. Seen a grizzly bear in the wild

	Survey group					
	Jasper		FtMF		Edmonton	
Seen a grizzly bear	n	%	n	%	n	%
Yes	236	88.5	381	86.2	225	54.9
No	31	11.5	61	13.8	185	45.1

Chi-square=145.2; DF=2; p<.0001.

Overall, the knowledge test indicated respondents were not very well informed about grizzly bears (Table 12). For example, a majority in all groups believed the Canadian Rockies is the best grizzly bear habitat in North America and subscribed to the commonly held myth that grizzlies have poor eyesight. A majority also did not know that the grizzly bear is not classified as endangered by the Government of Alberta. Other facts were more widely known. A majority in all groups knew that grizzlies eat mostly plants, do not prey heavily on livestock, once ranged across Alberta, are threatened by habitat loss, do not commonly die of old age, and are not best identified by colour. Mean test scores ranged from 5.3 out of ten for the Edmonton sample to 6.6 out of ten for the Jasper sample.

Table 12. Knowledge of grizzly bears

True-False Statement	Correct Answer	Survey group; % of respondents with correct answer						Chi-square	p value
		Jasper		FtMF		Edmonton			
		n	%	n	%	n	%		
Grizzly bears have very poor eyesight	False	89	32.8	116	25.9	113	26.8	4.4	0.1135
The best way to identify a grizzly bear is by its colour	False	225	83.2	337	75.2	241	57.1	62	<.0001
The Government of Alberta classifies the grizzly bear as an endangered species	False	118	43.6	162	36.2	128	30.4	12.5	0.002
Grizzly bears breed about once every 3 to 5 years	True	175	64.7	224	50	160	37.8	47.9	<.0001
The Canadian Rockies has the best grizzly bear habitat in North America	False	72	26.8	47	10.4	23	5.5	71.4	<.0001
Grizzly bears once ranged across most of Alberta, including where Edmonton and Calgary are now situated	True	194	71.9	286	63.7	253	59.9	10.5	0.005
Plants (including roots, shoots, and berries) are the main source of food for grizzly bears in Alberta	True	250	92.6	392	87.3	355	84.1	10.8	0.005
The greatest cause of grizzly bear deaths in the Canadian Rockies is old age	False	194	71.9	318	70.9	284	67.3	2.1	0.3434

True-False Statement	Correct Answer	Survey group; % of respondents with correct answer						Chi-square	p value
		Jasper		FtMF		Edmonton			
		n	%	n	%	n	%		
The greatest threat to grizzly bear populations is loss of habitat	True	240	88.7	353	78.7	381	90.3	26.7	<.0001
In areas where grizzly bears exist near livestock, their primary food is cattle and sheep	False	237	87.9	366	81.6	315	74.6	19	<.0001
Mean Knowledge Score (Std Dev) [1]		265	6.6 (1.8)a	447	5.8 (1.9)b	410	5.3 (2.0)c		

[1] Any two means in a row that do not share a letter are significantly different ($p<0.05$) according to Tukey's studentized range test.

Threats to Grizzly Bears

A majority of all samples indicated they felt the grizzly bear population in the FtMF is somewhat or very sustainable (Table 13). The FtMF sample was most likely to indicate the population is sustainable. Nearly one third of the FtMF group indicated it is very sustainable, in contrast to only 18.2% and 11.3% of Jasper and Edmonton residents, respectively. The Edmonton sample was much more likely to indicate they were unsure how sustainable the population is, suggesting less certainty about the grizzly's status.

Table 13. Sustainability of grizzly bear population in Foothills Model Forest

	Survey group					
	Jasper		FtMF		Edmonton	
Rating of sustainability	n	%	n	%	n	%
Very unsustainable	25	9.3	27	6.2	14	3.6
Somewhat unsustainable	44	16.3	43	9.9	91	22.6
Somewhat sustainable	126	47.3	193	44.4	165	40.8
Very sustainable	49	18.2	134	30.7	46	11.3
Not sure	23	8.8	38	8.8	88	21.8

Chi-square=102.5; DF=8; $p<.0001$.

For ease of presentation, possible threats to grizzly bear populations in the FtMF were categorized into: industry and development activities, human use of grizzly bear habitat, management, and environmental issues (Table 14). All development in bear habitat including agriculture, housing, timber harvesting, development of roads, tourist resorts, oil and gas, and mining, were among the most highly rated threats. These high risk ratings coincide with the fact

that between 79 and 90% of each sample was aware that loss of habitat is the greatest threat to grizzly populations (Table 12). With the exception of tourist resorts, the risks from all development activities were rated lower by the FtMF sample than by the Jasper or Edmonton samples. Jasper had a lower perception of the risk from tourist resorts than from other developments. These results may reflect a tendency to perceive a reduced risk from industries or activities with which one is associated or which are important to one's community.

Some threats from human use, such as grizzly bears becoming accustomed to humans, unrestricted public access, motorized off-road recreational use, and licensed grizzly bear hunting, also received moderate to high risk ratings. Again, FtMF residents rated the risk from human use related threats lower than the other groups. For the most part, management and environmental issues were perceived as much lower risks. Illegal and unlicensed killing of grizzly bears was the most notable exception; all groups considered this to be one of the highest risks. A lack of resources to address wildlife management issues was also considered a relatively high risk. Two threats were rated as low risks by all samples: "non-motorized recreational use of lands in bear habitat" and "putting a lot of trust in science to help develop solutions to wildlife management issues."

Table 14. Threats to grizzly bear populations in the Foothills Model Forest

Threat	Survey group[1,2]					
	Jasper		FtMF		Edmonton	
	n	Mean (Std Dev)	n	Mean (Std Dev)	n	Mean (Std Dev)
Industry and development activities						
Conversion of forested land into agriculture	259	4.3 (0.9)a	434	4.0 (1.1)b	397	4.4 (0.9)a
Tourist resorts in bear habitat	261	3.8 (1.1)a	435	3.8 (1.1)a	393	4.2 (1.0)b
Development of roads and other access routes in the forest	263	4.2 (1.0)a	436	3.7 (1.2)b	399	4.1 (1.0)a
Oil and gas exploration, drilling and pipelines in bear habitat	261	4.2 (1.0)a	436	3.5 (1.2)b	391	4.1 (1.0)a
Timber harvesting operations in bear habitat	262	4.2 (0.9)a	437	3.6 (1.2)b	394	4.3 (1.0)a
Mining developments in bear habitat	262	4.1 (1.0)a	433	3.3 (1.3)b	394	4.2 (1.0)a
Loss of forested land for housing	259	4.2 (1.0)a	430	3.7 (1.2)b	389	4.3 (0.9)a
Human use of grizzly habitat						
Unrestricted public use of roads and other access routes in the forest	262	4.1 (1.0)a	432	3.5 (1.2)b	400	4.1 (1.0)a
Licensed grizzly bear hunting	258	4.1 (1.2)a	429	3.3 (1.4)c	389	3.6 (1.3)b
Motorized off-road recreational use of lands in bear habitat	262	4.1 (1.0)a	437	3.2 (1.4)c	394	3.9 (1.2)b
Non-motorized recreational use of lands in bear habitat	261	2.6 (1.1)a	433	2.3 (1.1)b	393	2.7 (1.1)a
Grizzly bears becoming accustomed to the presence of humans	260	4.0 (1.1)a	434	3.8 (1.2)b	390	4.1 (1.0)a

Threat	Survey group[1,2]					
	Jasper		FtMF		Edmonton	
	n	Mean (Std Dev)	n	Mean (Std Dev)	n	Mean (Std Dev)
Management						
Illegal and unlicensed killing of grizzly bears	258	4.3 (0.9)a	435	4.3 (0.9)a	394	4.3 (0.9)a
Wildlife managers inadvertently making an incorrect decision	249	3.3 (1.2)a	400	3.1 (1.2)b	355	2.9 (1.1)b
Putting a lot of trust in science to help develop solutions to wildlife management issues	240	2.8 (1.1)a	394	2.8 (1.2)a	352	2.7 (1.2)a
Lack of resources to address wildlife management issues	253	4.0 (1.1)a	416	3.7 (1.2)b	379	4.0 (1.0)a
Environmental issues						
Global warming	249	3.2 (1.1)a	404	2.9 (1.2)b	374	3.2 (1.1)a
Forest fires	262	3.0 (1.2)a	432	3.3 (1.2)b	396	3.5 (1.2)c
Introduction of non-native plant and animal species	251	3.1 (1.1)a	404	2.7 (1.2)b	368	3.0 (1.2)a

[1] Rated on a scale of 1 to 5 where 1 = poses no risk and 5 = poses a great risk.

[2] Any two means in a row that do not share a letter are significantly different ($p<0.05$) according to Tukey's studentized range test.

Attitudes Towards Grizzly Bears

All samples had a positive attitude towards grizzly bears; summed attitudinal scores ranged between 50 and 53 out of a possible 65 (Table 15). For example, respondents strongly agreed that grizzly bears are important to the balance of nature, that a healthy grizzly bear population is a sign of a healthy environment, that it is important Alberta always has a sustainable grizzly bear population, that it is important to know grizzlies exist in Alberta, and that grizzly bears are a symbol of the greatness of nature. They also strongly disagreed that it is a grizzly bear's nature to want to kill humans, and that grizzly bears are a nuisance.

The most positive responses were for statements referring to the ecological or existence value of grizzly bears, such as "grizzly bears are important to the balance of nature" and "whether or not I get to see a grizzly bear, it is important to know they exist in Alberta." Only two statements revealed a slightly negative attitude towards grizzlies. FtMF residents disagreed slightly that "the needs of grizzly bears should come before the needs of people living in or near grizzly bear habitat." FtMF and Edmonton residents agreed weakly with "the quality of life in human communities near grizzly bear habitat should be a primary consideration in decisions on bear management." These two statements most clearly juxtapose the needs of humans and grizzly bears, which may help explain the ambivalent responses.

The Jasper sample had the most positive attitude, with a mean attitudinal score of 53.4; this equates to an average of more than 4 out 5 on each attitudinal statement. The FtMF and Edmonton samples were lower, and not significantly different from each other, at 50.0 and 51.1, respectively.

Table 15. Attitudes towards grizzly bears

Attitudinal statement	Survey group[1,2]					
	Jasper		FtMF		Edmonton	
	n	Mean (Std Dev)	n	Mean (Std Dev)	n	Mean (Std Dev)
Positive						
Grizzly bears are important to the balance of nature	262	4.6 (0.7)a	441	4.5 (0.8)b	404	4.5 (0.9)ab
The needs of grizzly bears should come before the needs of people living in or near grizzly bear habitat	259	3.4 (1.3)a	443	2.9 (1.3)b	404	3.3 (1.2)a
A healthy grizzly bear population is a sign of healthy environment	262	4.4 (0.9)a	443	4.2 (1.0)b	401	4.3 (0.9)ab
Grizzly bears have the right to exist for their own sake regardless of human concerns	261	4.0 (1.1)a	442	3.6 (1.3)b	403	3.9 (1.1)a
It is important that Alberta always has a sustainable grizzly bear population	260	4.6 (0.8)a	443	4.5 (0.8)a	404	4.5 (0.8)a
It is morally wrong to kill a grizzly bear	260	3.4 (1.4)a	441	3.0 (1.4)b	404	3.3 (1.3)a
Whether or not I get to see a grizzly bear, it is important to know they exist in Alberta	262	4.7 (0.8)a	443	4.5 (0.8)b	404	4.6 (0.8)ab
The grizzly bear is a symbol of the greatness of nature	261	4.6 (0.7)a	441	4.3 (0.9)b	403	4.4 (0.9)b

Attitudinal statement	Survey group[1,2]					
	Jasper		FtMF		Edmonton	
	n	Mean (Std Dev)	n	Mean (Std Dev)	n	Mean (Std Dev)
Negative						
Grizzly bear populations should be controlled so they pose no danger to people	262	2.0 (1.2)a	443	2.7 (1.4)b	403	2.8 (1.2)b
It is a grizzly bear's nature to want to kill humans	262	1.3 (0.8)a	441	1. 4 (0.9)ab	402	1.5 (0.9)b
All grizzly bears that attack people should be destroyed	262	2.8 (1.4)a	442	2.7 (1.4)a	405	2.7 (1.3)a
The quality of life in human communities near grizzly bear habitat should be a primary consideration in decisions on bear management	260	2.9 (1.2)a	441	3.1 (1.2)b	402	3.2 (1.2)b
Grizzly bears are a nuisance	262	1.3 (0.8)a	440	1.6 (0.9)b	402	1.5 (0.9)b
Attitudinal Score	252	53.4 (7.4)a	419	50.0 (7.7)b	383	51.1 (7.3)b

[1] Rated on a scale of 1 to 5 where 1 = poses no risk and 5 = poses a great risk.

[2] Any two means in a row that do not share a letter are significantly different ($p<0.05$) according to Tukey's studentized range test.

Grizzly Bear Management Preferences

For ease of presentation, management options were categorized into: industry and development activities, human access to grizzly habitat, legal hunting, and management and communications. Although there were differences of degree between the samples, there was general agreement in direction of support or opposition to the management options presented (Table 16). Of the twenty options, fifteen were supported by all three samples. Two were opposed by all three samples. For only three of the options was there disagreement between the samples as to whether the option should be supported or opposed.

Among the options related to industry and development, requiring industries to coordinate road building to reduce the number of roads was most strongly supported. This was followed by changing existing timber harvesting, mining, and oil and gas facilities to better address the needs of bears. Expansion of industrial activities was generally opposed. Jasper residents were more supportive of coordinated road building and changing industry practices, and were less supportive of industry expansion than the FtMF and Edmonton samples. The opposite was true of FtMF respondents. That is, of the three samples, FtMF was most supportive of industrial expansion and least supportive of changing existing industrial practices.

Although industry, development, and human use of grizzly habitat were perceived to be among the greatest threats to grizzly bear populations in the FtMF (Table 14), management options to address these threats were not the most strongly supported. Among the most strongly supported options by all groups were those related to management and communications, such as educating forest users about how to avoid and react to bear encounters, bear proofing settlements and facilities, educating the public about grizzly bears, increased enforcement of anti-poaching

laws, and moving bears that pose a risk to humans. Support for these options was high across all groups. It may be options related to education were more strongly supported because they do not require trade-offs in economic activity and access.

In terms of legal hunting, there was support for training hunters to distinguish between black and grizzly bears, a temporary ban on grizzly bear hunting, and reducing the number of grizzly bear licenses. However, a permanent ban on hunting of grizzlies received less support from Jasper and Edmonton residents and was opposed by FtMF residents. With the exception of hunter training, FtMF residents were less supportive of management options related to reducing hunting opportunities than were the other samples.

There was also support for limiting human access to grizzly habitat, by establishing new protected areas with no industrial activity or motorized recreational access, by seasonally or temporarily closing roads and trails to off-road motorized recreation, and by reducing speed limits on highways. FtMF residents tended to be less supportive of these options. Permanent closure of roads and trails received less support than the other access options from Jasper and Edmonton residents and was opposed by FtMF residents.

There was disagreement among the samples on three options. The FtMF sample opposed, and the Jasper and Edmonton samples supported, "permanent closure of roads and trails used for off-road motorized recreation" and "a ban on grizzly bear hunting forever". On the other hand, the FtMF sample supported, and the Jasper and Edmonton samples opposed, "new mines in grizzly bear habitat outside protected areas." These options were also those with the greatest variance among the means, suggesting they are the most controversial.

Table 16. Management preferences

Management Option	Survey group[1,2]					
	Jasper		FtMF		Edmonton	
	n	Mean (Std Dev)	n	Mean (Std Dev)	n	Mean (Std Dev)
Industry and development activities						
An increase in oil and gas development in grizzly bear habitat outside protected areas	260	2.0 (1.1)a	426	2.7 (1.2)c	381	2.3 (1.2)b
Changing existing oil and gas facilities and operations so the needs of grizzly bears are better addressed	258	4.1 (1.0)a	434	3.3 (1.3)c	394	3.9 (1.2)b
An increase in land where timber harvesting is allowed in grizzly bear habitat outside protected areas	254	2.1 (1.1)a	427	2.6 (1.1)b	372	2.3 (1.2)a
Changing existing timber harvesting facilities and operations so the needs of grizzly bears are better addressed	259	4.3 (1.0)a	435	3.6 (1.2)b	394	4.1 (1.0)a
New mines in grizzly bear habitat outside protected areas	258	2.1 (1.2)a	425	3.1 (1.2)c	382	2.3 (1.1)b
Changing existing mining facilities and operations so the needs of grizzly bears are better addressed	258	4.1 (1.0)a	428	3.4 (1.3)c	392	3.9 (1.1)b
Require industries to coordinate their road building activities to reduce the number of roads overall	262	4.6 (0.7)a	436	4.1 (1.1)b	388	4.2 (1.0)b

Management Option	Survey group[1,2]					
	Jasper		FtMF		Edmonton	
	n	Mean (Std Dev)	n	Mean (Std Dev)	n	Mean (Std Dev)
Human access to grizzly habitat						
Seasonal or temporary closure of roads and trails used for off-road motorized recreation	258	4.4 (1.0)a	437	3.5 (1.5)b	394	4.2 (1.1)a
Permanent closure of roads and trails used for off-road motorized recreation	258	3.6 (1.4)a	438	2.4 (1.5)b	392	3.3 (1.4)a
Establish more protected areas with no industrial activity or motorized recreational access	259	4.4 (1.0)a	436	3.5 (1.4)b	394	4.3 (1.0)a
Reduce speed limits on highways in areas with bears	259	4.1 (1.1)a	434	3.2 (1.3)c	394	3.7 (1.2)b
Hunting						
Train hunters to be able to distinguish between black bears and grizzly bears	253	4.6 (0.8)a	434	4.7 (0.7)a	392	4.6 (0.8)a
Reduce the number of grizzly bear hunting licenses	246	4.5 (1.0)a	426	3.9 (1.3)c	380	4.2 (1.0)b
A ban on grizzly bear hunting until the provincial population reaches a self-sustaining level	257	4.6 (0.8)a	432	4.1 (1.3)b	395	4.5 (1.0)a
A ban on grizzly bear hunting forever	254	3.7 (1.4)a	427	2.6 (1.4)c	387	3.1 (1.4)b

Management Option	Survey group[1,2]					
	Jasper		FtMF		Edmonton	
	n	Mean (Std Dev)	n	Mean (Std Dev)	n	Mean (Std Dev)
Management and Communications						
Increase law enforcement patrols to prevent poaching, catch poachers, and increase prosecution of poachers	261	4.7 (0.6)a	442	4.6 (0.8)a	398	4.6 (0.8)a
Educate forest users on how to avoid, how to be prepared for, and how to react to bear encounters	260	4.9 (0.4)a	440	4.8 (0.6)b	400	4.8 (0.5)ab
Educate the public about grizzly bears in the Foothills Model Forest	262	4.7 (0.5)a	436	4.7 (0.6)a	401	4.7 (0.5)a
Move bears that pose a danger to humans to more remote areas with suitable habitat	261	4.3 (1.1)a	438	4.5 (1.0)a	396	4.5 (0.9)a
"Bear proof" settlements, residences and facilities to reduce the availability of garbage and other things that attract bears	262	4.9 (0.4)a	438	4.6 (0.7)c	397	4.8 (0.5)b

[1] Rated on a scale of 1 to 5 where 1 = strongly oppose and 5 = strongly favour.

[2] Any two means in a row that do not share a letter are significantly different ($p<0.05$) according to Tukey's studentized range test.

To explore if the disagreement on these three options was related to specific interests, we examined the relationship of support or opposition to respondents' involvement in specific activities. First, we examined if support for permanent closure of roads to off-road vehicle use was related to use of off-road vehicles and participation in random camping. Second, we examined if support for a permanent ban on hunting grizzly bears was related to participation in hunting. Finally, we examined if support for new mining developments was related to economic dependence on the mining sector.

Support for each of the three management options had significant relationships with participation in the affected activity (Tables 17 to 20). Specifically, opposition to permanent closure of roads was significantly related to use of off-road vehicles. Those who do not use off-road vehicles supported permanent road or trail closure, while those who do participate do not support closure. Among random campers, only campers in the FtMF sample were opposed to permanent road closure. There was no significant difference among random campers and non-campers in the Edmonton and Jasper samples. Opposition to a permanent hunting ban was related to participation in hunting, with hunters in all three samples opposing a permanent ban. Support for the development of new mines was related to dependence on income from the mining sector among the FtMF sample only. Among the Jasper and Edmonton samples, both those who are dependent and those who are not were opposed to new mining developments. In the FtMF sample, those who do not participate in off-road vehicle use, random camping, or hunting, or do not depend on mining tended to neither support nor oppose (i.e., mean score near 3.0) the management options. Additionally, opposition to the management options among activity participants is strongest in the FtMF sample. In other words, it is specific interests in the

FtMF that are the source of the strongest opposition for the management options of permanent road closure, a permanent hunting ban, and no new mining developments.

Table 17. Support for permanent closure of roads and trails used by off-road vehicles by participation in off-road vehicle use

Survey Group	Uses off-road vehicles		Does not use		t-value	p-value
	n	Mean (Std Dev)	n	Mean (Std Dev)		
Jasper	28	2.2 (1.4)	230	3.8 (1.3)	6.3	<.0001
FtMF	204	1.8 (1.3)	234	3.1 (1.3)	10.3	<.0001
Edmonton	52	2.6 (1.5)	340	3.4 (1.3)	4.4	<.0001

Table 18. Support for permanent closure of roads and trails used by off-road vehicles by participation in random camping

Survey Group	Random camps		Does not random camp		t-value	p-value
	n	Mean (Std Dev)	n	Mean (Std Dev)		
Jasper	127	3.6 (1.5)	131	3.6 (1.3)	0.1	0.9528
FtMF	250	2.1 (1.4)	188	2.9 (1.4)	5.3	<.0001
Edmonton	111	3.3 (1.5)	281	3.3 (1.3)	0.6	0.5551

Table 19. Support for a permanent ban on hunting by participation in hunting

Survey Group	Hunts		Does not hunt		t-value	p-value
	n	Mean (Std Dev)	n	Mean (Std Dev)		
Jasper	24	2.8 (1.4)	230	3.8 (1.3)	3.6	0
FtMF	133	1.9 (1.3)	294	3.0 (1.3)	8.2	<.0001
Edmonton	39	2.1 (1.4)	348	3.2 (1.3)	5.6	<.0001

Table 20. Support for new mines by dependence on mining income

Survey Group	Receives income from mining		Does not receive mining income		t-value	p-value
	n	Mean (Std Dev)	n	Mean (Std Dev)		
Jasper	13	2.0 (1.2)	245	2.1 (1.2)	0.3	0.8017
FtMF	73	3.4 (1.3)	352	3.1 (1.2)	-2.1	0.0342
Edmonton	27	2.2 (1.2)	355	2.3 (1.1)	0.5	0.6428

The Role of the Public in Grizzly Bear Management

Not surprisingly, all three groups indicated the public should have some role in grizzly bear management, but few respondents indicated that the public should "set management goals and priorities and have professional managers carry them out" (Table 21). All samples selected the same options as their top two choices: "act as a full and equal partner with professional managers in setting management goals and priorities" and "let professional managers set goals and priorities and then actively inform and educate the public about their decisions." The former

was preferred by the Jasper and FtMF samples and the latter by the Edmonton sample. While Edmontonians are interested in being involved and informed, they may not feel as competent to make decisions about grizzly bear management, or they may feel more comfortable leaving the decision with professional managers as they expect less impact on their lives.

Respondents had the opportunity to write in other options for the role of the public in decision making. 49 people (4.4%) wrote comments, but many were about other aspects of the decision-making process, such as who should have influence. This suggests the options provided sufficient range to encompass respondents' preferences. Of the comments regarding the role of the public, the most common response (18 people) was that both public education and public input were necessary, but the final decision should rest with professional managers. Other comments indicated the public has a responsibility to take a more active role in decision making by staying informed, caring about nature, and demanding more complete information be made available.

Table 21. The public's role in grizzly bear management

Public role	Survey group					
	Jasper		FtMF		Edmonton	
	n	%	n	%	n	%
Have no role; let professional managers set all management goals and priorities without actively informing the public	0	0	5	1.2	6	1.5
Let professional managers set goals and priorities and then actively inform and educate the public about their decisions	77	30	126	29.5	163	41.4
Consult with professional managers on goals and let them set the priorities	58	22.5	62	14.4	59	15
Act as a full and equal partner with professional managers in setting management goals and priorities	111	43.3	201	46.9	116	29.6
Set management goals and priorities and have professional managers carry them out	6	2.3	20	4.6	36	9.1
Other	5	1.8	14	3.4	14	3.5

Chi-square=53.0; DF=10; p<.0001.

Stakeholder Influence in Grizzly Bear Management

The stakeholder group with greatest support for influencing decisions on grizzly bear management in the model forest was Parks Canada. It is the only stakeholder that a majority of all samples indicated should have a great deal of influence in decision making (Table 22). A relatively large proportion also supported provincial government departments, Albertans who live in or near grizzly bear habitat, and environmental groups having a great deal of influence. Support for environmental groups was strongest among the Edmonton sample (42%), followed by Jasper (40%), and the FtMF (25%). The FtMF residents seem divided in support for

environmental groups; 22% indicated they should have no influence. FtMF residents were also divided in the amount of influence that municipal governments should have with 20% indicating no influence and 21% indicating a great deal of influence. Although Edmonton and Jasper residents were quite supportive of aboriginal peoples having a great deal of influence, the FtMF sample was not. Of the industries, the forest industry received the most support for a great deal of influence among all three samples: Jasper (16%), FtMF (23%) and Edmonton (22%). There was little support for other industries, tourism operators, hunters and outfitters, motorized and non-motorized recreationists, and Albertans who do not live in or near grizzly bear habitat in having a great deal of influence. However, a majority of respondents from each sample indicated most stakeholders should have at least some influence on decisions. The exception was motorized recreational users; majorities of the Jasper and Edmonton samples and 48.0% of the FtMF sample indicated motorized recreational users should have no influence.

While in many of the previous results, such as environmental value orientation and attitudes, it was the Jasper and FtMF samples who formed the extremes of the range of results, here it is the Edmonton and FtMF samples who showed the greatest discrepancies. For example, FtMF respondents were more likely than the Edmonton respondents to give more influence to all industries, with the exception of ranchers. They also gave more influence to Albertans living in grizzly habitat and recreational groups. Edmonton respondents, on the other hand, were more likely to give greater influence to Parks Canada, environmental groups, Albertans who do not live in grizzly habitat, and aboriginal peoples. Jasper respondents tended to agree with one or both of the other samples.

Respondents were also given the option of writing in other stakeholders who they felt should have influence on grizzly bear management decisions. 178 respondents (15.8%) did so. By far the most common response (57 respondents) was to include grizzly bear biologists, ecologists, and other researchers. Other commonly suggested stakeholders included: the federal government, the Canadian Wildlife Service, or all Canadians; specific environmental, conservation or animal rights groups; students or youth; and the international community.

Table 22. Who should have a say in decision-making

Stakeholder Group	Survey group; % indicating amount of influence												
	Jasper				FtMF				Edmonton				
	n	None	Some	A great deal	n	None	Some	A great deal	n	None	Some	A great deal	p-value[1]
Parks Canada Agency	267	2.9	34.7	62.4	444	5.5	37.6	56.9	411	0.6	19.6	79.8	<.0001
Provincial government departments	263	3.7	57.9	38.4	440	6.4	52.9	40.7	412	7.3	49.7	43	0.1762
Environmental groups	265	6.3	53.9	39.8	441	21.9	53.4	24.7	411	8.6	49.3	42.1	<.0001
Albertans who live in or near grizzly bear habitat	263	1.6	67.7	30.7	441	5	61.1	34	413	6.9	66.3	26.9	0.01
Municipal governments	266	13	65.3	21.8	437	19.6	59.9	20.5	412	15.9	61.7	22.3	0.2249
Aboriginal peoples	267	14.4	59.1	26.5	439	29.4	55.1	15.5	411	21	57.7	21.3	<.0001
The forest industry	263	30.9	53.1	16	442	15.4	62	22.7	411	32.7	46.1	21.2	<.0001
The oil and gas industry	265	35.1	51.7	13.2	443	24.9	60.5	14.7	412	47.6	40	12.5	<.0001
Ranchers	267	20.7	64.9	14.3	440	16.7	71.1	12.2	411	22.5	65.8	11.7	0.196
The mining industry	262	34.3	53.8	11.9	443	23.3	62.6	14.1	411	49	39.8	11.2	<.0001
Tourism operators	266	26.1	62	12	440	27.4	60.4	12.2	411	39.4	48.1	12.5	0
Hunters and outfitters	260	36.5	52.7	10.8	442	29.2	56.2	14.5	410	43.7	47.2	9.1	0

Stakeholder Group	Survey group; % indicating amount of influence												
	Jasper				FtMF				Edmonton				
	n	None	Some	A great deal	n	None	Some	A great deal	n	None	Some	A great deal	p-value[1]
Non-motorized recreation users	267	21.1	66	12.9	444	24.8	64.3	10.9	411	32.9	57.8	9.3	0.01
Albertans who do NOT live in or near grizzly bear habitat	264	35.1	54.9	10	442	47	46.7	6.4	410	35.9	58	6.2	0
Motorized off-road recreation users	264	62.9	31.8	5.3	443	48	45.4	6.6	410	70.7	25.2	4.1	<.0001

[1] Based on Chi-square test of independence.

Respondents were asked to indicate which of the stakeholder groups should have the most and least influence in decisions on grizzly bear management in the FtMF (Tables 23 and 24). For the most influence, Parks Canada was mentioned most frequently by all groups, followed by provincial government departments. Environmental groups and Albertans who live in grizzly habitat were also mentioned frequently. Industry, recreational users, and Albertans living outside grizzly habitat were least likely to be listed as getting the most influence. Consistent with the previous ratings, motorized off-road recreation users were most likely to be mentioned by all three samples as deserving the least influence. Hunters and outfitters, Albertans living outside grizzly habitat, and the oil and gas industry, were also commonly indicated as deserving the least influence.

Although the questions asked respondents to indicate which one stakeholder group should have the most and least influence, many respondents indicated more than one group. Sixty one people indicated multiple stakeholders who should have the most influence. They listed a total of 142 choices, an average of 2.3 per respondent. Among the multiple answers, the most common was Parks Canada, listed by 49 respondents. This was followed by Alberta government departments (27), environmental groups (15), and people who live in grizzly habitat (14). Results therefore are very similar to the preferences of respondents who selected only one stakeholder. To some extent, multiple answers may reflect an understanding of shared authority in the FtMF.

85 respondents indicated multiple stakeholders who should have the least influence. They listed 283 choices, an average of 3.3 per respondent. The most commonly mentioned group was the oil and gas industry, indicated by 52 respondents. This was followed by the

mining industry (49), motorized recreational users (39), forestry industry (37), hunters and outfitters (26), ranchers (19), and tourism operators (17). This list differs somewhat from the single respondents in that multiple respondents seem to prefer less influence for industry, particularly oil and gas, mining, and forestry. These respondents may have had difficulty choosing between industries when faced with the question as to which single group should have the least influence.

Table 23. Who should have the most influence

	Survey group					
	Jasper		FtMF		Edmonton	
Stakeholder Group	n	%	n	%	n	%
Parks Canada Agency	97	45.8	121	31.6	203	53.8
Provincial government departments	35	16.5	115	30.3	67	17.7
Environmental groups	32	14.9	33	8.6	48	12.7
Albertans who live in or near grizzly bear habitat	29	13.4	59	15.4	21	5.6
The forest industry	3	1.4	17	4.5	10	2.8
Aboriginal peoples	6	3	8	2	12	3.1
Municipal governments	2	1	12	3.3	2	0.4
The mining industry	3	1.2	4	0.9	5	1.4
Hunters and outfitters	0	0	8	2.1	2	0.4
Non-motorized recreation users	2	0.8	2	0.6	4	1
The oil and gas industry	3	1.6	1	0.3	1	0.1
Ranchers	0	0.2	0	0	4	1
Motorized off-road recreation users	0	0	2	0.4	0	0
Albertans who do NOT live in or near grizzly bear habitat	0	0.2	0	0	0	0
Tourism operators	0	0	0	0	0	0

Chi-square=101.5; DF=26; p<.0001.

Table 24. Who should have the least influence

	Survey group; % of respondents					
	Jasper		FtMF		Edmonton	
Stakeholder Group	n	%	n	%	n	%
Motorized off-road recreation users	87	39.6	78	20.2	112	31.3
Hunters and outfitters	35	16.1	45	11.7	49	13.6
Albertans who do NOT live in or near grizzly bear habitat	19	8.6	74	19.1	32	9
The oil and gas industry	16	7.2	24	6.1	51	14.2
Aboriginal peoples	7	3.3	39	10	23	6.4
The mining industry	12	5.4	20	5.1	17	4.6
Municipal governments	14	6.4	16	4.2	14	4.1
Environmental groups	3	1.6	35	9	9	2.6
Tourism operators	8	3.5	15	3.9	16	4.4
The forest industry	4	1.9	6	1.7	20	5.5
Provincial government departments	3	1.2	19	4.9	3	0.7
Non-motorized recreation users	6	2.5	3	0.9	8	2.3
Parks Canada Agency	4	1.9	5	1.4	3	0.9
Ranchers	2	0.8	6	1.5	1	0.1
Albertans who live in or near grizzly bear habitat	0	0	1	0.3	2	0.4

Chi-square=122.9; DF=28; $p<.0001$

For some respondents there were inconsistencies between the ratings of how much influence the various stakeholder groups should have and respondents' choice of which groups should have the most and least influence. That is, the group which some respondents selected as deserving the most influence did not receive the maximum score they gave when rating how

much influence each group should have. Similarly, the group which some respondents selected as getting the least influence did not receive the minimum score they gave for influence rating. Between 16 and 27% of answers did not correlate in this way (Table 25). This suggests that for some respondents, there may have been confusion about this question. In addition, 10.3% and 8.4% of respondents did not answer the questions on who should have the most and least influence, respectively.

Table 25. Agreement between influence ratings and who should have the most and least influence

	Survey group; % of respondents with answers that are consistent					
	Jasper		FtMF		Edmonton	
Question	n	%	n	%	n	%
Who should have the most influence	194	73.2	347	77.6	345	84.2
Who should have the least influence	197	74.3	334	74.7	308	75.1

DISCUSSION

This study provides insight into some of the human dimensions of grizzly bear management and has several implications for grizzly bear management and communications for the FtMF. Respondents from Jasper, other FtMF communities, and Edmonton demonstrate experience with grizzly bears but have low knowledge of grizzly bear biology and ecology, they have positive attitudes towards them, and support many management options aimed at achieving forest sustainability while balancing the needs of grizzly bear. They perceive grizzly bear populations in the FtMF as sustainable, but rate many potential threats as posing risks to the

populations. Management implications of these findings centre around educational opportunities, public support for management options, potential conflicts in grizzly bear management, and engaging the public in management decisions.

Educational Opportunities

The FtMF grizzly bear research program is not well known outside of the FtMF. Nearly two thirds of Edmonton respondents indicated they were not at all informed about grizzly bear research in the FtMF. In addition, the objective knowledge measure suggests Albertans lack information about grizzly bear populations, their habitat requirements, and the impact of human activities on grizzly populations. Even FtMF residents, although aware of the model forest grizzly research program, exhibited low knowledge of bears. This suggests that publicity about the research program is effective but results from the research may not be getting across to the public. Transferring results from the research program to natural resource managers is a primary goal of Phase III of the FtMF. However, if management efforts are to be supported then it will be necessary to ensure that the results are also conveyed to a broader public.

In contrast to the opinions of bear biologists (Nielsen et al. 2004; Gibeau et al. 2002; Kansas 2002; McLellan 1990), the public does not consider the population in eminent danger. Most respondents viewed the grizzly bear population in the model forest as at least somewhat sustainable with many FtMF respondents viewing it as very sustainable. In addition, most respondents either believe or are not sure that the grizzly bear has been declared an endangered species by the government of Alberta. Therefore, they may also think the grizzly bear is afforded more protection in the province than is currently the case. Additionally, the bears' basic habitat

requirements are not well understood. For example, many respondents viewed the Canadian Rockies and hence much of the model forest as being the best grizzly bear habitat in North America, while many other respondents were unsure. The lack of basic understanding of the bears' status and habitat requirements are examples where the model forest could transfer bear research findings beyond the model forest boundary. Effective management of grizzly habitat will require constraints on human disturbance (Gibeau et al. 2002; Weaver et al. 1996) and education about threats to grizzly bears may increase acceptance of such limitations. The pro-environmental value orientations and positive attitudes towards grizzlies exhibited in this study suggest Albertans would be receptive to information on grizzly bears.

Public Support for Management Options

Management options which do not require trade-offs, such as education and increased law enforcement, were most strongly supported. However, changing existing operations for oil and gas, forestry and mining to better address the needs of grizzly bears was also supported and new industrial development was opposed. Clearly, there is support for making some sacrifices of industrial development and economic opportunities to enhance grizzly bear conservation. In addition, several management options which would restrict hunting (such as a temporary ban on hunting grizzly bears) and access (such as a temporary closure of roads) were supported.

Only three options elicited disagreement between the study samples: the expansion of mining, permanent closure of roads and trails to off-road vehicle users, and a permanent ban on grizzly hunting. It appears that support for new mining and opposition to permanent road closures and a permanent hunting ban occurs primarily among respondents with specific

interests. Off-road vehicle users and random campers in the FtMF sample appear to be the main source of opposition to permanent road closure, people dependent on mining in the FtMF sample were the source of support for new mines, and hunters were the source of opposition to a permanent ban on grizzly bear hunting.

Awareness of differences among specific interests will assist FtMF managers in developing potential mitigation to offset negative impacts if these management options are implemented. For example, managing access through restriction and enforcement may meet with a large degree of opposition from off-road vehicle users. Therefore, development of off-road vehicle opportunities in areas of low habitat suitability or areas not frequented by grizzly bears may help to mitigate lost opportunities and gain public support. If off-road vehicle or random camping opportunities will be impacted negatively by access restrictions it may be necessary to take a proactive approach to managing these activities in the model forest. Opening new opportunities such as off-road vehicle trails with random camping opportunities away from grizzly bear areas that meet the specific needs of recreationists might help mitigate closed access. A study in the Sunpine Forest Products forest management agreement area indicates that off-road vehicle campgrounds with designated trail networks are desirable among random campers (McFarlane et al. 2003). These types of opportunities in the model forest might help offset opposition from off-road users. The extent to which such camping opportunities are acceptable to FtMF off-road users and random campers should be explored further.

Potential Conflicts

Although there was general agreement among the three samples on perceived threats to grizzly bears, attitudes towards grizzly bears, and management preferences, there were also some notable differences. The FtMF sample is more optimistic about the sustainability of grizzly bear populations in the model forest, perceive less risk to grizzly bears from industrial activities, and are not as receptive to restrictions on public access and industrial expansion in grizzly bear habitat. Rural residents and people employed in primary industries are often found to be less pro-environmental and have more negative attitudes towards wildlife and pro-environmental policies (Edgell and Nowell 1989; Ericsson and Heberlein 2003; Lohr et al. 1996; Kaltenborn et al. 1998). Interestingly, however, attitudes of the FtMF sample towards grizzly bears were similar to those of Edmonton residents, and quite positive. Of the three samples, Jasper residents are generally more extreme in their attitudes (i.e., their ratings were generally more positive or more negative than the FtMF and Edmonton samples). Understanding attitudinal differences is important to gaining acceptance of grizzly bear conservation initiatives because individuals with extreme attitudes may be less receptive to alternative views and less likely to change their views (Bright and Manfredo 1995). Although other studies have shown that urban residents tend to represent extreme attitudes and preferences and are a major source of conflict in natural resource management (Patterson et al. 2003; Ericsson and Heberlein 2003), this study suggests controversy over grizzly bear management may originate within the FtMF, between residents of Jasper and residents of other communities in the model forest. These findings are consistent with Kellert et al. (1996) who conclude that attitudinal differences tend to be polarized with increasing proximity to grizzly habitat. Because areas rich in natural resources tend to attract

people who hold differing viewpoints, such as nature enthusiasts and people involved in extractive industries, conflicts over management preferences can be anticipated, and may be compounded by positive and negative personal experiences with bears.

Several demographic differences may help explain the differences in attitudes and preferences between the Jasper and the FtMF sample. For example, the Jasper sample had a higher proportion of females, younger people, people with more education, and people involved in environmental organizations and natural history and birdwatching clubs. All these characteristics have been related to attitudes and management preferences, such as support for reintroduction of wolves (e.g., Kellert 1991; Bath 1989; Bjerke et al. 1998; Lohr et al. 1996). Also, the Jasper sample had very high employment in tourism and natural resource agencies, whereas the FtMF sample was highly dependent on forestry, mining, and oil and gas sectors. Perceptions of differing impacts on these industries may also affect attitudes and management preferences. As well, it may be that national parks tend to attract people with certain values or attitudes, or that living in parks results in exposure to certain attitudes. Future analysis will include multivariate analysis to explore the influence of demographics, environmental value orientation, knowledge, and experience with grizzly bears on attitudes and management preferences.

Engaging the Public

Stakeholders that traditionally have had considerable influence in natural resource and wildlife management decisions in Alberta, such as extractive industries, hunters, and off-road vehicle users, are not supported in having a lot of influence by local or Edmonton residents.

Although there was support for a variety of stakeholders having some influence in decisions on grizzly bear management, respondents agreed that Parks Canada, provincial government departments, environmental groups, and local residents should have more influence. Surprisingly, all samples gave environmental groups more support in influencing decisions than municipal governments, aboriginal peoples, industries, hunters, and off-road vehicle users. This occurred despite the fact that only the Jasper sample had a relatively high proportion that belonged to an environmental or conservation organization. In other words, this support for environmental groups seems to transcend beyond membership in environmental groups to support from a broader public. The public did not support off-road vehicle users influencing decisions on grizzly bear management. Even the FtMF sample, with 46% using off-road vehicles, did not support this group influencing decisions.

Other studies suggest rural residents resent a perceived urban dominance in resource management (Patterson et al. 2003; Ericsson and Heberlein 2003). Edmonton residents, however, agreed with the model forest samples that locals should have more influence than non-locals in grizzly bear management decisions. Additionally, many Edmonton residents seem content in having a less active role than residents of the model forest. The Edmonton sample was more supportive of letting professional managers set goals and priorities and then being informed and educated of their decisions. In contrast, most local residents wanted an active role as equal partners in setting goals and priorities for grizzly bear management. However, involving only local residents will present a challenge if consensus is sought on management decisions, because of the differences in attitudes and preferences between Jasper and other local residents. As well, while Edmonton residents appear willing to accept locals having more input, they may

not agree with the outcome if the decisions cater to specific interests in the model forest. For example, a decision to allow new industrial development in grizzly bear habitat may appeal to a limited local interest and not be supported by citizens who are not employed by a natural resource sector. Therefore, public involvement in grizzly bear management in the FtMF should include processes that foster discussion and deliberation of values and preferences and that result in the public having a meaningful impact on decision-making.

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APPENDIX A. THE SURVEY

Managing for Grizzly Bears in the Foothills Model Forest

Thank you for taking the time to complete this questionnaire. The information you provide will help us understand Albertans' preferences for grizzly bear management and provide direction for management needs within the Foothills Model Forest.

Please try to answer all of the questions. They can be answered by checking (✔) the box that best describes your answer or writing in the space provided. If there are any questions you do not wish to answer, please leave them blank and move to the next question.

All information you provide is confidential. Your name never appears with your answers. Only a summary of everyone's answers will be made public.

Please return your completed questionnaire in the postage paid envelope provided.

If you have any questions about this survey please contact:

Dr. Bonnie McFarlane or Dave Watson
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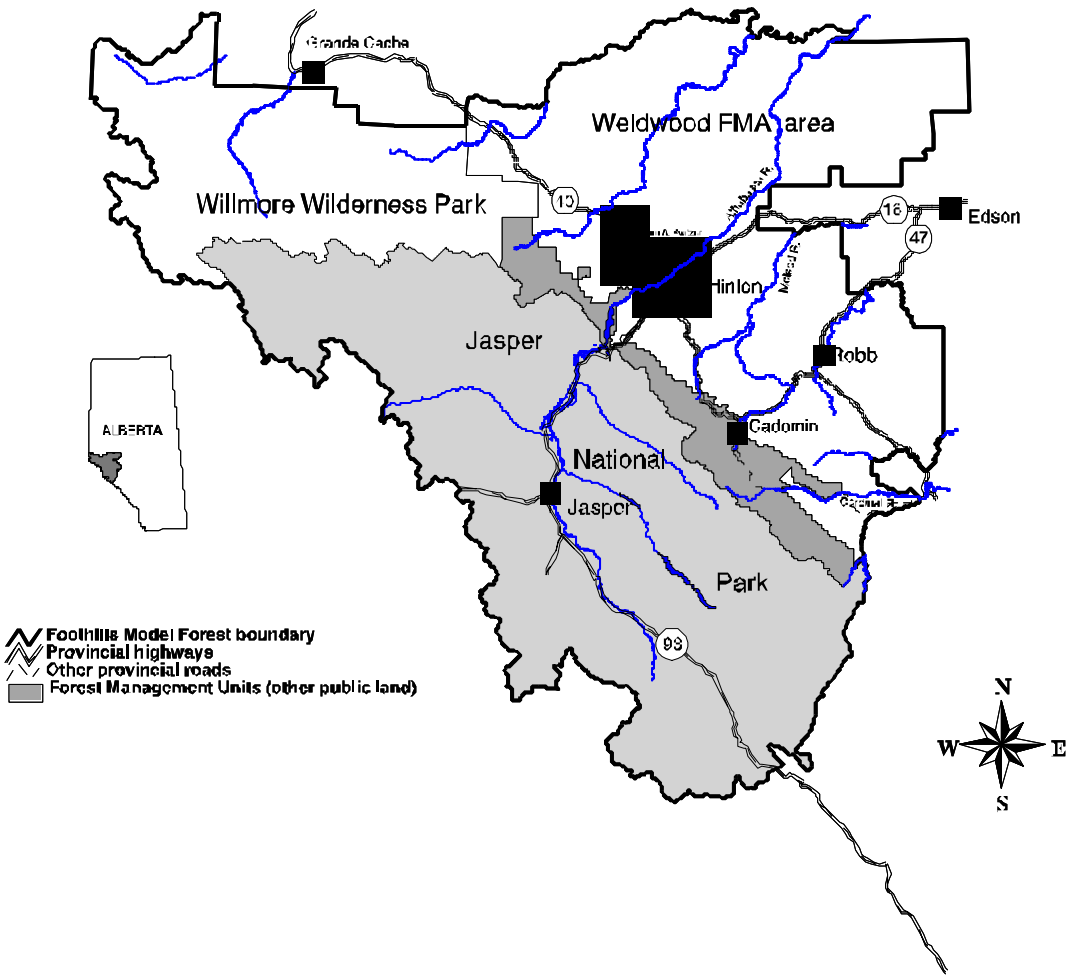


The Foothills Model Forest

The Foothills Model Forest is a partnership of industry, federal and provincial governments, landowners, and others, established to improve resource management in the foothills of the Rocky Mountains. The Foothills Model Forest is located in west-central Alberta and is based in the community of Hinton, about three hours west of Edmonton. It covers roughly 2.75 million hectares (27,500 square kilometres), and embodies Jasper National Park of Canada, the Willmore Wilderness Park, and the forest management area of Weldwood of Canada Ltd. Forest uses include timber, petroleum, and coal extraction within the Weldwood FMA and tourism and recreation throughout. The Foothills Model Forest Grizzly Bear Research Program was created in 1999 to provide research for grizzly bear management and long-term conservation on a large-scale or "landscape level."

For more information, visit <http://www.fmf.ab.ca>.

SECTION 1. YOUR VIEWS ON GRIZZLY BEAR MANAGEMENT

1. How informed would you say you are about grizzly bear research in the Foothills Model Forest?

Not at all informed	Somewhat informed	Very well informed
☐ 1	☐ 2	☐ 3

2. Do you feel that the grizzly bear population in the Foothills Model Forest is sustainable? (By sustainable we mean the grizzly bear will be able to maintain a healthy and productive population for a long time into the future.)

Very unsustainable	Somewhat unsustainable	Somewhat sustainable	Very sustainable	Not sure
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

3. Now we would like to ask about your familiarity with grizzly bears. Please indicate if you think each statement is true or false.

a. Grizzly bears have very poor eyesight	☐1 True	☐2 False	☐3 Not sure
b. The best way to identify a grizzly bear is by its colour	☐1 True	☐2 False	☐3 Not sure
c. The Government of Alberta classifies the grizzly bear as an endangered species	☐1 True	☐2 False	☐3 Not sure
d. Grizzly bears breed about once every 3 to 5 years	☐1 True	☐2 False	☐3 Not sure
e. The Canadian Rockies has the best grizzly bear habitat in North America	☐1 True	☐2 False	☐3 Not sure
f. Grizzly bears once ranged across most of Alberta, including where Edmonton and Calgary are now situated	☐1 True	☐2 False	☐3 Not sure
g. Plants (including roots, shoots and berries) are the main source of food for grizzly bears in Alberta	☐1 True	☐2 False	☐3 Not sure
h. The greatest cause of grizzly bear deaths in the Canadian Rockies is old age	☐1 True	☐2 False	☐3 Not sure
i. The greatest threat to grizzly bear populations is loss of habitat	☐1 True	☐2 False	☐3 Not sure
j. In areas where grizzly bears exist near livestock, their primary food is cattle and sheep	☐1 True	☐2 False	☐3 Not sure

4. Next, we would like your views on issues facing grizzly bear management. Listed below are several items that might pose a threat to grizzly bears. Please rate how much of a risk you think each item poses, in terms of its impact on the health and productivity of grizzly bear populations in the Foothills Model Forest.

	Poses no risk				Poses a great risk	No opinion
a. Global warming	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
b. Illegal (poaching) and unlicenced (self-defense and misidentification) killing of grizzly bears	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
c. Forest fires	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
d. Wildlife managers inadvertently making an incorrect decision	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
e. Introduction of non-native plant and animal species	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
f. Conversion of forested land into agriculture	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
g. Putting a lot of trust in science to help develop solutions to wildlife management issues	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
h. Tourist resorts in bear habitat	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
i. Development of roads and other access routes in the forest	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
j. Unrestricted public use of roads and other access routes in the forest	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
k. Licensed grizzly bear hunting (legal hunting)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
l. Oil and gas exploration, drilling and pipelines in bear habitat	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
m. Timber harvesting operations in bear habitat	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
n. Mining developments in bear habitat	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
o. Loss of forested land for housing	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
p. Motorized off-road (quads, dirt bikes, snowmobiles, ATVs, four-by-fours) recreational use of lands in bear habitat	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
q. Non-motorized recreational use of lands in bear habitat	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
r. Grizzly bears becoming accustomed to the presence of humans	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
s. Lack of resources (expertise, funding, staff) to address wildlife management issues	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6

5. Now we would like your views on grizzly bears and their management. Please rate the extent to which you agree or disagree with each statement.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
a. Grizzly bears are important to the balance of nature	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
b. Grizzly bear populations should be controlled so they pose no danger to people	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
c. The needs of grizzly bears should come before the needs of people living in or near grizzly bear habitat	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
d. It is a grizzly bear's nature to want to kill humans	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
e. A healthy grizzly bear population is a sign of a healthy environment	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
f. All grizzly bears that attack people should be destroyed	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
g. The quality of life in human communities near grizzly bear habitat should be a primary consideration in decisions on bear management	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
h. Grizzly bears have the right to exist for their own sake regardless of human concerns	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
i. It is important that Alberta always has a sustainable grizzly bear population	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
j. Grizzly bears are a nuisance	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
k. It is morally wrong to kill a grizzly bear	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
l. Whether or not I get to see a grizzly bear, it is important to know they exist in Alberta	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
m. The grizzly bear is a symbol of the greatness of nature	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

SECTION 2. PREFERENCES FOR RESOURCE MANAGEMENT

6. We would like your views on what should be done to help the Foothills Model Forest achieve it goals of stewardship and forest sustainability while balancing the needs of grizzly bears. Please indicate the extent to which you are in favour of, or opposed to, each item.

	Strongly oppose	Somewhat oppose	Neither favour nor oppose	Somewhat favour	Strongly favour	No opinion
a. Seasonal or temporary closure of roads and trails used for off-road motorized recreation (quads, dirt bikes, snowmobiles, ATVs, four-by-fours)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
b. Permanent closure of roads and trails used for off-road motorized recreation (quads, dirt bikes, snowmobiles, ATVs, four-by-fours)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
c. An increase in oil and gas development in grizzly bear habitat outside protected areas	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
d. Changing existing oil and gas facilities and operations (e.g. roads, plant sites, wells, pipelines) so the needs of grizzly bears are better addressed	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
e. An increase in land where timber harvesting is allowed in grizzly bear habitat outside protected areas	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
f. Changing existing timber harvesting facilities and operations (e.g. roads, cutblocks) so the needs of grizzly bears are better addressed	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
g. Increase law enforcement patrols to prevent poaching, catch poachers, and increase prosecution of poachers	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
h. Educate forest users on how to avoid, how to be prepared for, and how to react to bear encounters	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6

	Strongly oppose	Somewhat oppose	Neither favour nor oppose	Somewhat favour	Strongly favour	No opinion
i. New mines in grizzly bear habitat outside protected areas	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
j. Changing existing mining facilities and operations (e.g. roads) so the needs of grizzly bears are better addressed	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
k. Train hunters to be able to distinguish between black bears and grizzly bears	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
l. Educate the public about grizzly bears in the Foothills Model Forest	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
m. Reduce the number of grizzly bear hunting licenses	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
n. Move bears that pose a danger to humans to more remote areas with suitable habitat	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
o. A ban on grizzly bear hunting until the provincial population reaches a self-sustaining level	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
p. A ban on grizzly bear hunting forever	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
q. "Bear proof" settlements, residences and facilities to reduce the availability of garbage and other things that attract bears	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
r. Establish more protected areas with no industrial activity or motorized recreational access	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
s. Reduce speed limits on highways in areas with bears	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
t. Require industries to coordinate their road building activities to reduce the number of roads overall	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6

SECTION 3. YOUR VIEWS ON THE ENVIRONMENT

7. Now we would like your general views on the relationship between people and the environment. These views will help us understand people's preferences for grizzly bear management. Please rate the extent to which you agree or disagree with each statement.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
a. We are approaching the limit of the number of people the earth can support	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
b. Humans have the right to modify the natural environment to suit their needs	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
c. When humans interfere with nature it often produces disastrous consequences	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
d. Human ingenuity will ensure that we do NOT make the earth unlivable	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
e. Humans are severely abusing the environment	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
f. The earth has plenty of natural resources if we just learn how to develop them	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
g. Plants and animals have as much right as humans to exist	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
h. The balance of nature is strong enough to cope with the impacts of modern industrial nations	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
i. Despite our special abilities, humans are still subject to the laws of nature	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
j. The so-called "ecological crisis" facing humankind has been greatly exaggerated	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
k. The earth is like a spaceship with very limited room and resources	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
l. Humans were meant to rule over the rest of nature	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
m. The balance of nature is very delicate and easily upset	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
n. Humans will eventually learn enough about how nature works to be able to control it	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
o. If things continue on their present course, we will soon experience a major ecological catastrophe	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

SECTION 4. WHO SHOULD HAVE A SAY IN GRIZZLY BEAR MANAGEMENT?

8. There are many groups that could be involved in decisions on grizzly bear management. Please indicate how much influence you feel each of the following should have in bear management decisions in the Foothills Model Forest.

	No influence at all	Some influence	A great deal of influence
a. Provincial government departments	☐ 1	☐ 2	☐ 3
b. Parks Canada Agency	☐ 1	☐ 2	☐ 3
c. Aboriginal peoples	☐ 1	☐ 2	☐ 3
d. Albertans who live in or near grizzly bear habitat	☐ 1	☐ 2	☐ 3
e. Albertans who do NOT live in or near grizzly bear habitat	☐ 1	☐ 2	☐ 3
f. The forest industry	☐ 1	☐ 2	☐ 3
g. The oil and gas industry	☐ 1	☐ 2	☐ 3
h. Tourism operators	☐ 1	☐ 2	☐ 3
i. The mining industry	☐ 1	☐ 2	☐ 3
j. Ranchers	☐ 1	☐ 2	☐ 3
k. Hunters and outfitters	☐ 1	☐ 2	☐ 3
l. Environmental groups	☐ 1	☐ 2	☐ 3
m. Motorized off-road recreation users (quads, ATVs, dirt bikes, 4X4, snowmobiles)	☐ 1	☐ 2	☐ 3
n. Non-motorized recreation users (hikers, horseback riders, mountain bikers, skiers, canoers)	☐ 1	☐ 2	☐ 3
o. Municipal governments	☐ 1	☐ 2	☐ 3

Is there another group who should be considered a stakeholder in decisions on grizzly bear management in the Foothills Model Forest?

_____

From the groups listed in question 8, which one do you think should have the **most** influence?

Please enter the letter of the group: _____

From the groups listed in question 8, which one do you think should have the **least** influence?

Please enter the letter of the group: _____

9. In your opinion, an ideal role for the public in grizzly bear management in the Foothills Model Forest should be to: (Please check only one)

☐ 1 Have no role; let professional managers set all management goals and priorities without actively informing the public

☐ 2 Let professional managers set goals and priorities and then actively inform and educate the public about their decisions

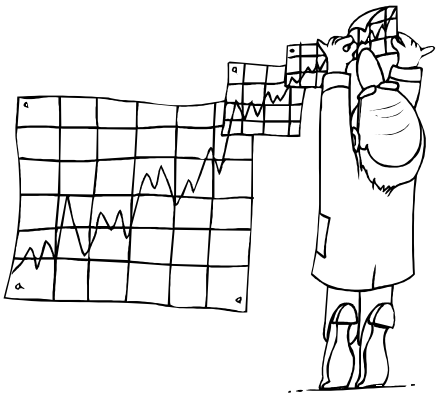
☐ 3 Consult with professional managers on goals and let them set the priorities

☐ 4 Act as a full and equal partner with professional managers in setting management goals and priorities

☐ 5 Set management goals and priorities and have professional managers carry them out

☐ 6 Other (please specify): _____

SECTION 5. ABOUT YOU



Finally, we would like to ask a few questions about you to help determine if there are connections between peoples' backgrounds and their opinions. Your name never appears with your answers, however, if there is a question you do not want to answer, leave it blank and move to the next question.

10. You are: ☐0 Male ☐1 Female

11. What is your present age? _____ Years

12. How often have you visited the Foothills Model Forest in the past five years?

☐0 Never

☐1 1 to 5 times

☐2 6 to 10 times

☐3 more than 10 times

☐4 I am a resident of the Foothills Model Forest

13. Have you ever seen a grizzly bear in the wild?

☐0 No

☐1 Yes

14. In a typical year, do you take part in the following activities in Alberta? (Check all that apply)

- ☐ Walk or hike in parks and protected areas
- ☐ Walk or hike on public land outside of parks
- ☐ Camp in serviced campgrounds
- ☐ Camp in areas without serviced campgrounds (random camp)
- ☐ Hunt
- ☐ Fish
- ☐ Use off-road vehicles for recreation (quads, ATVs, dirt bikes, 4X4, snowmobiles)
- ☐ I do not take part in these activities

15. Do you belong to any of the following organizations? (Check all that apply)

- ☐ A hunting or fishing organization
- ☐ A natural history or birdwatching club
- ☐ An off-road vehicle club
- ☐ An outdoor recreation club
- ☐ An environmental or conservation organization
- ☐ I do not belong to any of these

16. Are you or is anyone in your household employed in the following sectors? (Check all that apply)

- ☐ Forest industry
- ☐ Mining industry
- ☐ Oil and gas industry
- ☐ Agriculture
- ☐ Tourism industry
- ☐ A natural resource agency (e.g. a provincial or federal government department)
- ☐ Nobody in the household depends on them

17. What is the highest level of education that you have completed?

- ☐$_1$ Grade 9 or less
- ☐$_2$ Some High School
- ☐$_3$ High School Graduate
- ☐$_4$ Technical School or Community College
- ☐$_5$ Some University
- ☐$_6$ University Degree (Bachelors)
- ☐$_7$ Some Graduate Studies
- ☐$_8$ Graduate University Degree

18. We are always trying to reduce the cost of conducting surveys. We are investigating the use of the internet in survey research. Do you have access to the internet:

☐$_1$ At home?

☐$_2$ At work?

☐$_3$ I do not have access to the internet

19. If you have access, would you prefer to receive surveys through the internet and complete them on-line?

☐$_1$ Yes

☐$_0$ No

Is there anything else you would like to tell us?

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THANK YOU FOR YOUR PARTICIPATION!
TO RETURN THIS QUESTIONNAIRE, SIMPLY PUT IT IN THE POSTAGE-PAID ENVELOPE PROVIDED AND DROP IT IN THE NEAREST MAILBOX

A summary of the results of this survey will be posted on the Foothills Model Forest website (www.fmf.ab.ca) in August 2004.

APPENDIX B. ANALYSIS OF COMMENTS

In addition to quantitative data collected from the close-ended questions on the survey, qualitative data were collected in the form of the respondents' written comments. Open-ended questions allow respondents to provide more depth and detail than in the close-ended survey questions. Respondents can express their thoughts and perceptions in their own words and provide background to answers given in the close-ended questions. It also allows respondents an opportunity to raise issues not included in other survey questions. 430 respondents (38.2%) took the opportunity to offer additional comments at the end of the survey. Many of these expanded on their attitudes towards grizzly bears, their management preferences, or the influence of stakeholders. Other comments touched on the survey itself or other environmental issues.

NUD*IST Vivo (Nvivo), a software package designed to search, sort, and code qualitative data, was used to sort paragraphs, passages and sentences into specific researcher-defined categories (e.g. hunting). To begin the analysis, comments were sorted into broad categories: five management areas (industry and development, access and recreation, hunting, communications and education, and poaching), stakeholders, the balance between meeting human and grizzly needs, other comments regarding bears, the survey, and other comments. Comments regarding the five management areas, stakeholders and the balance between humans and grizzlies were then broken down by region, to allow comparison between the comments of residents of Jasper, the FtMF, and Edmonton. Although all comments making up each category are not presented in this report, a few have been selected to represent each category and are presented in tables below.

While Nvivo was useful in organizing the comments, the variable nature of the comments required the researcher to classify the comments. Many paragraphs contained multiple subjects; each respondent's comments could be coded into one or multiple categories. This creates an element of subjectivity to the results. However, the comments do offer some insight into the choices respondents made on the quantitative portion of the survey.

Comments about Industry and Development

91 respondents wrote comments regarding industry and development. Of these 28 were from Jasper, 45 from the FtMF, and 18 from Edmonton. Overall, there appears to be a feeling among people who provided comments that the FtMF is nearing or has exceeded its capacity for industrial development and that any further growth must be carefully scrutinized. This supports the quantitative analysis showing opposition to new forestry and oil and gas development. Comments suggest that respondents have concerns about clearcuts, roads and seismic lines, and lack of bear proofing at industrial sites. However, there are also mixed feelings about two industries: mining and tourism. Jasper residents in particular oppose mining expansion and the Cheviot mine in particular as being incompatible with the nearby national park. Most FtMF residents support mining and focus on successful reclamation projects. Most FtMF respondents do not associate the negative impacts of other industries with mining. This is consistent with the quantitative results, in which development of new mines is supported by FtMF respondents and opposed by other groups. The tourism industry also has both positive and negative associations, but was mentioned by relatively few respondents. It is seen as a source of non-extractive

sustainable revenue, but is also associated with access related concerns, described more fully in the next section. Expansion of residential developments is also identified as a source of concern.

Jasper respondents wrote that industry can do better at meeting the needs of grizzly bears (eight respondents), and that more government oversight is needed to ensure that industry appropriately addresses these needs (four respondents). Some Jasper respondents also addressed specific industries. For example, nine respondents commented on mining, mostly negative and mostly expressing concerns about the proposed Cheviot mine near the park boundary. Five respondents mentioned forestry and the need to reduce the number and size of clearcuts. Oil and gas and ranching were also mentioned negatively, while tourism was mentioned positively. For the most part, Edmonton respondents who wrote comments about industry mentioned specific industries, including forestry, oil and gas, mining, and tourism, in a negative context. Edmonton respondents also mentioned residential developments resulting in habitat loss and the need for more protected areas without industrial activity.

Most FtMF respondents who wrote comments about industry also addressed specific industries. For example, 16 wrote about forestry and 17 wrote about oil and gas. Most of these comments were negative, many focussing on the impact of roads crisscrossing the landscape. Tourism and expansion of residential areas were also mentioned negatively. On the other hand, 21 FtMF residents wrote about mining and most of these comments were positive, many mentioning the attention the industry pays to reclamation and wildlife that is attracted to mining sites. Industry in general was also mentioned by several respondents who expressed concerns about the dangers of habituation and cumulative impacts on the landscape. Other writers

indicated that industry can do better, for instance by coordinating their road building activities, or harvesting logs cut when roads are built by other industries.

Sample comments about industry and development

Sample	Comments
Jasper	Things like mining, forestry and oil and gas exploration are not bad for bears per se but where these activities occur is very important. We should arrange our extraction and disturbance around the habitat requirements of the grizzly.
	I admit that when I hear of open pit mining on the border of Jasper National Park, poaching and indiscriminate killing of bears in and around the Hinton/Cadomin area I lose faith in humans and their ability to be responsible around wildlife.
	I sincerely hope that Alberta's reputation as an area with little respect for conservation diminishes and that our provincial government enforces more stringent rules for industry. Tourism of our diverse wild areas needs to be enhanced and promoted for a sustainable economic future.
	Industry should respond to the needs of the environment, even if it costs more for consumers in the long run.
FtMF	I feel that something could be done to improve the management for grizzly bears in the Foothills Model Forest. But at the same time I am a strong supporter in the rapid growth in industry. I have worked in both the forest and mining industry and have been around some oil and gas activity and in my opinion feel these industries have been doing an excellent job in sustaining a healthy habitat for all wildlife.
	I am appalled at the number of oil, gas and timber access roads being built all up and down the Eastern Slopes in the past 2 years. One needs to take a drive in order to believe it. The public needs to be made aware of this devastation of our wilderness. Whatever happened to the government's plans for a "green zone" on the Eastern slopes? ... More wilderness areas need to be set aside where there is absolutely no motorized access or industrial activity. This needs to be acted upon immediately so that future generations can enjoy what we have enjoyed and taken for granted all these years.
	I think our mines in this area have done an amazing job of recovery and I believe they are very concerned about environmental issues. I would hope the forest industry acts responsible for environmental concerns also.

Sample	Comments
	Working in the oil and gas industry, I have seen and travelled in the Robb, Hinton and Fox Creek areas. I have been concerned about all the land that has been cleared from forestry and wonder if that is where the most damage lies for the bear habitat. More and more wellsites are only accessed in the winter or by quad and I have seen some improvements in environmental preservation as new wells are built. (Thanks to govt regulations). What I cannot see improving is the number of trees removed. It changes: 1) the water table as more evaporation is imminent, 2) homes for animals and other biological life, 3) the amount of food and shelter from predators available, 4) many other factors too numerous to mention.
	I'm greatly distressed by the number of linear features (roads, pipelines, etc.) that crisscross our 'wilderness' areas. I believe industry needs to cooperate to reduce this
	Industrial sites in wilderness areas (rig camps) draw bears to a potentially fatal situation. There seems to be no government requirement to bear proof these camps. Garbage and human waste are often left on site where bears can access them. These grizzlies become "problem" bears that aren't tolerated.... More permanent human habitation, like camp grounds, golf courses and acreages will eventually forever drive grizzlies from that area. No one will tolerate a grizzly bear foraging for berries beside their new backyard. Never mind that this bear, and other bears before it, having been using these same bushes for decades. I would much rather see a cutblock in a wilderness area than a new ski hill, golf course, campground or acreage development.
	I have noticed more bears now than in my earlier years. I've also noticed in areas with heavy seismic activity, little if any bear sign. In my opinion it seems that the oil/gas exploration affects the bear population more so than logging.
	I am not against industrial activity as long as it is carried in a sustainable and controlled manner and mined areas are reclaimed. Areas that have been mined have proven by the great amount of wildlife both in active mining areas and reclaimed areas that a good job can be done. Forestry and gas exploration are much bigger threats as they cover bigger areas and must be done in a responsible way. Tourism is as big a threat to environment as any other industry. Uncontrolled expansion of urban centres gobbling up farmlands and wildlife areas is probably the biggest threat to wildlife and the environment.
Edmonton	I have seen much of the countryside in the Coal Branch. I believe it should not be open to forestry, mining or oil exploration or private interests of any kind. This area has its natural beauty and should be left natural and not for greed, money or profit of any kind.

Sample	Comments
	I find it very disdainful when I see all the clearcuts, like the Weldwood Mgmt area, all the cutlines and logging roads in the areas mapped here in. I have been to the Cadomin area once and seen the devastation of the mines and off shoot activities. We here in Alberta feel it is our God given right to exploit every inch of Alberta environment for our greed with little respect for the nature of our province.
	I think that it's a fine balance between getting tourism dollars into a region and allowing that tourism to have an impact on natural habitats. While controls on motorized vehicles will have a negative impact on a few tourism agencies, I think those losses are necessary to promote a sustainable tourism industry.

Comments about Access and Recreation

Fifty respondents wrote comments regarding access and recreation. Of these, ten were from Jasper, 28 were from the FtMF, and 12 were from Edmonton. The comments are consistent with the quantitative results, expressing serious concerns about access to grizzly habitat and support for limitations on access. Motorized recreation in particular is associated with negative environmental impacts and restrictions on this activity are generally supported.

Most of the Jasper respondents mentioned open roads and easy access to grizzly habitat as an important problem which must be addressed by limiting access or reclaiming industrial roads. Two writers specifically mentioned off-road vehicles, while one mentioned the danger of grizzlies being hit by a car.

The most common comment by FtMF and Edmonton respondents regarding access and recreation concerned the negative impact of off-road vehicles on grizzly bears and their environment. A smaller number of writers from the FtMF indicated that off-road vehicles do not disturb grizzlies or cause damage, while one writer called for new areas where off-road vehicles

could be used where they would not disturb grizzly bears. Other FtMF and Edmonton comments called for restricted access in general or more protected areas.

Sample comments about access and recreation

Sample	Comments
Jasper	Unlawful grizzly mortalities are primarily associated with nearness to roads, therefore strict measures must be developed to control road densities in grizzly habitat, and restrict access where appropriate.
	Access is a major major problem. Too many roads, cut lines, gas lines, power lines, access is pressure, pressure is bad. You don't want people walking or driving through your house all day; its upsetting to the whole family. Maybe build roads to extract resources but make them impenetrable when you're done. Service gas wells via helicopter. Heli-log. If you eliminated the ability to access these areas by road you would decrease human visitation by at least 90%. Problem solved.
FtMF	Motorized vehicles are another greed operated industry. The devastation of ATVs and 4x4s etc is disgusting and they should not be admitted into backcountry areas. Period!
	For the grizzly to even have a future, a secure habitat is not merely a dream, it is an absolute necessity!
	I am against closing off access to areas because of any needs. The land belongs to the public not a few grizzly bear researchers, or American owned forestry and oil and gas companies which already block off too much access.... Don't let the overblown need of grizzly bears add to this.
	ATVs and off-highway vehicles are destroying many pristine valleys, muskegs and marshy areas. Their use must be greatly reduced. It is impossible to police their use of ATV trails unless hikers and horseback riders are encouraged to report them (much like the "Report a Poacher" program).
Edmonton	if it has been found that there is a permanent residence of a grizzly, especially sow with cubs should consider closure. ATV users should require license and further public education which includes not only how to handle ATV but wildlife conflict considerations.
	I would like to see less land use by motorized vehicles including quads. More control of camping in forested area (ie., control of campfires and drinking, garbage, and general misuse of our environment).

Comments about Hunting

46 respondents wrote comments about hunting: 11 from Jasper, 25 from the FtMF, and ten from Edmonton. Most comments from all groups indicated that the grizzly bear hunt should be stopped. Many expressed concerns about hunting in general, trophy hunting in particular, and whether the current grizzly population could sustain the hunt. Several writers mentioned frustration that the Alberta government has not followed recommendations to declare grizzlies endangered and end the grizzly bear hunt. However, other writers supported the hunt. Several FtMF residents and one Edmonton resident consider a limited hunt a means to control the population or to increase the survival of young bears, by killing adult males. As well, some Jasper respondents supported allowing the hunt for aboriginal peoples only, for cultural reasons.

Sample comments about hunting

Sample	Comments
Jasper	Why would you kill a grizzly? Grizzly hunting should be illegal unless you're native and it's survival for you! Education is the key, there is too many red neck out there!
	Grizzlies don't stand a chance in Alberta as long as the Klein government refuses to listen to govt-appointed committee recommendations to classify grizzlies as threatened and stop all hunting of this species.
FtMF	Everywhere that the bear hunt has been cancelled has had bear problems. The bears are there if you look for them.
	I am ashamed that our provincial Premier and our Minister of Sustainable Resource Development in Alberta have chosen to ignore their own science regarding the recommendations to add the grizzly bear to the Alberta Endangered Species List. Even their own government "Grizzly Bear Recovery Team" recommended the grizzly bear hunt be suspended, but the 2004 hunt continued irregardless! Why pay for studies to choose to ignore the results and recommendations???
	There has been a lot of controversy in Alberta to close the grizzly bear hunting season. Then I ask why should we loose for the grizzly hunt, when that's not the problem. The problem with these bears is not hunting them, it is industrial greed that is taking place on what little habitat they have left.
	Hunting helps sustain manageable population levels and is necessary has been since the beginning of time. Grizzly bear hunting is aimed at the male population, which by nature are cannibalistic. Hunting them helps the survival of younger bears.
Edmonton	Hunting should not be stopped due to the possibility of over population.
	If grizzly bears are a threatened species, they should not be hunted period!

Comments about Communications and Education

Forty respondents wrote comments about communications and education: 12 from Jasper, 13 from the FtMF and 15 from Edmonton. Most respondents from all groups mentioned the importance of the general public being well informed in order to help make sound management

decisions, to accept necessary management practices, and to avoid human-bear conflict. Some writers called for public education specifically from bear biologists, Parks Canada or the FtMF, or on certain topics such as the positive and negative impacts of industry on grizzly bears. Some FtMF and Edmonton respondents called for education programs directed at students, particularly at an early age, to increase their awareness of grizzly bears and related environmental issues.

Sample comments about communications

Sample	Comments
Jasper	People should be shown aerial views of the area to convince them of the incredible impact the last few years has had on all of the foothills region.
	I think Parks Canada is improving their methods of public awareness. Although this past year, the focus seems to have been on wolves, elk and caribou, they are succeeding in public involvement.
FtMF	Public awareness is key to the success of any program of this nature. It would be nice to see the model forest network increase their profile, and better inform the general public (local and otherwise) of the programs they are involved with. Specifically, it would be nice to know how the professionals (biologists/ecologists) at the model forest feel about issues such as oil/gas, mining and forestry activities and their impact on the region, from a scientific/factual point of view. Perhaps a more active (rather than passive) public awareness campaign is needed.
	Education is very important and if the public sees through cameras or experience what a jewel we have then maybe more will be done by the govt to preserve habitats.
Edmonton	3 years ago my family and I, while visiting Jasper and Banff saw several grizzly bear info centers set up. My kids were able to touch a bear skull and fur pelt. The park was using animals killed by poachers as well as animals that had to be put down because of being dangerous to humans. This has touched my daughter deeply.
	The public should be informed on the dangers whether it be pamphlets handed out entering our parks or signs in these areas. Most tourists aren't taught enough, and feed the bears thinking they won't attack of you have food. The public needs to learn to respect the grizzly territory.

Comments about Poaching

22 comments were received about poaching: six from Jasper, 12 from the FtMF, and four from Edmonton. Many called for increased fines or jail terms for poachers, while others called for more resources to catch poachers. As well, some writers expressed dismay that people would poach grizzly bears; several FtMF residents wrote about Mary and her cubs, and their disappointment in her death.

Sample comments about poaching

Sample	Comments
Jasper	I am glad that poaching comes with sever consequences, but I think there is always room for improvement. Steeper fines and longer jail time could be implemented to hopefully deter more poachers.... I strongly feel that if the presence of governing authorities in the backcountry were increased on a continual basis, that the number of poached animals would drop.
FtMF	We all watched Mary and were proud of her and her new cubs and were totally disgusted when her life was taken by a gun.
	I believe the #1 reason for declining grizzly population are the idiots everyone knows as poachers.
Edmonton	More money is needed to ensure we have more park rangers with more power to access fines and help prevent damage to our ecosystem.

Comments about Stakeholders

85 respondents wrote about stakeholders: 29 from Jasper, 28 from the FtMF, and 28 from Edmonton. Many respondents from Jasper and Edmonton expressed concerns over the provincial government's handling of grizzly bear management, such as the reluctance to declare the grizzly endangered and a perceived unwillingness to invest in conservation and protection programs. Another common sentiment from Jasper and Edmonton respondents was that industry

has profit as its primary objective and therefore should not have too much influence over grizzly bear management. Both these sentiments were also present in the FtMF comments, but were less common. FtMF writers were more likely to express the feeling that outsiders and environmental groups should not have influence in decision making. Ten writers indicated these groups should have no influence as they are seen as unaffected by grizzly bear management in the FtMF, or as not credible. The need for many stakeholders to collaborate to find a balanced and effective approach to grizzly was also commonly expressed by all three groups. Other common comments included the importance of sound science and the input of biologists and ecologists to finding effective solutions (especially among Jasper respondents), frustration over the imposition of the will of outsiders on local residents (FtMF residents), and confidence in professional wildlife and park managers (especially among Edmonton residents).

Sample comments about stakeholders

Sample	Comments
Jasper	I don't trust the Alberta provincial government as it has a "this province is for Albertans to use" mentality. Nor are loud mouthed single minded environmental groups very helpful. We need good biological studies and then need to act on them. "Stakeholders" need to stand down to the bears' needs not steer management so that their interests compromise the long term viability of the grizzly.
	A collaborative working group is generally the best approach for most organizations trying to change behaviour of certain user groups. Involving representation from all user groups in the decision-making process results in decisions everyone can live with. Closures and banning certain groups generally results in little changed behaviour. Although we may all not agree on certain uses in an area, we must allow all concerned to have input in any type of restrictive change.

Sample	Comments
	I perceive provincial (Alberta) government biologists to be knowledgeable and competent to develop programs to ensure grizzly bear conservation for a sustainable future, but I perceive political interference is a significant barrier to advancing grizzly bear population.
	I do not believe any groups should have any more influence than another groups in grizzly bear management. I think it is important however that those most involved should be very educated/informed on the issues facing grizzly bear management. For example there can be just as many uninformed persons in environmental groups as there are hunters or ranchers. I also think it is important that all of the groups listed have an equal say so that a variety of voices and viewpoints are heard. Basically, do not allow the uninformed to have any involvement in decision making as difficult as this may be.
	Who speaks for the grizzlies, some environment groups think they are speaking of behalf of myself or there members, some industry types say what there doing is ok. We all know they are more interested in bottom lines and corporate image.
FtMF	What angers me most however is 'city people' who are not facing job losses expressing their opinion on my community. Without any respect or consideration for the devastating blow mine/forestry closure have on the families and communities that depend on the income/economy. To these people I say "OK, you quite your job and then come and tell me that its OK to devastate my neighbours' lives for the sake of the environment."
	All forms of industry whether it is forestry, oil and gas, mining and even tourism are greedy! Their greed and profit margins are always their priority when making decisions and none should have influence on decision making when the environment is concerned. When $ are removed, only then is a person objective.
	I think it is easy for environmental groups to verbally attack industry when it comes to developing in bear habitat (ie mining). I would have more respect for the environmental groups if they did more pro-active things. Ie help to discourage the legal and illegal shooting of all bears.

Sample	Comments
	I realize it would not be possible to implement a grizzly management program in the Model Forest without the input of mining, forestry and oil and gas concerns. I do not believe, however, that they should have any real power in the decision making. A public forum could be held to rate concerns or ideas, but the majority of the public does not know enough to make good decisions concerning grizzly bears or their habitat. Professional consultants should be used for information or implementation only. The final decisions can only be made by a public body of gov representatives. If in that case the decisions are wrong there are more checks and balances. The grizzly bears are a natural resource, we cannot let private interests of any concerned group determine their future.
	Provincial Governments have the best understanding of the needs of Alberta. I doubt that 5% of the people in Ottawa know the difference between a polar bear and a grizzly bear. This is a provincial matter. Ultimately the people must be heard. It is the professionals responsibility to educate the public and then listen to all the stakeholders for direction.
Edmonton	Increased public involvement may lead to more pressure being put on industry and government to think more about nature and the environment, than the dollar or mineral/timber lease value.
	I believe that industrial interests, forestry, mining and oil-natural gas, are already overwhelmingly represented through the influence they wield over our provincial government. Their environmental record is dismal and I do not trust them in these matters at all.
	I expect it is going to be a challenge to save the grizzlies even if the management of this task is handled by those who care to save them. Very little hope of success if managed by people with a conflict of interest, whether these be in the 'public sector' or in 'professional managements' areas. The key question is the goal of the 'management' whether it is to save the grizzlies from extinction or to 'manage' them so they don't interfere with people
	I remember with love the many evenings spent with park naturalists at the campground amphitheatres, being educated about the parks and wildlife. These people helped forge a deep respect and protective urge for bears in me.... It is those people I want making decisions in grizzly bear management. Not people in offices removed from the land of the grizzly bear.
	ENGOs (Environmental Non-Government Organizations) should have a lot more influence in decisions regarding forestry management and grizzly bear habitat.

Comments about Balance

64 writers gave comments about the appropriate balance between meeting the needs of humans and the needs of grizzly bears. Of these, 13 were from Jasper residents, 35 from FtMF residents, and 16 from Edmonton residents. A majority of Jasper and FtMF respondents indicated the need for balance between development and habitat conservation. Vigilance is necessary to regulate human use, but extreme positions should be avoided. FtMF respondents often indicated that this balance has been achieved. Several Jasper respondents and one FtMF writer indicated that the needs of bears should be the primary consideration in land management decisions. These writers often indicated that humans are causing the problems and that humans must accept the consequences or limitations of living in grizzly habitat. On the other hand, several FtMF respondents wrote that humans needs must be the priority. These writers often indicated that industrial development must continue in order to maintain the economy and human standard of living, that humans and bears were not created equally, and that grizzly bears will adapt to human activities. The sixteen Edmonton writers were evenly split between the balanced, grizzly first and human first positions.

Sample comments about balance

Sample	Comments
Jasper	Finding the solution for all sectors of our community to enjoy this great resource is the challenge. It certainly won't be easy, but don't lock it away. That benefits no one, in the long run, and I believe the grizzly needs us as much as we need him there.
	Anyone who lives in bear country must give bears their place... move or accept your losses minimize your human affairs and respect bears required behaviour. We more often than not are the problem. Not the bears!

Sample	Comments
	We need to promote a sustainable and healthy grizzly bear population even if it means regulating human use.
FtMF	As a resident of a community that depends on resource industry, I know only too well that need to create balance between the environment and employment. I do not want to lose industry in our area but at the same time, I am often disgusted by the blatant disregards and lack of respect for the beauty that surrounds us.
	In my opinion Hinton and area is a great example of industry and government working together to ensure viable wildlife populations of all species. The fact we had enough extra wolves in our area to export some to the United States is proof that its not as bad as some special interest environmental groups would have us believe. A recent drive down to Cadomin from Hinton I saw approximately 25 bighorn sheep rams, 1 3 yr old grizzly, 2 spiker mule deer, and one cow moose all on mine property. Is there a problem for wildlife to co-exist with industry? I think not.
	I think that it is more important for humans and industry to survive than bears. Although I do not wish any animal extinction I do not think that we should shut down industry and our town for survival. They will survive and adjust as they have in the past.
	I have worked in the mining industry for over 32 years and dealt with grizzly bears for all these years. We have never had problems. We have learned to co-exist.
	I strongly believe that humans have souls and animals do not. I don't believe in cruelty to animals but I don't believe in worshipping them either. We are not and were not created equal.
	It is difficult to make decisions between jobs and nature. The economy of our province is very important and one can see this by the # of people that have moved here from other provinces. We need to strike a reasonable balance between the future of our children and the future of our wildlife. I believe industry needs to be monitored to ensure that all possible considerations are made to protect that wildlife of Alberta.
Edmonton	The grizzly bear (and maybe the wolf) are so dependent on a large unspoiled habitat that this should be the priority for their survival. These great creatures should come first in all decisions on land use. When they are gone from an area it is a great loss for all.
	We need industry, roads and recreation but not at the total expense of nature.

Sample	Comments
	When it comes to help in between humans and animals we should prefer humans.

Other Comments about Bears

88 respondents wrote other comments related to grizzly bears. Most commonly, these expressed the value writers placed on grizzlies and expressing concern or hope for their future. Often these comments expressed the ecological, existence or spiritual value of bears. Other common comments included descriptions of the writers' experiences with grizzly bears, the feeling that there are lots of grizzly bears in the FtMF, or the opinion that humans should leave bears alone and not try to manage them. Other comments were wide-ranging. Some examples include comments touching on grizzly relocation, grizzly research, their lack of knowledge or their desire to learn more about bears, and their fear or lack of fear of bears.

Sample of other comments about bears

Sample	Comments
Jasper	After living for many years in the Canadian Rockies I am embarrassed to admit how little I know about these magnificent animals but I am concerned for their welfare and pleased that serious research is done.
	I believe grizzly populations in protected areas in the Rocky Mountains of Alberta are not self-sustainable, without the capability of the industrial forest/foothills to also sustain grizzly bear populations.
	Present counts are inaccurate and breeding females may be "more threatened" than adult males. I worry about genetic inbreeding and its potential impact on the future of grizzly bears in the Canadian Rockies.

Sample	Comments
	I think if you look at places like Europe and parts of the USA you can see our future unless we start being proactive instead of reactive. In many of these places you will never see any type of bear in the wild and would be fortunate in many European countries to even see an ungulate such as a deer.
FtMF	I think the grizzly population is doing good right now. Every year we see between 10-50 grizzlies. One year we seen more grizzlies than black bears. That tells me something.
	The bears are an important part of Alberta's wildlife.... The bears should also be left alone to live in peace in their natural habitat.
	Bears that come into towns and harm people may have to be destroyed. Bears that attack people in forest areas around these areas should be relocated and bears that attack people in remote bear areas should be left alone. If people want to intrude in the bear's domain, they can live by nature's rules.
	There are many more grizzlies now than there were several years ago. I photograph them on a weekly basis. We even had a nice white griz cub hanging around. 2 year old cubs have wandered around town, not scared of people or barking dogs. Last week a mother griz took down a lamb (bighorn sheep) and we watched as her and her cub devoured it. A coyote sat by patiently on a knoll occasionally trying to get his share but was promptly chased away by the mother.
	I believe we have to stop encroaching on the grizzly bears. They are one of the most beautiful and most wild of our animal habitat on earth. They're more significant than that damn beaver is.
	I watch the Grizzly Bears Throw my Living room window They move through Cadomin Spring & Fall
Edmonton	Grizzlies are an important part of our environment. Let's do everything we can to protect them.
	Since I moved to Alberta some 13 yrs ago, I have never gone hunting or fishing fore fear of grizzly bear attack. In my opinions they should "only" exist in captivity.
	I believe the grizzly is a very important part of our system and should be protected so they can continue to survive and be healthy but they must be kept in balance so they don't overpopulate an area proper balance.

Sample	Comments
	A healthy grizzly bear population is very important for our planet and I am tired of big business getting their way when it comes to development in the environment.

Comments about the Survey

110 respondents wrote comments about the survey itself. Of these, by far the most common comment (42 respondents) was appreciation for the opportunity to participate and voice their opinions on grizzly bears and their management. Other common comments included a desire for more information or anticipation of seeing the results, positive comments on the survey and the FtMF's grizzly bear research, and questions about how the results would be used or pessimism about whether the survey would make a difference. About a dozen negative comments were also received, indicating the survey was too long, suggesting the survey was biased or raising concerns about individual questions.

Sample comments about the survey

Sample	Comments
Jasper	When I am asked for my input, I happily oblige I it will improve the possibility of a health wildlife population. I hope you have a healthy response to your research efforts and that they are helpful in the planning of management in the Foothills Model Forest.
	I look forward to seeing the results and further information on the project.
	It's difficult to answer questions about management decisions for grizzly bears only in the model forest without thinking more broadly about decisions in Alberta and BC. Bear conservation is much bigger than just the model forest.
FtMF	I wish you would have included a brochure or pamphlet giving us some FACTS about the grizzly bear. Instructions could have been to read after completing the survey. It was a good opportunity to educate the public!

Sample	Comments
	It seems to me many surveys or research is done which spends a great deal of money, but we hear no more about the situation. I am not against obtaining information, but why not have a plan as to what will be done, then use the money to see if the original idea is on the right path and perhaps gain ideas to help with the goals. In my opinion, the questions in section 3 reflect a subjective or personal bias of the person who wrote the questionnaire. All other sections appear fair and objective.
Edmonton	Some questions were difficult to answer yes or no to but rather a short answer would have been better. This was an issue I had never heard of prior to being contacted about the survey. Thank you for allowing me to express my views.

Other Comments

64 people wrote other comments. Most often, these expressed general pro-environmental values. Other comments touched on certain environmental management issues, such as wildlife protection, habitat conservation, prescribed burns and forest fires, and water management.

Sample of other comments

Sample	Comments
Jasper	It is time for humans to realize a few things otherwise we are going to pay the big price. · Overpopulation · Taking over animal's territories · Gas industry has to stop or change their philosophy · We will have to reduce our consumption · Be more involve socially and stop thinking only for ourself.

Sample	Comments
	Why does the FtMF plan to "avoid core areas of caribou use" in the short term? What about the long term? After all, aren't we supposed to be addressing whole ecosystems and their long term sustainability?... Your objective with respect to climate change is stated as "to produce better estimates of timber yields and annual allowable cuts." Why not try to contribute to decreasing the effects also? Such as using less fossil fuels for logging, less logs cut, every single log cut to be replaced. No, it's all related to the bottom line. That's why it's all greenwash and I don't trust the FtMF. It's just about how to facilitate and appease the public.
FtMF	Before humans this must have been a most beautiful perfect co-existence with plant and animals. The native community had an impact on any nature but I think had a more co-existence than any that followed. Our society is more into self-gratification than harmony with nature as we know it. The rain forests, deserts, glaciers, oceans we are far too many to allow these to self survive I am sure. We pass the buck to the next generation to fix I pray they can.
	I live in _____ and one of the major benefits of living here is nature. Both in the town and its surroundings. Born in _____ but only animals (mostly) were in the zoo. Here both in the town and on my daily walks to work have the good chance to confront deer, elk, black and grizzly bears, wolves, coyote, lynx. What more could you ask for?
Edmonton	I believe and I live according to a philosophy that all living things have a right to exist in nature. This without encroachment by humans. When we put species in peril through negligence, or through misuse of resources, or through the raping of nature, we must amend our ways. When we do not, we and/or future generations will suffer and regret ill-advised decisions.
	Anything that can be done to protect nature so that it will be there for generations to come is good.