Forest Social Values and Management Preferences of Campers in the Foothills Model Forest

Bonita L. McFarlane
Department of Rural Economy
University of Alberta

Peter C. Boxall
Canadian Forest Service
Northern Forestry Centre

January 1998

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Acknowledgments

The authors thank the staff of William A. Switzer Provincial Park and Alberta Environmental Protection and the private contractors operating the campgrounds for their cooperation and assistance with the study. The technical assistance of Jeannette Corbett, Mandy Fisher, Nicole Witwicki, and Bob Zalitach is greatfully appreciated. Funding for this project was provided by the Foothills Model Forest, the Sustainable Forest Management Network Centres of Excellence, and the Socio-economic Research Network of the Canadian Forest Service.

Executive Summary

The Foothills Model Forest (FMF) philosophy is to develop approaches to resource management that include a diversity of social values (Foothills Model Forest 1997). This requires identification of stakeholders, their values, and how they will be affected by natural resource management decisions. A study of campers using the FMF was initiated in 1995 to provide baseline information on campground use, user characteristics, the economic value of camping, and to examine campers' forest social values and management preferences. The study was used as a pilot project for the development of forest values and attitudes scales that will be used in future studies of the general Alberta population. This report provides preliminary analysis of forest social values, attitudes toward forest management, knowledge of basic forest-related facts, campground management preferences, and socioeconomic characteristics of campers.

On-site interviews and mail surveys were used to collect data from campers who stayed at managed and unmanaged (random) sites in the FMF. Forest social values were measured using a rating scale that reflects: 1) the utilization of forests for human benefit, referred to as human-centred values, and 2) the inherent worth of forest regardless of their usefulness to humans, referred to as bio-centred values. Attitudes toward forest management and preferences for facilities and services at Provincial Recreation Area (PRA) campgrounds were measured using rating scales used previously in a study in the nearby Rocky-Clearwater Forest of Alberta. True/False questions were used to examine knowledge of basic forest-related facts.

Campers tended to be bio-centred in their forest values suggesting they value the intrinsic worth of forests. While most campers do not seem to be opposed to using forests for human needs, they do not agree that human needs should be the primary goal of forest management.

A ***minority*** of campers agreed with attitude statements that reflect successful sustainable forest management in Alberta:

- 28% agreed that forests in Alberta are being managed successfully to meet present and future needs
- only 11% agreed that forestry practices produce no long term adverse effects on the environment
- 21% agreed that enough harvested trees are being replaced to meet future timber needs

A ***minority*** agreed with traditional types of forest management objectives such as economic development:

- only 7% agreed that providing jobs and economic development is more important than setting aside forests from logging
- 14% agreed that setting aside forests is not desirable if it means lower wages and fewer jobs
- only 5% thought that the forest should be managed mainly for timber and lumber products
- 10% agreed that economic benefits from forestry usually outweigh any negative consequences
- 10% agreed that economic stability of communities is more important than setting aside forests from logging

Most (63%) agreed that logging forests is acceptable if the forest is not harmed and 55% agreed that when making forest decisions, the concerns of communities close to the forest should be given a higher priority than other communities.

A ***majority*** agreed with most statements reflecting protection types of management strategies:

- 87% agreed that legislation should be established to protect endangered species
- 90% agreed that forest management should emphasize a variety of plants and animals

While only 3% agreed that some existing protected areas should be opened for logging, 45% agreed that representative examples of Alberta's forest regions should be excluded from development such as forestry, oil and gas, and tourism.

These results suggest that campers are supportive of a holistic management approach like the ecosystem management paradigm proposed by the FMF. Most respondents seem to have basic knowledge of forest-related facts.

Campers were ***not in favour*** of facility or services requiring further development at PRA campgrounds. Facilities requiring a high level of development were rated as undesirable:

- 87% rated fast food stands as undesirable
- 84% rated hotels or motels as undesirable
- 77% rated commercial lodges as undesirable
- 53% rated stores selling camping supplies as undesirable

Items requiring little development were rated as desirable.

- 86% rated maps of recreational opportunities in the area as desirable

- 74% rated facilities for other activities such as hiking, fishing, or biking as desirable
- 58% rated security patrols as desirable

Bundles of firewood for sale was rated as desirable by only 19% of respondents whereas higher camping fees and free firewood was rated desirable by 43%. This suggests that campers prefer to have the cost of firewood included in the camping fee. Overall, 80% of campers were satisfied with publicly owned campgrounds in the Hinton and Edson area. Sixty percent of respondents thought that campgrounds located on public land in the Hinton and Edson area should be owned and operated by the provincial government, 35% thought they should be owned by the provincial government and privately operated, and only 5% thought they should be privately owned and operated. This suggests that campers in the FMF favor a semi-primitive camping opportunity, with minimal facilities and services at PRAs, and are not in favor of the privatization of campgrounds located on public land.

Two segmentation analyses were performed to identify subtypes of campers. The first, based on camping experience and commitment, identified 5 subtypes: Veterans, Loyalists, Regulars, Escapists, and Beginners. Veterans are characterized by their many years of camping experience; Loyalists are primarily repeat visitors to the same camping area; Beginners are relatively new to camping and do not find it particularly enjoyable; Regulars are experienced campers who camp regularly but are not particularly loyal to any one campground; and Escapists are very similar to Regulars except that camping primarily provides them with escape from everyday problems.

Differences were observed among the segments on forest social values, management preferences, and some socioeconomic characteristics:

- The Beginner or Regular groups were not as bio-centred in their forest values as the Escapists or Veterans.
- Beginners or Regulars identified more strongly than Escapists with several human-centred statements.
- Escapists tended to agree less than Beginners with attitude statements relating to the sustainability of current forest management but identify more strongly with statements relating to protection-oriented management.
- Beginners tended to be more in favour of some traditional types of forest management than Regulars or Escapists.
- Although Beginners were generally not in favor of increased development at PRAs they tended to be more tolerant of facilities and services rating showers, flush toilets, lodges, and hotels or motels as more desirable than Loyalists, Regulars, or Escapists.
- Loyalists and Escapists tended to be the least tolerant of development at the PRAs.
- Regulars tended to be younger and had higher household incomes than the other groups.
- Loyalists tended to be the oldest, were the least educated, had the lowest household incomes, and had the lowest proportion of Edmonton and Calgary residents.

- Veterans and Loyalists had a high proportion of local residents, with 50% and 72%, respectively.

The second segmentation analysis, based on forest social values, identified 3 segments: Bio-centred, Human-centred, and Moderates. The segments can be arranged on a continuum from the most to the least bio-centred. The Bio-centred group consisted of the most bio-centred respondents, the Human-centred group the least, and the Moderate group was between these two extremes. Differences were observed among the segments on management preferences and socioeconomic characteristics:

- The Bio-centred group tended to be younger, had a larger proportion with a university education, and almost half of the members live in Edmonton or Calgary.
- The Human-centred group was the least educated (24% had a university education) and had the lowest proportion of Edmonton or Calgary residents (28%).
- The Bio-centred group consistently agreed more with statements related to protection type of forest management strategies than the Human-centred and Moderate segments and agreed less with statements related to the sustainability of current forest management and traditional types of timber management.
- The Bio-centred group was less tolerant of development at the Provincial Recreation Area campgrounds and privatization of campgrounds on public land than the Human-centred and Moderate groups.

This study has provided the first analysis of forest social values and management preferences of a stakeholder group using the FMF landbase. Results suggest that campers support a holistic approach to natural resource management that considers multiple values and does not emphasize jobs and economic development. These recreationists in the FMF represent a range of values and preferences. Those with the most camping experience and those who hold bio-centred forest values tend to be the least tolerant of traditional types of forest management and development at campgrounds, suggesting that subtypes of campers will be affected differently by changes in forest or campground management. This study identifies some communication opportunities for the FMF such as demonstrating research activities and innovative management techniques and providing information at campgrounds to convey FMF activities that are contributing to sustainable forest management.

Future analysis will include a comparison of the forest social values of campers with other stakeholder groups such as hunters and the general Alberta population. To understand and to predict how segments of society or recreationists will react to management actions and identify target audiences for communication efforts à multivariate analysis that examines variables influencing values and preferences will be performed.

Introduction

The Foothills Model Forest (FMF) is one of ten Model Forests established across Canada in 1992. The philosophy of the FMF is to develop approaches to resource management that include a diversity of social values (Foothills Model Forest 1997). This requires identification of stakeholders, their values, and assessments of how they will be affected by natural resource management decisions. The goal of this study was to examine one user group of the FMF and assess their forest social values and management preferences. The study also served as a pilot project to develop forest values and attitudes scales for use in future studies of the general Alberta population.

One of the most obvious and traditional stakeholder groups are the direct users of the resource. A study was initiated in 1995 to examine recreation use in the FMF. Camping was chosen as an indicator of recreation use because of its prominence in terms of the number of users, distribution throughout the model forest landbase, and because campers generally engage in multiple recreational activities such as fishing and hiking while staying in the forest (McFarlane et al. 1996). Previous studies (McFarlane and Boxall 1997; McFarlane et al. 1997) showed that over 24,000 people camped at managed campgrounds outside of Jasper National Park and camping parties spent over 16,000 nights in the FMF during 1995. These campgrounds generated estimated direct economic benefits of about $436,600 in 1995. Campers engage in a variety of summer and winter recreational activities such as hiking, fishing, hunting, off-highway vehicle use, and wildlife viewing throughout the model forest and generally do these in close proximity to industrial activities. These findings suggest that campers constitute an important

stakeholder group in the model forest and their forest social values and management preferences should be an important consideration in natural resource management decisions.

The camping study was divided into three phases. In Phase I data were collected from camping fee permits and provided baseline information of the level of campground use, spatial and temporal distribution of use, and estimates of the economic value of camping (McFarlane and Boxall 1997). Phase II involved on-site interviews with campers to determine their recreational activities while camping in the FMF and visitation characteristics such as length of stay and familiarity with the area (McFarlane et al. 1997). Phase III consisted of follow-up mail surveys administered to respondents of the on-site interviews to determine forest social values, management preferences, knowledge of forest-related facts, and socioeconomic characteristics. This report presents preliminary results from Phase III. Specifically, we surveyed campers at managed and unmanaged (random) camping areas in the FMF and examine their forest social values, preferences for forest and campground management, basic knowledge of forest-related facts, and their socioeconomic characteristics. Our goal was to understand how diverse these forest users are in terms of these variables. As a result of this inquiry we create two subtypologies of campers: one based on camping experience and commitment to camping and the other on forest social values.

Changing Values

Since the arrival of the first Europeans, forest management in North America has focused primarily on timber production and economic development (Kimmins 1995). Initially, the forests were exploited for their timber with little regard for other uses of the forest or future timber

supply. By the beginning of the twentieth century, foresters were realizing that the rate of deforestation was considerable. The concept of sustainable timber production was introduced in North America by foresters such as Bernhard Fernow and Gifford Pinchot (Kimmins 1995; MacKay 1985; Nash 1982). More recently, the increased demand for a diversity of forest products and services has led to the introduction of a new forest management paradigm. This paradigm has been referred to by many names (Bengston 1994), but in Canada integrated resource management or ecosystem management seem to be the most common. In this paradigm the emphasis is not simply on sustainable timber production. Rather, it purports to be responsive to other social values such that biological and social systems are managed sustainably (Bengston 1994).

In Canada, the Model Forest Network was initiated in 1991 as a mechanism to help define and implement the concept of sustainable forest management. The model forest program recognizes that in order for ecosystem management to be successful it must include forest social values. Traditional economic values, particularly as they relate to the value of timber production, have been the dominant values considered in ecosystem management (e.g., the number of jobs and economic impact of forestry activities). However, to be responsive to forest social values and to sustain social systems, ecosystem management must formally incorporate a diversity of values and be responsive to how such values change (Bengston 1994). Broadening the range of values considered in forest management is a major challenge facing natural resource managers and is an integral component of the model forest program. To broaden the range of forest social values, managers and policy makers must address four fundamental questions: 1. What values should be included? 2. Whose values should be considered? 3. How can these values be used in natural

resource decisions to enhance sustainable forest management? 4. How can conflicting values and preferences be accommodated in natural resource decisions?

What are Forest Social Values?

Each academic discipline (e.g., economics, sociology, psychology, etc.) uses different definitions and takes different approaches to studying values. Bengston (1994) suggests that values should be examined using several approaches because each has a unique contribution to make in understanding the diversity of values. This multi-disciplinary approach has been taken in the FMF socio-economic program. Previous socio-economic studies in the FMF have involved economic valuation (market and non-market) (e.g., Alavalapati et al. 1996; McFarlane et al. 1997) and sociological approaches to valuing natural resources. This study takes a social-psychological approach to examine forest values associated with the FMF.

Values, as used in this study, represent the fundamental elements in a person's belief system. These values are the basis of an individual's attitudes and preferences and are very stable and difficult to change. These forest values are referred to as held values and have been defined as "relatively enduring conceptions of the good related to forests and forest ecosystems" (Bengston 1994). Although held values are stable and difficult to change in an individual, in society these values evolve and change over time. Aggregating individual values and tracking these over time provides an indication of changing societal values.

Two basic types of held forest values have been distinguished in the literature (Fig. 1). They have been referred to as instrumental and intrinsic (Bengston 1994), instrumental and non-instrumental (Xu and Bengston 1997), and anthropocentric and biocentric (Steel et al. 1994).

Instrumental or anthropocentric values refer to those values associated with the utilization of forests for products and services that satisfy human wants and needs. If human-centred values dominate natural resource management then forests could be defined in terms of the resources they provide for humans such as forest products, employment, and life support functions. In our study we refer to these as human-centred values. Intrinsic, non-instrumental, or biocentric values refer to the worth of something as an end in itself regardless of its usefulness to humans. Included in these are spiritual, aesthetic, and existence values. Nature is recognized as having inherent worth and a right to exist for its own sake and human uses and benefits are not necessarily the most important uses of the forest (Steel et al. 1994). In our study we refer to these values as bio-centred values.

Historically, bio-centred values have received much less attention and legitimacy in forest management than human-centred values. However, it is the bio-centred values that are increasing in importance in our society (Xu and Bengston 1997) and have led to conflict between land managers and other stakeholders. The lack of understanding and incorporation of these values in forest management has manifested itself in public protests against traditional forms of management and legal action against the forest industry. People whose value orientation is primarily bio-centred may become more involved in forest issues because of the threat of loss of something for which they perceive as having no substitutes (Xu and Bengston 1997). In order to make forest management more responsive to a broad range of social values and thus, increase social acceptability, it is essential to increase our understanding of the bio-centred values of various stakeholder groups and to monitor these values over time (Bengston 1994).

The forest social values discussed above are not mutually exclusive. Rather, the dichotomous classifications have been arrayed on a continuum with human-centred at one end and bio-centred at the other and individuals segmented into subgroups based on having more of a human-centred or bio-centred orientation towards forests (Steel et al. 1994).

These value orientations or subgroups have been associated with forest management and policy preferences by a number of researchers. Bio-centred individuals are more likely to oppose traditional timber management objectives than human-centred individuals (Steel et al. 1994). Certain segments of society have been associated with particular value orientations. For example, some studies show that women are more concerned about the environment (Jones and Dunlap 1992; Mohai 1992) and hold stronger bio-centred values than men (Steel et al. 1994). Individuals with higher levels of education are more likely to express greater environmental concern (Jones and Dunlap 1992) and hold bio-centred values (Steel et al. 1994). Age has also been associated with environmental attitudes with younger individuals having more pro-environmental attitudes and being more bio-centred (Jones and Dunlap 1992; Steel et al. 1994). Individuals who are associated with interest groups may hold divergent forest social values. For example, people who rely on the forest sector for their economic livelihood are more supportive of providing commodities for human use and managing forests for timber production. People belonging to environmental organizations value forests for their intrinsic value and are more supportive of protection type management strategies (Steel et al. 1994). This suggests that forest social values can be used to segment people based on their value orientations. Certain socioeconomic characteristics might be associated with these value orientations or subgroups and may be used to

predict how segments of society or individual stakeholder groups will react to forest management activities and policies and to identify target audiences for communication programs.

Differentiating Stakeholders

An ecosystem management approach includes "public involvement" to determine the values of importance to society and acceptable forest management strategies to achieve or support those values. Traditionally, public natural resource managers and the forest industry were the primary stakeholders who determined what values were in the public interest. However, in Alberta most forested land is publicly owned giving each citizen a legitimate voice in its management. There are many potential publics and stakeholders in the management of public lands. Whose values should be considered in forest management requires an understanding of who these stakeholders are. Some common mechanisms for public involvement have included advisory committees, open houses, petitions, personal letters, form letters, and workshops. However, these mechanisms have been criticized because they often elicit input from elite members of society or interest groups who may not be representative of other stakeholders (e.g., Dennis 1988; Force and Williams 1989; Heberlein 1976). One group of stakeholders whose values should be considered but might not participate in traditional public involvement mechanisms, are people who are direct users of the forests for non-industrial purposes such as recreation.

Understanding recreationists' values is important because recreationists often use forested areas that are in close proximity to industrial activities. Participation in various types of recreational activities has been associated with divergent views on the environment (Jackson

1986; Van Liere and Noe 1981) and natural resource management (Jackson 1987). For example, people in Alberta who prefer appreciative activities such as hiking tend to be more supportive of resource preservation than people who prefer mechanized activities such as snowmobiling or consumptive activities such as hunting (Jackson 1987).

In addition to differences among participants in different activities, there may be subtypes or segments of participants within an activity that also hold different social values in relation to natural resource management. One aspect of recreation that may be associated with values and may be used to distinguish subtypes is the amount of experience an individual has with an activity. The concept of recreation specialization is one means for examining experience.

Specialization theory suggests that participants in an activity can be segmented based on the amount of experience they have and their psychological attachment or commitment to the activity (Bryan 1977). One aspect of this theory relevant to natural resource management is the potential shift in an individual's values as participants become more protection-oriented. Specialized individuals have been shown to exhibit a greater concern for conservation by preferring less management intervention and manipulation of the resource than their less specialized counterparts. For example, campers in central Alberta who are most familiar with an area and those with the most camping experience were the least supportive of traditional forest management and increased campground development (McFarlane and Boxall 1996). Studies examining participants in other activities such as fishing (Bryan 1977), backcountry hiking (Virden and Schreyer 1988), and vehicle-based camping (McIntyre and Pigram 1992) have also found that as experience in an activity increases participants prefer less management intervention and more natural environments. These findings are relevant to natural resource management in

the FMF because participants within an activity may represent a diverse group of stakeholders. They may also hold differing forest social values and may be affected differently by natural resource and campground management actions.

Relevance of Values Information

While scientific information can inform natural resource management decisions, it is the values of society that guide which scientific facts are relevant and important (Steel et al. 1994). Bengston (1994) outlines three ways in which values information can guide management decisions. First, values information helps managers establish forest management goals and strategic guidelines. By understanding the relative importance of the values of stakeholders, managers can develop goals that satisfy or support social values and be able to justify goals and guidelines. Second, knowing values of various stakeholder groups will help managers predict how stakeholders will react to management practices and what groups will be positively or negatively impacted by changes in management. Third, values information can help in dealing with conflicts over forest management through an improved understanding of the nature of the conflict. For example, are there differences in the fundamental values of the stakeholders involved or is the conflict over something that is more easily resolved such as differences in how to manage for a particular forest value? Values information does not provide a right answer. It is a tool that helps guide management decisions by providing an indication of what management actions are socially acceptable, which stakeholders will agree or disagree with these actions, and the potential impact of actions on stakeholder groups.

Methods

The Survey

At the time of this study, the FMF consisted of about 2.3 million hectares situated in the foothills and Rocky Mountains of west-central Alberta and was comprised of primarily publicly owned land. Jasper National Park joined the model forest in 1995 and Willmore Wilderness Area was included in 1997, after this project was initiated. Therefore, recreationists in these areas are not included in this study. The majority of the model forest outside of Jasper National Park and Willmore Wilderness is public land administered by the Province of Alberta and is managed for multiple use.

Personal interviews were conducted with Alberta residents at 10 Provincial Recreation Areas (n = 805), William A. Switzer Provincial Park (n = 354), and random camping areas (n = 277) during the summer of 1996. Details on the on-site interview procedures can be found in McFarlane et al. 1997. Of the 1436 campers interviewed, 91% (1307) agreed to participate in a follow-up mail survey. One person from each camping party was interviewed. An additional 132 campers who were members of the camping parties interviewed but who did not complete the on-site interview expressed an interest in completing the mail survey. These campers were added to the mail list resulting in a total sample of 1439 individuals.

Because of the amount of information we wanted to collect and the concern of response burden, two surveys were designed. The first survey collected information on camping trips in the last 2 years, campground management preferences, satisfaction with campground management, and knowledge of basic forest-related facts. The second survey collected information on camping experience and commitment, forest social values, attitudes toward forest

management, and socioeconomic information and was sent only to those who returned the first survey (n = 1083). The second survey also contained a choice experiment in which respondents were asked to make trade-offs among various campground management attributes (see Adamowicz et al., in press for a description of this methodology). The choice experiment will be used to develop a computerized decision support system (DSS) of camping site choice behavior and examine economic values of camping in the FMF. The DSS and accompanying report will be available at a later date.

The first survey was mailed in November 1996 and the second in May 1997. Each survey consisted of an initial mailing, followed by a reminder postcard about one week later, and a second survey was sent about one month after the initial mailing to those who had not yet responded. Adjusting for questionnaires that could not be delivered because of incorrect addresses, a response rate of 78% was attained on the first survey and 82% on the second survey. Overall, 63% (n = 853) of the original sample returned both surveys.

Segmentation Analyses

Two segmentation analyses were performed: one based on camping specialization of individuals and the other based on their forest social values (Fig. 2). For each analysis the resulting segments were compared on several attributes including their forest management preferences, management preferences at Provincial Recreation Area campgrounds, and socioeconomic characteristics.

Camping Specialization

Camping specialization was measured following the procedures of McIntyre and Pigram (1992). A behavioral dimension of specialization was assessed by past camping experience and familiarity with the campground where respondents were interviewed. A composite index comprised of the number of years of camping experience and average number of camping trips in the last 2 years was used as a measure of past experience. Familiarity with the campground was based on the number of previous visits in the last 10 years. A psychological dimension of specialization was measured using the 13 enduring involvement statements proposed by McIntyre and Pigram (1992). Enduring involvement is a measure of the affective attachment or commitment of individuals to camping and is comprised of 3 components: Attraction, Centrality, and Self-expression. Respondents rated the enduring involvement statements on a scale of 1 to 5 ranging from "strongly disagree" to "strongly agree."

The 13 statements were factor analyzed using principal component analysis with varimax rotation. Reliability of the factors was examined using Cronbach's alpha. A regression score was calculated for each of the factors for each individual. The factor scores, and prior experience and familiarity measures were standardized to a mean = 0 and standard deviation = 1. To identify subtypes of campers based on camping experience and commitment a discrete cluster analysis was performed on the standardized specialization variables (FASTCLUS procedure, SAS Institute Inc. 1989).

Forest Social Values

Two broad categories of forest social values were used to measure campers' value orientations. Based on the work of Steel et al. (1994) and Xu and Bengston (1997) statements were developed to reflect bio-centred and human-centred orientations toward forests. The bio-centred statements included items on the rights of nonhuman species, existence value, and spiritual significance of forests. The human-centred statements included items on the use of forests to benefit humans. Respondents rated a series of 15 statements on a 5 point scale ranging from "strongly disagree" to "strongly agree."

The 15 forest social value statements were factor analyzed using principal factor analysis with varimax rotation. Reliability of the components was examined using Cronbach's alpha. A regression score was calculated for each of the factors for each individual. To identify subtypes of campers based on forest social values a discrete cluster analysis was performed on the factor scores (FASTCLUS procedure, SAS Institute Inc. 1989).

Forest social value orientations were examined by calculating a bio-centred score for each individual. Human-centred statements were recoded so that higher numbers represent a bio-centred orientation and lower numbers represent a human-centred orientation. Then the responses were summed to create an indicator of forest values with a possible range from 15 to 75.

Management Preferences

A scale to measure attitudes toward forest management was developed based on a scale used previously in Alberta (McFarlane and Boxall 1996). Items were developed to measure an individual's preferences for forest management by using statements about the protection of forest

resources, traditional timber management, and the sustainability of current forest management in the province. Respondents rated a series of 15 statements on a 5 point scale ranging from "strongly disagree" to "strongly agree."

Preferences for facilities and services at Provincial Recreation Area campgrounds were measured by rating 11 items on a 5 point scale ranging from "not at all desirable" to "very desirable." Items ranged from facilities requiring extensive development and investment (e.g., commercial lodges) to services requiring no development and minimal investment (e.g., maps of recreational opportunities).

Knowledge of Forest-related Facts

Respondents familiarity with basic forest-related facts was measured based on questions contained in *tree*via, a forest trivia game produced by the Canadian Council of Forest Ministers, and questions developed by consulting experts in forest management. Respondents answered 14 statements as True, False, or Not sure. A composite knowledge score was calculated for each respondent by summing the number of correct responses. The maximum score possible was 14.

Socioeconomic Characteristics

Information was collected on respondents age, gender, number of people living in the household, education, and level of total household income. Interest group affiliation was measured by membership in a conservation-related organization and by dependence of a household member on the forest sector for their economic livelihood.

Results

Socioeconomic Characteristics

The socioeconomic information indicates that campers are well educated with 28% having at least some university education (Table 1). Only 13% of FMF residents and 22% of the general Alberta population have attained this level of education (Statistics Canada 1991). Household incomes were high with 35% earning $70,000 or more in 1996 (Table 2) compared with only 21% of FMF and 19% of Alberta households (Statistics Canada 1991). The most common number of people living in a respondent's household was two (34%) (Table 3). Almost half of respondents did not have anyone under 18 years old living in their household. This household structure reflects the age of the sample: the mean age was 41 years and 68% were 35 or older (Table 4). This age structure of the FMF campers shows that they were considerably older than the general population; only 53% of the FMF and 56% of the Alberta populations were 35 or older in 1991 (Statistics Canada 1991). Interest group affiliation was measured by membership in a conservation-related organization and by the economic dependence of someone in the household on the forest sector. Twenty four percent belonged to a conservation-related organization and 19% had a household member dependent on the forest sector. About 35% of respondents lived in Edmonton or Calgary and 34% lived in the local communities of the FMF (Hinton, Edson, Grande Cache, Brule, Cadomin, Robb, or Jasper).

Forest Social Values

The factor analysis of the forest social values statements identified 2 factors (Table 5). Factor 1 represents a Bio-centred factor and contains statements related to existence values,

rights of non-human species, and spiritual values. Factor 2 represents a Human-centred factor and contains statements related to the use of forests for human needs. One statement on the rights of non-human species had a negative loading on this factor.

Overall, campers in the FMF tend to be more bio-centred than human-centred (Table 6). An overwhelming majority of campers agreed with most of the bio-centred statements. Over 70% agreed that it is important to know that forests exist and that future generations enjoy the same benefits from forests that the current generation enjoys suggesting that respondents support a concept of sustainable forest management. It is also evident that forests represent a means of spiritual renewal and that respondents feel forests have a right to exist independent of human needs. There were 2 items that received less agreement than the others: "forests have a right to exist without being managed by humans" and "forests are sacred places." While a majority, (57% and 55%, respectively), agreed with these, many respondents neither agreed nor disagreed with these statements.

An examination of the human-centred statements suggests that campers are not opposed to using forests for human needs. For example, the majority agreed that forests should be managed to meet the needs of as many people as possible (70%) and that if forests are not threatened, we should use them to add to the quality of human life (62%). However, it appears that campers do not agree that human needs should be the primary goal of forest management. For example, most disagreed that: forests exist mainly to serve human needs (77%); forests that are not used are a waste of our natural resources (86%); the primary use of forests should be for products that are useful to humans (75%); and that as many uses should be made of as much forested public land as possible (68%).

Forest Management Preferences

The distribution of forest attitude item scores (Table 7), which reflect preferences for forest management, shows that a ***minority*** of campers agreed with the statements that: forests are being managed successfully to meet our present and future needs (28%); forestry produces no long term adverse effects on the environment (11%); and enough harvested trees are being replaced to meet future timber needs (21%). This suggests that campers do not view current forest management practices as being sustainable to meet our future needs. These results are consistent with qualitative interviews conducted with representatives from various stakeholder groups in the FMF. When asked if they thought forest management was being done sustainably in the Hinton area, only 7% of representatives from recreation groups answered a definite "yes" and 29% answered a "qualified yes" (T. M. Beckley, personal communication, March 9, 1998).

A ***minority*** of respondents agreed with several of the traditional timber management items: providing jobs and economic development is more important than setting aside forests from logging (7%); setting aside forests is not desirable if it means lower wages and fewer jobs (14%); forests should be managed mainly for timber and lumber products (5%); economic benefits outweigh negative consequences from forestry (10%); and economic stability of communities is more important than setting aside forests from logging (10%). Sixty one percent agreed that clear-cut logging should be banned on public land. However, a ***majority*** agreed that logging forests is acceptable if the forest is not harmed (63%) and that communities close to the forest should be given a higher priority in forest decisions than other communities (55%).

The ***majority*** also agreed that legislation should be established to protect endangered species (87%) and forest management should emphasize a variety of plants and animals (90%). A

minority agreed that some existing protected areas should be opened for logging (3%) and that typical examples of Alberta's forest regions should be excluded from resource development including tourism (45%).

Overall, these results suggest that the campers in the FMF do not view current forest management as being adequate to meet our future needs and they are not in favor of some traditional forest management goals. However, they are not opposed to logging *per se* but appear to be opposed to traditional types of forest management strategies that emphasize timber production and economic development. While respondents were in favour of protection-oriented management strategies the majority were not in favour of excluding public land from all development such as oil and gas, forestry, and tourism. An ecosystem management approach with a holistic orientation that considers other users, manages for a variety of species (biodiversity), employs alternative harvesting methods, and provides some protection, especially for endangered species, may be acceptable to these stakeholders.

Knowledge of Forest-related Facts

Scores on the forest-related knowledge items indicate that most respondents seemed to have basic knowledge of some forest-related issues (Table 8). For example, over 60% knew that chemicals are not commonly used to control weeds in Alberta's forests, 93% knew that forest companies must follow government guidelines when harvesting timber, 69% knew that there is a natural replacement of the kinds of trees in a forest, and 83% knew that insects can cause severe damage to forests and the number of bull trout have declined. However, only 30% of respondents knew that woodland caribou require old-growth forest, 42% knew that areas do not have to be

replanted after harvesting in order for the forest to return, and 42% knew that less than 12% of Alberta's forests are protected by legislation from resource development. There were also some items that had a high proportion of respondents who were "Not sure" of the correct response. About 50% were "Not sure" of the answer for the percentage of forested land that has protected status and that woodland caribou need old growth forest. About one third were "Not sure" that Alberta had more softwoods than hardwoods and that seedlings planted after harvesting are usually softwoods.

Provincial Recreation Area Management Preferences

Management preferences for Provincial Recreation Area (PRA) campgrounds indicate that facilities or services requiring further development of the campgrounds were rated as undesirable (mean < 3.0) by the majority of respondents (Table 9). In particular, facilities requiring a high level of development such as fast food stands, stores selling camping supplies, lodges, and hotels or motels were rated the least desirable. In contrast, facilities and services requiring minimal development and compatible with a semi-primitive camping experience were rated as desirable (mean > 3.0). Items such as maps of recreational opportunities, facilities for hiking, fishing, or biking, and security patrols were rated as desirable. Showers and flush toilets were rated about neutral (mean = 3.0). Bundles of firewood for sale was rated as undesirable whereas higher camping fees and free firewood was rated about neutral. This suggests that campers do not like buying bundles of firewood, which is a common practice at the PRAs, but would prefer to have the cost of firewood included in the camping fee.

Overall, 80% of campers were satisfied with campgrounds in the Hinton and Edson area. Sixty percent of campers thought that campgrounds located on public land in the Hinton and Edson area should be owned and operated by the provincial government, 35% thought they should be owned by the provincial government and privately operated, and only 5% thought they should be privately owned and operated. This suggests that campers are in favor of a semi-primitive camping opportunity, with minimal facilities and services, and are not in favor of the privatization of campgrounds located on public land.

Segmentation Analyses

Factor analysis of specialization variables

The factor analysis identified 3 factors reflecting psychological attachment or commitment to camping (Table 10). These correspond to McIntyre and Pigram's (1992) Attraction, Centrality, and Self-expression components of enduring involvement. Factor 1 represents a Self-expression component. It refers to how a person perceives camping as a reflection of their personality and consists of items relating to escape and freedom from everyday problems. Factor 2 represents an Attraction component and consists of items relating to the enjoyment and importance of camping to the individual. Factor 3 represents a Centrality component and refers to the role camping plays in an individual's life and has a strong social content.

Segmentation based on specialization

The cluster analysis based on camping experience and the 3 commitment factors identified 5 discrete specialization clusters or segments. For ease of presentation the segments were named Veterans, Loyalists, Beginners, Regulars, and Escapists (Table 11 and Fig. 3).

Veterans comprised about 5% of respondents. These respondents have the highest experience scores (Fig. 4 & Table 11). However, they are not particularly loyal to any one campground taking an average of 29 camping trips a year but making only 16 visits in the last 10 years to the campground where they were interviewed. Veterans have similar scores as Loyalists on the Centrality and Self-expression commitment factors (Fig. 3 & Table 11). Veterans and Loyalists have the highest Centrality score suggesting that camping plays a strong role in their lives and is an important social activity for these respondents.

Loyalists comprised about 4% of respondents. They differ from the other groups in that these respondents seem to be primarily repeat visitors to the same campground (Fig. 4 & Table 11). This group was most familiar with the campgrounds where they were interviewed, averaging 168 visits in the last 10 years. They also are a very experienced group with 91% having more than 20 years of camping experience and taking an average of 13 camping trips a year. Loyalists had the highest proportion of respondents whose primary activity while camping was fishing. Loyalists took few trips to national parks; only 5% of their camping trips in the last 2 years were to Jasper or Banff National Parks.

Beginners comprise about 20% of the sample. These respondents have the least experience (only 54% had more than 20 years of camping experience and averaged only 5 camping trips a year) and are the least familiar with the campgrounds (only 6 visits to the

campground in the last 10 years) (Fig. 4 & Table 11). Beginners scored lower than the other clusters on the Attraction factor suggesting that camping is not as pleasurable nor as important for this group of campers (Fig. 3).

Regulars and Escapists comprised the majority (71%) of campers. While these respondents have more experience than Beginners they scored among the lowest on familiarity with the camping areas (Fig. 4) suggesting they are not new to camping but may be touring the area or passing through. Regulars comprised 37% of respondents. They had the highest Attraction and the lowest Self-expression scores of all groups suggesting that camping is an enjoyable experience and very important to these individuals but is not very important as a means of escape from everyday problems (Fig. 3 & Table 11). This group is very similar to the Tourist segment found in a study in the Rocky-Clearwater Forest (McFarlane and Boxall 1996).

Escapists comprised 34% of respondents. They differed from the other groups in that they had the highest Self-expression and lowest Centrality scores suggesting that camping represents primarily a means of escape from everyday problems and is not an important social activity for these campers (Fig.3 & Table 11). Escapists have more experience than Regulars (78% had more than 20 years of camping experience) but, on average, they were less familiar with the campgrounds (7 visits to the campground in the last 10 years) (Fig. 4). Because camping represents primarily a means of escape for these campers, this group was named Escapists. Respondents in this group spent a greater proportion of their camping trips in national parks than the other groups. Thirteen percent of their camping trips in the last 2 years were to Jasper and Banff National Parks compared to only 5% of the trips of Loyalists and 9% of Veterans.

Significant differences occurred among the camper segments on some of the mean forest values statements (Table 12). Beginners or Regulars tended to score lower than the Escapists or Veterans on several bio-centred statements and higher than Escapists on 3 human-centred statements. These results suggest that the subtypes of campers differ in their forest social values. Results of the composite bio-centred score, which is an indicator of bio-centred orientation, tend to confirm this. Beginners had a significantly lower composite bio-centred score than Veterans, Regulars, or Escapists suggesting that Beginners are the least bio-centred group (Table 11).

Significant differences occurred among the segments on some of the mean attitude scores that reflect forest management preferences (Table 13). Escapists tended to score lower than Beginners on sustainability related statements and were more in favour of protection related statements. Beginners had higher scores than Regulars or Escapists on 3 timber management statements. Escapists were more in favour than Regulars to ban clear-cut logging on public land and were in less agreement than Regulars and Beginners that economic stability of communities is more important than setting aside forests from logging. These results suggest that campers with little camping experience are more supportive of traditional types of management than the more experienced campers. Those who view camping as a means of escape from everyday problems tend to be less supportive of traditional timber management and more supportive of management that has a holistic approach.

The proportion of respondents in the segments with correct answers on the forest-related knowledge items differed on only 3 of the knowledge items. More Loyalists (89%) knew that the number of bull trout in Alberta has declined, that old-growth forests exist in Alberta (89%), and

that insects can cause severe damage to forests (92%). There were no differences among the segments on the total number of correct responses (Table 11).

Differences were observed among the camper segments on some of the facility and service preferences at Provincial Recreation Area campgrounds (Table 14). Beginners tended to be more tolerant of facilities and services rating showers, flush toilets, lodges, and hotels or motels as more desirable than Loyalists, Regulars, or Escapists. Loyalists and Escapists tended to be the least tolerant of development at the PRAs having the lowest desirability scores on many items. These two groups comprise over 70% of the sample and thus, represent the majority of FMF campers. Because PRAs represent the least developed of the managed campgrounds in the FMF, increased development might result in more campers moving to random camping areas. Some campers might be affected more that others. For example, the group of Loyalists, Regulars, and Escapists, who are the least tolerant of facilities, might be the most sensitive to development and negatively impacted by increased facilities and services at PRAs. Beginners might be more tolerant, and development might have less of a negative impact on their camping experience.

No differences occurred among the segments on the proportion who were satisfied with the campgrounds on public land in the Hinton and Edson area or on who they thought should own and operate these campgrounds.

Some differences were observed among the segments on socioeconomic characteristics (Table 11 & Fig. 5). Regulars tended to be younger (mean = 39) and had the highest household incomes (37% earned $70,000 or more). The Escapists were the most educated group with 24% having some university education. Veterans and Loyalists had a higher proportion of respondents living in the local communities, with 50% and 72%, respectively. Loyalists had the lowest

proportion of Edmonton and Calgary residents (11%), tended to be the oldest (mean = 44), were the least educated group (only 3% had some university education), and earned the lowest household incomes (17% earned $70,000 or more). This suggests that many retirees from the local FMF communities are represented in the Loyalists group. Beginners had the lowest proportion (13%) with a membership in a conservation-related organization and the Veterans had the highest (45%). No differences occurred among the segments on gender or the proportion with a household member dependent on the forest sector for their economic livelihood.

Segmentation based on forest social values

The cluster analysis identified 3 segments based on the forest social values factor scores. A mean composite bio-centred score was calculated for each segment (Table 15) and shows that the segments can be arranged on a continuum with one group having a high bio-centred score, another a low bio-centred score, and the third with a score between these two extremes. Thus, the segments were named Bio-centred, Human-centred, and Moderate. The Bio-centred group comprised 30% of respondents, Human-centred 44%, and Moderates 26%.

On average, respondents in the Bio-centred group tend to be younger than those in the other groups, a larger proportion have a university education, and almost half of their members live in Edmonton or Calgary (Table 15 & Fig. 6). The Bio-centred group has the smallest proportion (22%) of respondents living in the local communities (Hinton, Edson, Grande Cache, Brule, Cadomin, Robb, or Jasper) of the FMF. Respondents in the Human-centred group were the least educated (24% had a university education) and had the lowest proportion of Edmonton or Calgary residents (48%). Contrary to other studies (e.g., Steel et al. 1994) interest group

affiliation as measured by membership in a conservation organization and economic dependence on the forest sector was not associated with the value segments. No differences occurred among the segments on the proportion of women or household income.

Differences occurred among the segments on all forest management preference statements (Table 16). The Bio-centred group consistently rated statements related to the sustainability of current forest management and traditional types of timber management lower than the Human-centred and Moderate segments and statements related to protection types of management strategies higher than these segments. The Human-centred and Moderate groups did not differ from each other on most statements.

The proportion of respondents with the correct answer on the forest-related knowledge items differed on only one item. More of the Bio-centred group knew that woodland caribou need old-growth forest. There were no differences among the segments on the composite forest-related knowledge score. These results suggest that the segments do not differ significantly on their knowledge of basic forest-related facts.

Differences occurred among the segments on 6 of the Provincial Recreation Area management preferences (Table 17). The Bio-centred group rated flush toilets, supply stores, fast food stands, lodges, and hotels as less desirable and rated maps of recreational opportunities as more desirable than the Human-centred or Moderate groups.

Differences occurred among the segments on who they thought should own and operate campgrounds on public land: 66% of the Bio-centred group, 58% of the Moderate group, and 55% of the Human-centred group thought they should be owned and operated by the provincial government ($\chi^2 = 13.37$, $p = .010$). The Human-centred group was more in favour of privatization

of campground operations with 41% in favour of campgrounds being owned by the government and operated by the private sector compared with 34% of the Moderate group, and 32% of the Bio-centred group. No differences occurred among the groups on the level of satisfaction with campgrounds located on public land in the model forest area.

Discussion

This study has provided the first analysis of forest social values and management preferences of a stakeholder group using the Foothills Model Forest. Based on the forest social values used in our study it appears that although campers do not seem to be opposed to using forests to benefit humans, they do not think that humans should be the primary focus of forest management. Campers were primarily bio-centred, agreeing with spiritual and existence values and the rights of forests and other species to exist for their own sake. Although respondents agreed with some of the statements related to human use of the forest, they do not agree that human needs should be paramount in management. This is reflected further in campers' forest management preferences where respondents disagreed with managing primarily for timber and economic development and agreed with managing for a variety of species and protecting species and existing protected areas. Our results suggest that a holistic management approach to resource management that provides for biodiversity and protects species while providing a diversity of benefits to society would be acceptable to campers in the FMF. Although the model forest has proposed such an approach, it appears that campers are either not aware of these management strategies or they do not believe they are being implemented successfully. For example, while virtually all respondents knew that the forest industry must follow government guidelines when

harvesting, only a minority agreed with attitude statements reflecting successful sustainable management in Alberta. This suggests that campers either think the guidelines are not adequate or that they are not being followed or enforced.

While most campers (63%) were not opposed to logging, most (61%) agreed that clear-cutting should be banned on public land. Continued clear-cutting particularly in areas visited by campers (e.g., along highway 40 north) may result in this stakeholder group not being convinced that forest management includes multiple values and could foster resistence to industry initiatives. Enhancing camping and associated recreational opportunities away from industrial forestry activities and communicating new harvest methods (e.g., partial cuts, snag retention, minimal residual material requirements) and strategies might help alleviate potential conflict between recreational and industrial stakeholder groups. Why campers are opposed to clear-cutting was not explored in this study. It could be that campers are not aware of new harvest strategies that are based on concepts of biodiversity, include smaller cut block designs, irregular shaped cuts, and harvests that mimic natural disturbances such as fire.

Demonstrating research activities and innovative management techniques (e.g., the use of wildlife habitat supply models, smaller cut block sizes, and mimicking natural disturbances) in areas accessible to campers and providing information at campgrounds might help communicate new forest management strategies and the role of the FMF in achieving sustainable management of multiple forest values. The FMF provides an excellent opportunity to demonstrate sustainable forest management practices to campers. The FMF consists of a mosaic of protected areas (some of which are large such as Jasper National Park and Willmore Wilderness), recreational opportunities, and industrial development that is managing for a variety of species,

experimenting with new harvest methods, has an extensive research program, and has a recovery plan for the only endangered species (woodland caribou) within its boundary. These types of activities are important elements in ecosystem management and sustainability of many different forest values (Kimmins 1995) and need to be communicated to the camping constituent. Communication messages that emphasize the importance of industrial development based primarily on jobs and economic development may not be very successful with campers. Developments will have to demonstrate incorporation of ecosystem functions and enhance a variety of benefits, not just economic, to be acceptable to these stakeholders.

This study demonstrated that campers can be segmented into subtypes that differ on their values and management preferences. One analysis, based on camping experience and commitment to camping, showed that some of the 5 resulting segments differ in their forest social values and management preferences and may be impacted differently by changes in forest and campground management. Those who are most familiar with an area and those with the most camping experience were the least tolerant of development at Provincial Recreation Area campgrounds and were in favour of protection type forest management strategies. Another segmentation analysis based on forest social values identified 3 subtypes and showed that the most bio-centred group are more supportive of protection types of forest management, are the least supportive of traditional timber management, development at Provincial Recreation Area campgrounds, and privatization of campgrounds on public land.

Provincial Recreation Areas represent semi-primitive camping opportunities in the FMF. Because there are no substitute semi-primitive campgrounds in the model forest some campers, such as those with the most camping experience or those with the most bio-centred forest values

may be negatively impacted and affected the most by increased campground development. These campers might seek a more primitive camping experience in random areas, go to campgrounds outside the model forest, or they might drop out of camping. People who are new to camping might be impacted positively by increased development. However, many other developed camping opportunities (e.g., Jasper National Park, William A. Switzer Provincial Park) currently exist in the FMF for these campers.

More people random camping might increase land use pressure in the model forest. Conflict between off-highway vehicle users and campers and between campers and industrial users could increase as campers become more dispersed over the landscape. The risk of forest fires, environmental impacts such as erosion and garbage, and public health concerns such as *Giardia sp.* in waterways could increase with higher levels of random camping.

Initiatives undertaken by Weldwood of Canada Ltd., Hinton Operations appear to be consistent with the camper preferences. Communication efforts such as the Recreation Map and Activities guide produced for Weldwood's forest management area (FMA) appear to be catering to campers' information needs. The guide provides information on campgrounds, trails, roads, services and facilities in the FMA, and regulations. The proposed establishment of user maintained camping areas that have minimal facilities such as pit toilets, fire rings, and picnic tables is also consistent with camper preferences. Our results suggest that services such as these will enhance the camping experience and will be welcomed by FMF campers.

A decision support system (DSS) that predicts the effect of changes in campground management on camp site choice (ie., how campers move across the FMF following changes in campground attributes) is currently being developed. The DSS is based on economic models.

Factors influencing behavior in these models usually involve environmental or recreation management features of the sites. For example, Boxall, Watson, and Englin (1996) found that travel distance, forest types, and management features significantly influenced backcountry canoe route choice in Nopiming Provincial Park in Manitoba. What is missing from these models is the integration of social psychological factors with the economic and environmental factors. We believe that dimensions of camping specialization and forest social values examined in this study may yield a promising direction in this regard by incorporating social psychological components with economic and environmental factors in recreation choice behavior. The incorporation of social psychological factors into the DSS of camping behavior in the FMF is being explored.

The forest social values scale seems to be a promising tool for examining held forest values. Subtypes of campers were identified using the scale and the subtypes differed on their management preferences and socioeconomic characteristics. This suggests that the scale is useful in helping managers develop goals and strategies that are socially acceptable, be able to predict how certain segments of society will react to management practices, and determine what groups will be positively or negatively impacted by management activities.

Future analysis of the data in the current study will include a comparison of the forest social values of campers with other stakeholder groups such as hunters and the general Alberta population. To understand and be able to predict how segments of society or recreationists will react to management actions a multivariate analysis that examines variables influencing values and management preferences will be necessary. For example, are there certain socioeconomic variables, subtypes of users, or membership in certain stakeholder groups that are associated with

value orientations or management preferences? Answers to these types of question will provide managers with information on the forest social values stakeholders regard as important, what management actions might be socially acceptable to particular segments of society, and identify target audiences for communication efforts.

While the analysis presented in this report provides information on what people think and feel about certain aspects of forests and forest and campground management it does not include an examination of the trade-offs people are willing to make in order to manage for these values and preferences. For example, if protecting endangered species is important to the FMF campers then are they willing to forgo camping opportunities in endangered species habitat or are they willing to incur a surcharge on camping equipment to raise funds for habitat protection programs? These types of questions involving trade-offs should be addressed in future research.

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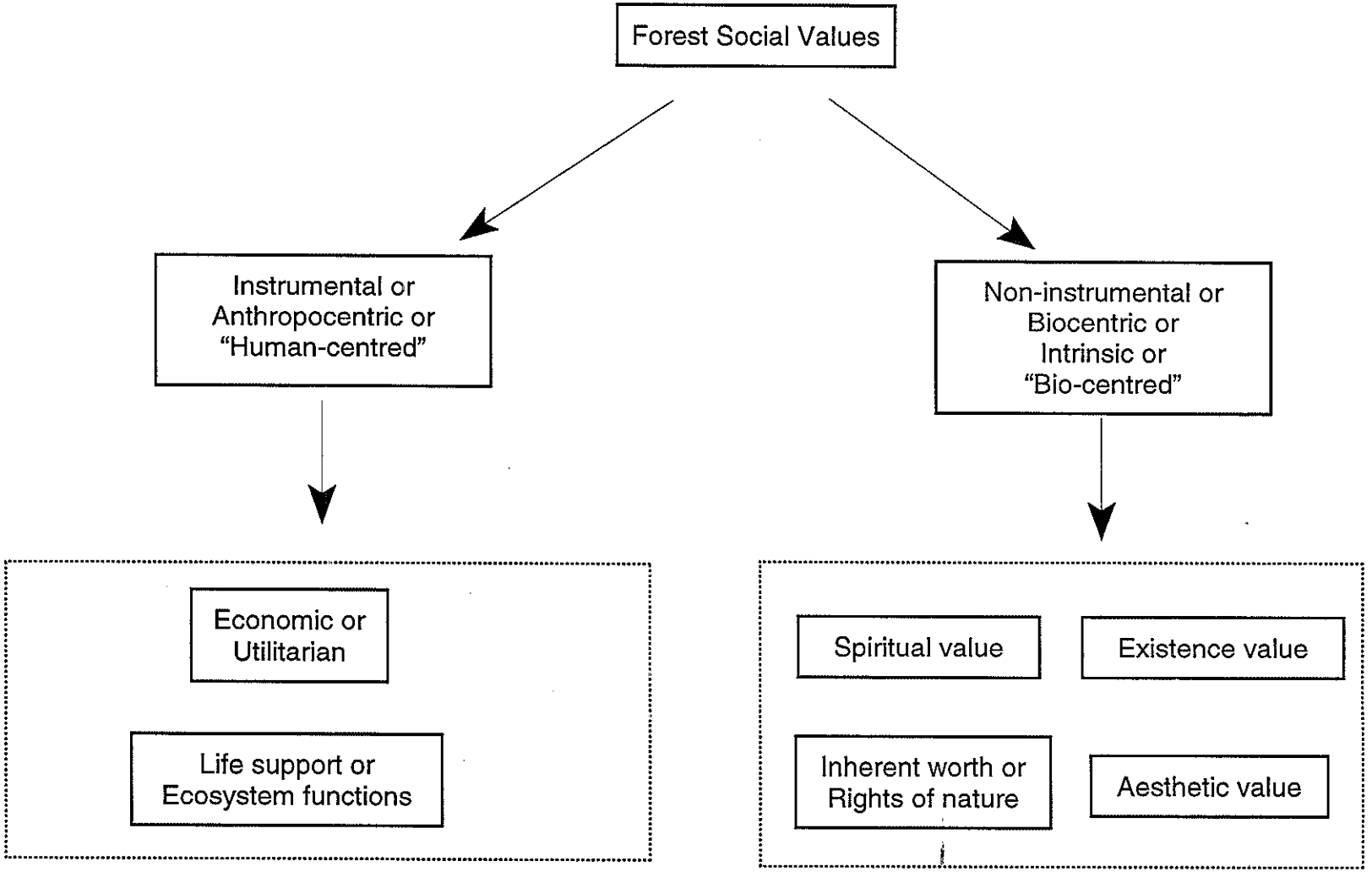

Figure 1. Classification Scheme for Held Forest Social Values.

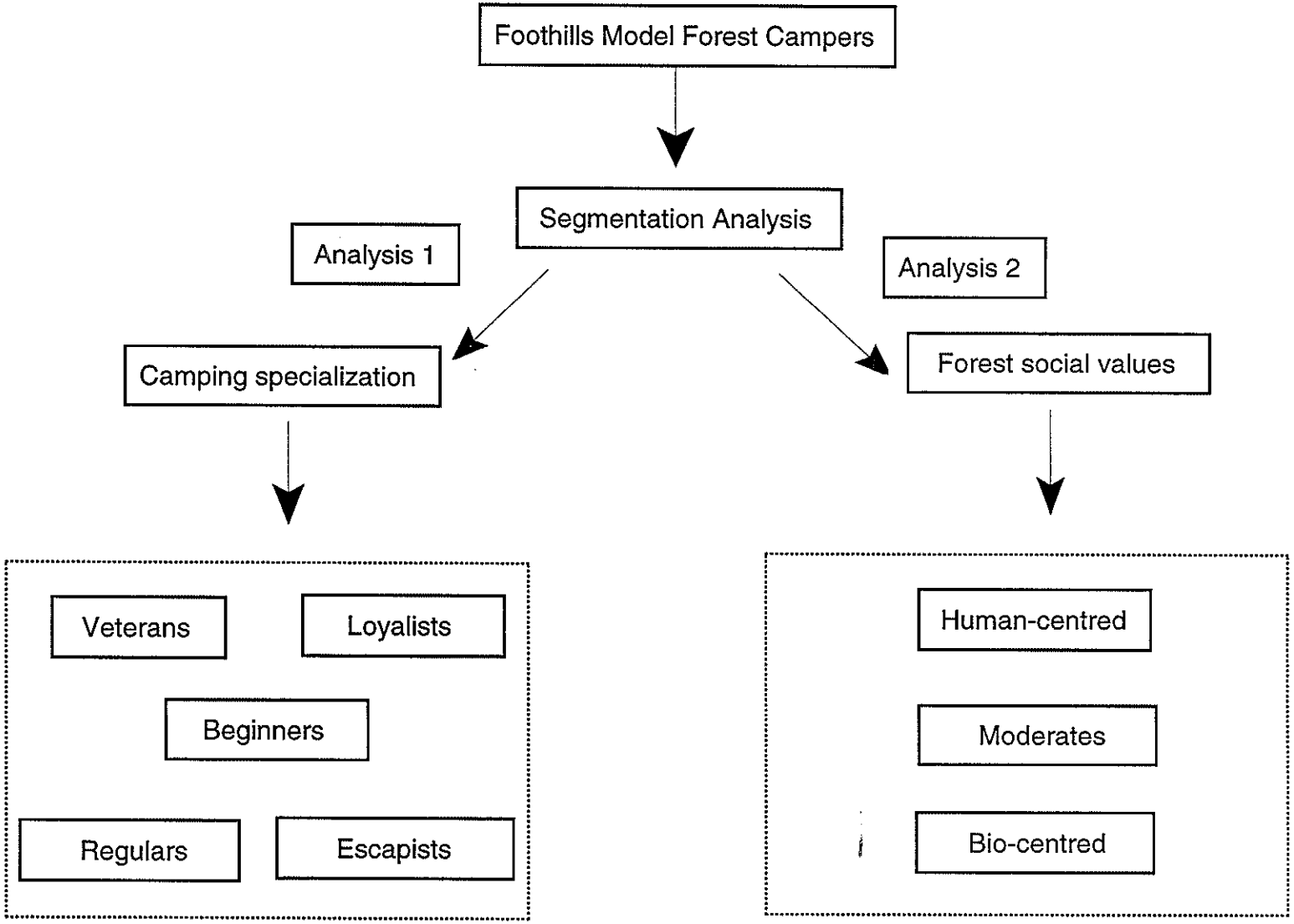

Figure 2. Schematic Representation of Data Analysis

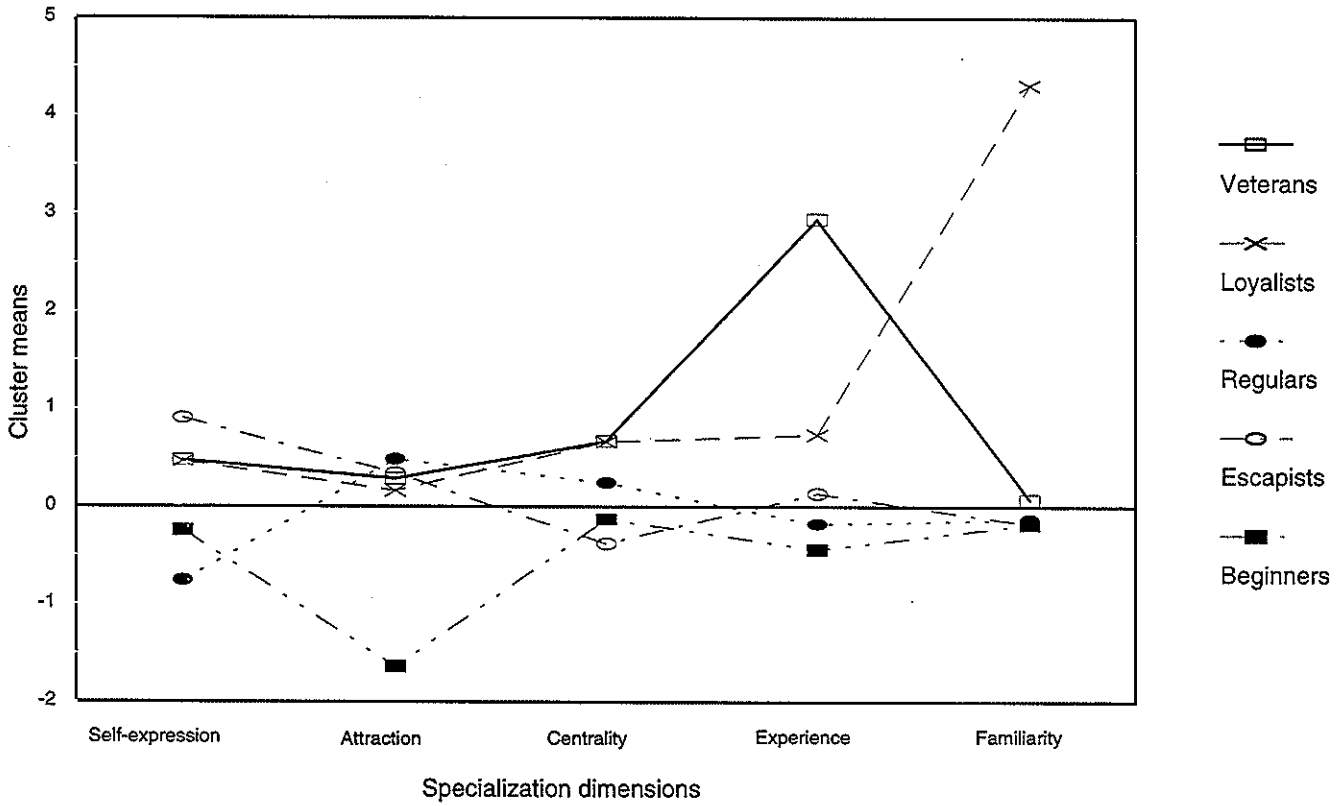

Figure 3. Camping Specialization Segments

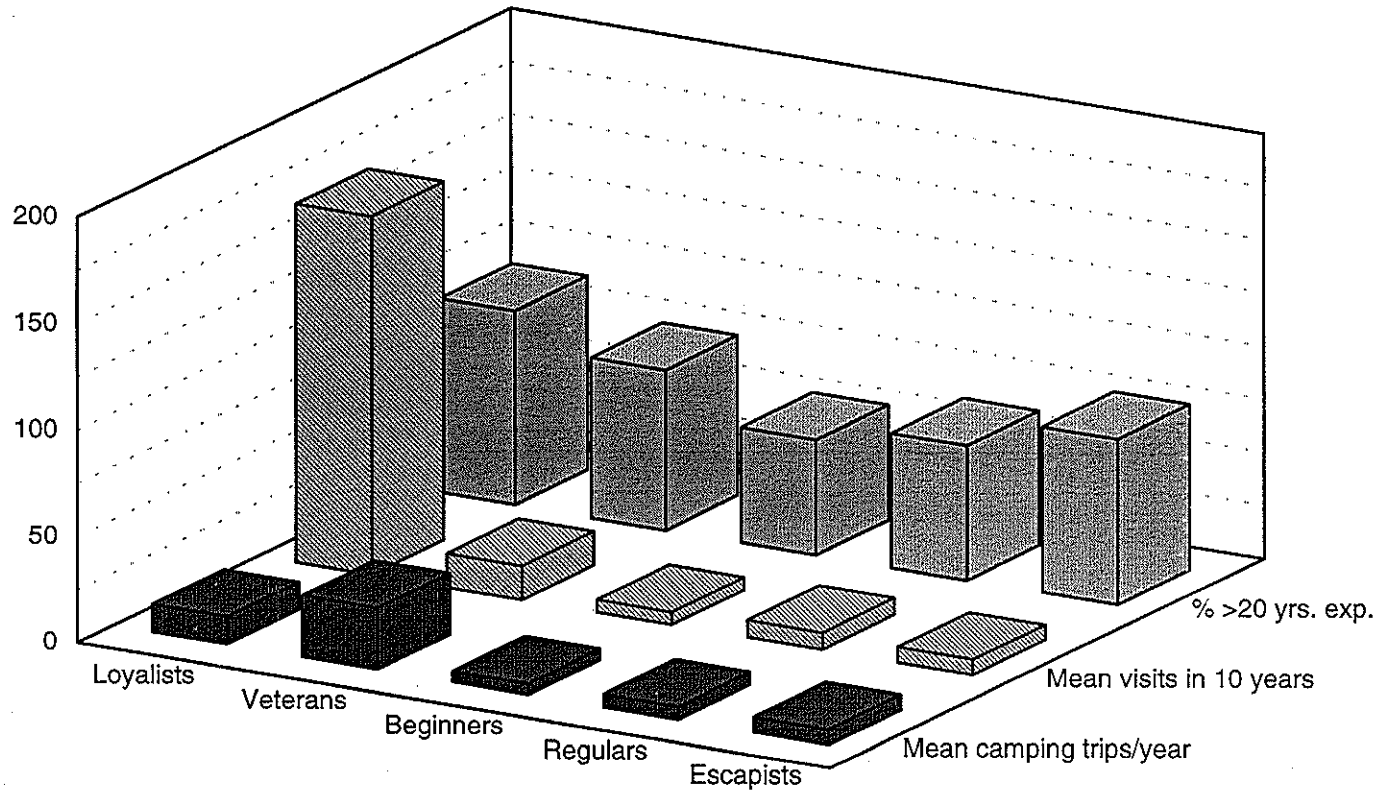

Figure 4. Camping Characteristics of Specialization Segments.

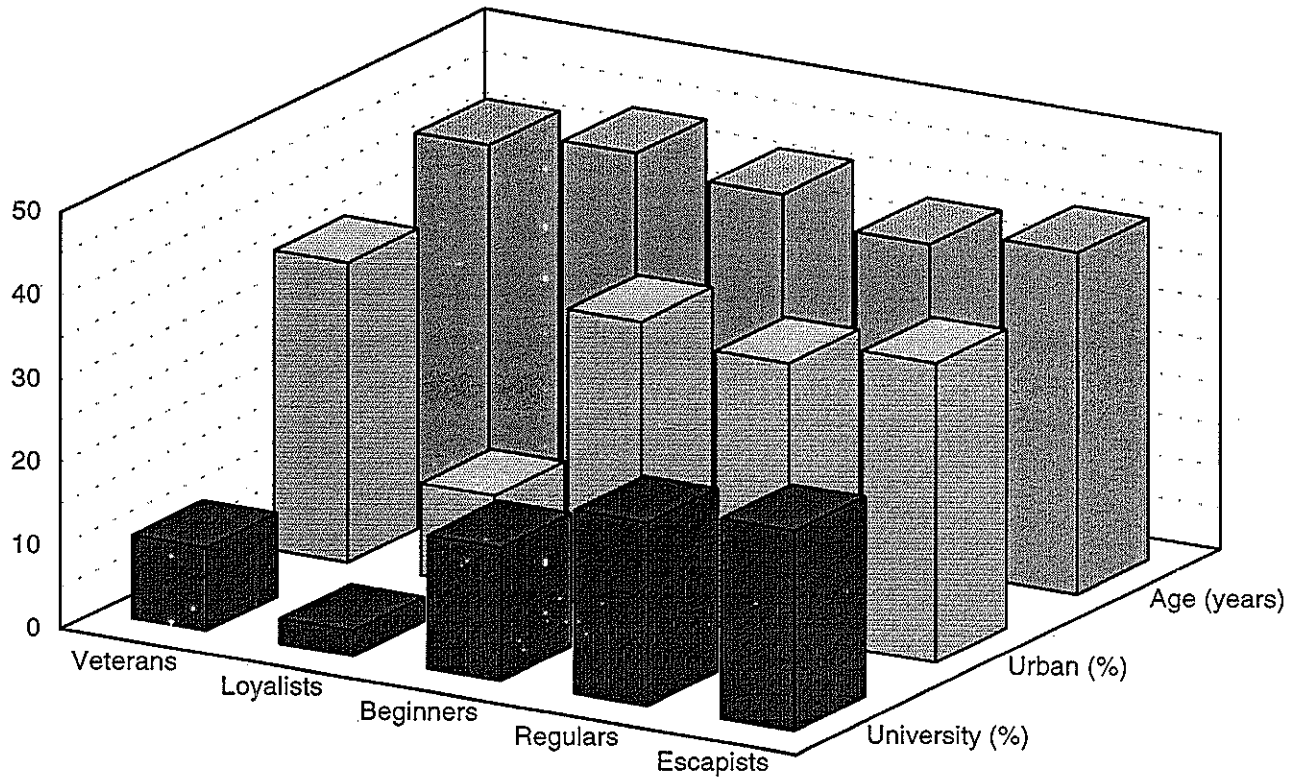

Figure 5. Socioeconomic Characteristics of Specialization Segments.

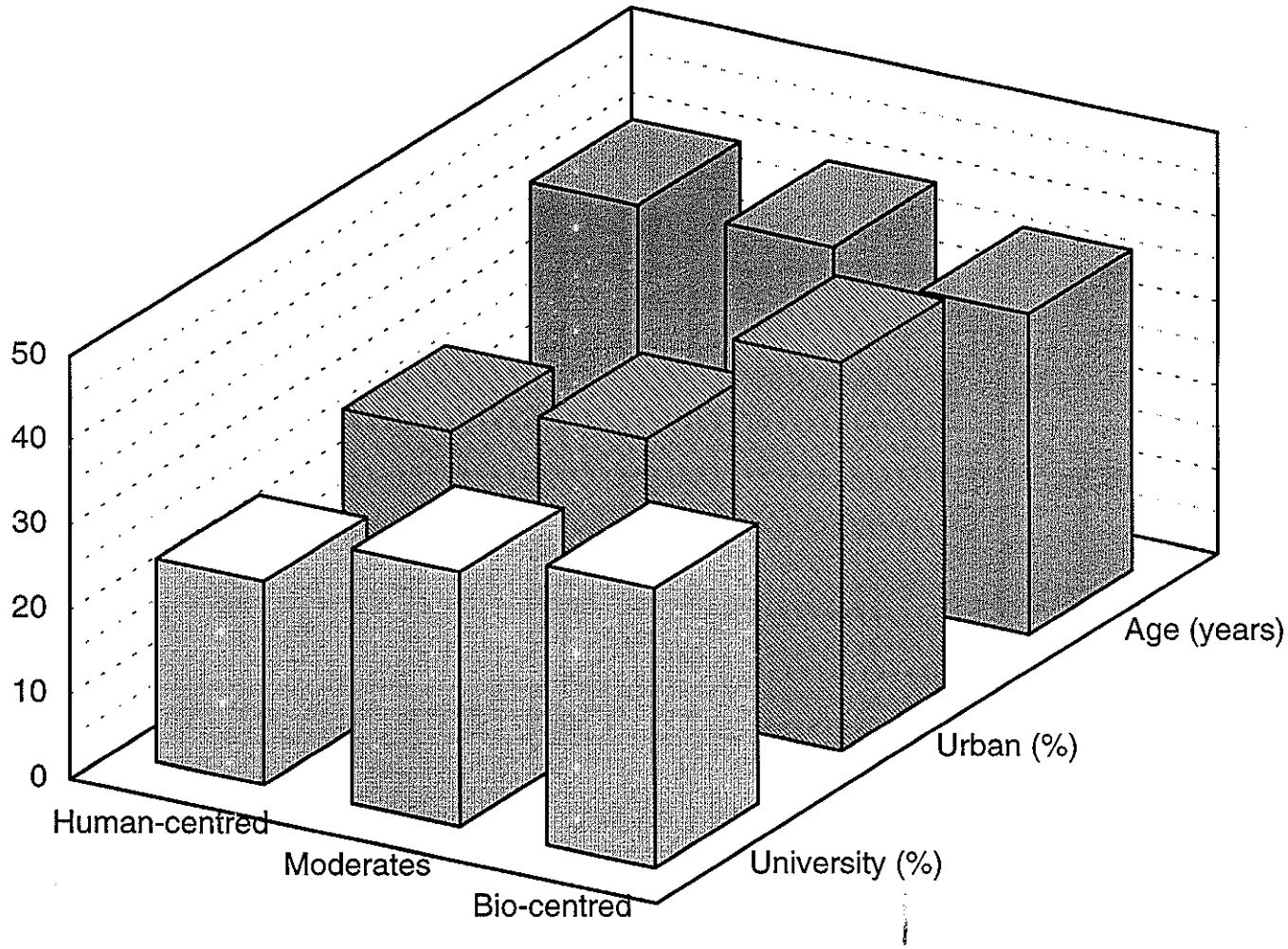

Figure 6. Socioeconomic Characteristics of Forest Social Values Segments.

Table 1. Distribution of education levels

Education level	Campers (n = 840)	Foothills Model Forest population[1] (n = 23715)	Alberta population[2] (n = 1918290)
High school or less	38.5	48.7	49.8
Trade or other non-university	33.3	29.4	31.4
Some university	28.2	22.9	13.1

[1] Population 15 years and older living in Hinton, Edson, Grande Cache, and Improvement Districts 12 and 14 in 1991 (Statistics Canada 1991).
[2] Population 15 years and older in 1991 (Statistics Canada 1991).

Table 2. Distribution (%) of total household income

Household income ($)	Campers (n = 759)	Foothills Model Forest population[1] (n = 11135)	Alberta population [2] (n = 910390)
less than 10,000	0.8	5.2	6.6
10,000 - 19,999	3.6	12.4	15.6
20,000 - 29,999	8.6	12.0	13.6
30,000 - 39,999	8.6	11.6	13.4
40,000 - 49,999	14.6	12.5	12.3
50,000 - 59,999	15.2	13.8	10.9
60,000 - 69,999	13.6	11.8	8.2
70,000 or more	35.2	20.5	19.3

[1] Income of Hinton, Edson, Grande Cache, and Improvement Districts 12 and 14 households in $1991 (Statistics Canada 1991).
[2] Income of Alberta households in $1991 (Statistics Canada 1991).

Table 3. Distribution (%) of people living in the household

Number of people	Total people in household n = 836	People under 18 n = 823
0	-	47.0
1	6.9	15.7
2	33.9	24.5
3	15.1	9.6
4	28.5	2.7
5 or more	15.7	0.5

Table 4. Age distribution (%)

Age category (years)	Campers (n = 828)	Foothills Model Forest population[1] (n = 23960)	Alberta population[2] (n = 1944455)
15 - 24	5.4	19.5	19.1
25 - 34	25.2	27.3	25.2
35 - 44	21.3	23.1	21.3
45 - 54	12.8	13.2	12.8
55 - 64	8.0	9.3	9.8
over 65	4.8	7.6	11.8

[1] Population 15 years and older living in Hinton, Edson, Grande Cache, and Improvement Districts 12 and 14 in 1991 (Statistics Canada 1991).
[2] Population 15 years and older in 1991 (Statistics Canada 1991).

Table 5. Factor analysis of forest values scale administered to campers in the Foothills Model Forest

Statement	Factor loadings[1]	
	Factor 1 Bio-centred	Factor 2 Human-centred
Forest give humans a sense of peace and well-being	.74	
Forests let us feel close to nature	.72	
Forests rejuvenate the human spirit	.66	
It is important to maintain our forests so that future generations will enjoy the same benefits that we enjoy	.55	
Forests are sacred places	.48	
Humans should have more respect and admiration for out forests	.47	
Whether or not I get to visit the forest as much as I like, it is important to know that forests exist in Alberta	.46	
Wildlife, plants, and humans have equal rights to live and develop	.30	
The primary use of forests should be for products that are useful to humans		.57
Forests exist mainly to serve human needs		.53
Forests should be managed to meet the needs of as many people as possible		.50
Forests that are not used are a waste of our natural resources		.50
As many uses (for example, forestry, wildlife habitat, recreation, and oil and gas) should be made of as much forested public land as possible		.48
If forests are not threatened, we should use them to add to the quality of human life		.36

Table 5. Factor analysis of forest social values scale administered to campers in the Foothills Model Forest (continued)

Statement	Factor loadings[1]	
	Factor 1 Bio-centred	Factor 2 Human-centred
Forests have a right to exist without being managed by humans		-.37
Eigenvalues[2]	3.32	1.29
Percent variance	.79	.30
Cronbach's alpha	.78	.50

[1] A minimum loading of 0.30 was used to identify items belonging to a factor.
[2] Factors were extracted until the eigenvalue was ≤ 1.0.

Table 6. Distribution of forest value scale scores among campers in the Foothills Model Forest

Statement	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Mean[1] (std. dev.)
Bio-centred statements:						
Whether or not I get to visit the forest as much as I like, it is important to know that forests exist in Alberta	0.4	0.0	24.7	24.7	74.0	4.72 (0.51)
Forest give humans a sense of peace and well-being	0.1	0.0	4.0	46.9	49.0	4.45 (0.59)
Forests let us feel close to nature	0.0	0.0	2.5	48.9	48.6	4.46 (0.55)
Wildlife, plants, and humans have equal rights to live and develop	2.1	8.6	12.4	47.9	29.0	3.93 (0.97)
Forests are sacred places	2.3	10.9	32.2	34.2	20.3	3.59 (1.00)
It is important to maintain our forests so that future generations will enjoy the same benefits that we enjoy	0.1	0.0	0.6	28.8	70.5	4.70 (0.49)
Humans should have more respect and admiration for out forests	0.8	0.8	4.7	40.0	53.6	4.45 (0.70)
Forests rejuvenate the human spirit	0.2	0.6	13.2	57.0	29.0	4.14 (0.67)

Table 6. Distribution of forest value scale scores among campers in the Foothills Model Forest (continued)

Statement	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Mean[1] (std. dev.)
Human-centred statements:						
Forests should be managed to meet the needs of as many people as possible	4.1	13.0	13.2	38.3	31.5	3.80 (1.14)
As many uses (for example, forestry, wildlife habitat, recreation, and oil and gas) should be made of as much forested public land as possible	15.5	32.3	25.3	20.0	6.9	2.70 (1.15)
Forests exist mainly to serve human needs	35.0	42.4	13.9	6.9	1.8	1.98 (0.96)
Forests that are not used are a waste of our natural resources	50.2	35.6	7.9	4.2	2.1	1.72 (0.93)
The primary use of forests should be for products that are useful to humans	28.8	46.0	18.3	5.8	1.1	2.04 (0.89)
If forests are not threatened, we should use them to add to the quality of human life	3.8	13.2	21.1	50.2	11.7	3.53 (0.99)
Forests have a right to exist without being managed by humans	2.6	15.8	24.2	35.1	22.3	3.59 (1.08)

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

Table 7. Distribution of forest management preference scores of campers in the Foothills Model Forest

Statement	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Mean[1] (std. dev.)
Sustainability statements:						
Our forests are being managed successfully to meet our present and future needs	7.4	29.9	34.8	26.1	1.8	2.85 (0.95)
Forestry practices generally produce no long term adverse effects on the environment	25.3	43.2	20.6	10.0	0.8	2.18 (0.95)
Enough harvested trees are being replaced by planting new ones or by natural seeding to meet our future timber needs	18.4	29.7	31.1	18.9	1.9	2.56 (1.05)
Protection statements:						
Typical examples of Alberta's forest regions (for example boreal and aspen parkland) should be excluded from development such as forestry, oil and gas, and tourism	1.7	19.0	34.6	30.1	14.6	3.37 (1.00)
Legislation should be established to protect endangered species of plants and wildlife in our forests	0.9	2.8	9.0	46.2	41.0	4.23 (0.80)
Forest management should emphasized a variety of plants and animals	0.0	1.2	8.9	66.9	22.9	4.12 (0.59)
Some existing protected areas such as parks should be opened for logging	60.0	31.4	5.1	2.7	0.7	1.53 (0.76)

Table 7. Distribution of forest management preference scores of campers in the Foothills Model Forest (continued)

Statement	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Mean[1] (std. dev.)
Timber management statements:						
Providing jobs and economic development is more important than setting aside forests from logging	24.6	48.0	20.6	5.8	1.0	2.10 (0.87)
Setting aside forests from logging is not desirable if it means lower wages or fewer jobs	15.8	44.5	25.7	12.3	1.7	2.40 (0.95)
Forests should be managed mainly for timber and lumber products	29.4	52.6	13.0	4.4	0.5	1.94 (0.80)
The economic benefits from forestry practices usually outweigh any negative consequences	21.1	43	25.4	9.2	1.2	2.26 (0.93)
Logging forests is acceptable if the forest is not harmed	6.0	12.1	19.0	57.2	5.7	3.45 (0.98)
When making forest decisions, the concerns of communities close to the forest should be given a higher priority than other communities	3.5	20.1	21.5	45.2	9.8	3.38 (1.02)
Clear-cut logging should be banned on public land	4.2	9.9	24.9	31.8	29.2	3.72 (1.11)
Economic stability of communities is more important than setting aside forests from logging	17.1	42.2	31.3	7.9	1.6	2.35 (0.91)

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

Table 8. Distribution of knowledge scores of campers in the Foothills Model Forest

Knowledge item	% Correct	% Not sure
Chemicals are commonly used to control weeds in Alberta's forests	61.0	25.5
There are no old-growth forests in Alberta	83.5	11.1
Lodgepole pine depends on forest fire to open its cones and shed its seeds	57.8	24.6
The number of bull trout have decreased in Alberta	82.6	14.7
Over 12 percent of Alberta's forests are protected by legislation from resource extraction such as forestry and oil and gas	42.4	51.2
Clearcutting is the most common method of harvesting trees in Alberta	65.1	18.4
Most of Alberta's forested land is owned by the provincial government	74.6	17.2
Forest companies are required to follow government guidelines when harvesting timber	92.5	5.4
Over time, there is a natural replacement of the kinds of trees in a forest	69.4	11.1
Alberta has more softwoods than hardwoods	62.2	29.8
The woodland caribou prefers old growth forest but can survive in areas that have been cleared by logging	30.0	47.7
All areas where trees are harvested must be replanted in order for the forest to return	41.5	9.6
The seedlings planted after harvesting are usually hardwoods	56.4	33.3
Insects such as caterpillars can cause severe damage to forests	82.9	10.3

Table 9. Distribution (%) of Provincial Recreation Area management preferences of campers in the Foothills Model Forest

Management items	Very undesirable	Somewhat undesirable	Neither desirable nor undesirable	Somewhat desirable	Very desirable	Mean[1]
Showers	13.6	8.0	28.3	31.2	19.0	3.34
Flush toilets	15.4	9.2	37.9	23.5	14.1	3.13
Stores selling supplies	35.9	17.3	28.1	15.2	3.5	2.31
Higher camping fees & free firewood	28.8	13.9	18.6	23.7	14.9	2.85
Bundles of firewood for sale	49.0	15.3	16.6	13.5	5.7	2.10
Fast food stand	76.4	10.4	10.1	1.6	1.5	1.39
Security patrols	12.5	7.7	21.7	34.1	24.1	3.56
Maps of the area showing trails, fishing areas, ...	3.6	2.8	7.5	28.4	57.7	4.35
Facilities for other activities such as hiking, fishing, biking, ...	6.6	3.5	16.0	32.8	41.1	4.00
Commercial lodges	58.9	17.7	16.0	5.4	2.1	1.69
Hotels or motels	72.4	11.4	12.0	2.5	1.7	1.47

[1] Rated on a scale of 1 to 5, where 1 = not at all desirable and 5 = very desirable.

Table 10. Factor analysis of enduring involvement statements

Items	Factor loadings[1]		
	Factor 1 Self-expression	Factor 2 Attraction	Factor 3 Centrality
When I am camping I can really be myself	0.77		
Camping offers me relaxation when life's problems build up	0.73		
Camping says a lot about who I am	0.71		
Camping is one of the most satisfying things I do	0.59		
Camping is very important to me	0.54		
I have little or no interest in camping[2]		0.86	
I do not particularly like camping[2]		0.86	
Camping is one of the most enjoyable things I do		0.57	
Camping is nothing more than a place to stay while I do other things[2]		0.54	
Most of my friends are in some way connected to camping			0.84
I enjoy discussing camping with my friends			0.74
I find a lot of my is organized around camping			0.64
You can tell a lot about a person when you see them camping			0.52
Eigenvalues[3]	5.3	1.66	1.09
Percentage of variance	40.7	12.8	8.4
Cumulative percentage	40.7	53.5	61.9
Cronbach's alpha	0.83	0.76	0.72

[1] A minimum loading of 0.30 was used to identify items belonging to a factor.
[2] Items were reverse coded for analysis.
[3] Components were extracted until the eigenvalue was ≤ 1.0.

Table 11. Characteristics of camping specialization segments

Characteristic	Specialization segments					Statistics	
	Veterans (n = 40)	Loyalists (n = 36)	Regulars (n =320)	Escapists (n = 289)	Beginners (n = 168)	F/χ^2	*p*
Mean camping trips/year	29.1	12.5	6.3	6.9	5.0	na	na
Mean previous visits in last 10 years	15.5	167.6	8.3	6.6	6.0	na	na
% with > 20 years camping experience	75.0	90.9	62.8	77.7	53.8	na	na
Attraction[1]	0.28	0.16	0.48	0.34	-1.64	na	na
Centrality[1]	0.67	0.67	0.24	-0.38	-0.13	na	na
Self-expression[1]	0.47	0.46	-0.76	0.90	-0.25	na	na
Mean % of camping trips to national parks[2]	8.6	4.6	9.0	13.0	11.2	2.84	.0235
Mean age (years)	41.5	44.2	39.2	41.3	41.8	2.69	.0303
Some university education (%)	10.3	2.9	21.7	23.8	16.1	19.90	.011
Household income ≥$70,000 (%)	20.0	16.7	36.6	31.1	27.4	11.29	.024
Local residents (%)	50.0	72.2	35.3	28.7	29.8	34.80	.000
Edmonton or Calgary residents (%)	35.9	11.1	32.5	36.3	35.3	9.62	.047

Table 11. Characteristics of specialization segments (continued)

Characteristic	Specialization segments					Statistics	
	Veterans (n = 40)	Loyalists (n = 36)	Regulars (n =320)	Escapists (n = 289)	Beginners (n = 168)	F/χ^2	*p*
Women (%)	35.0	33.3	36.6	39.0	37.4	0.76	.943
Member of conservation organization (%)	45.0	27.8	25.8	24.7	12.9	21.68	.000
Dependent on forest sector (%)	17.5	19.4	20.5	14.6	22.7	5.65	.227
Mean bio-centre score	54.7	53.0	53.0	55.0	51.6	14.71	.0001
Mean knowledge score	7.8	9.1	8.6	8.7	8.4	1.76	.1354

na = Not applicable. These variables were used in the segmentation analysis and therefore, the differences are expected to be significant.

[1] Enduring involvement factor scores were standardized to a mean of 0 and standard deviation of 1.

[2] No differences occurred among the segments on the proportion of total camping trips to William A. Switzer Provincial Park, Provincial Recreation Areas, or random areas.

Table 12. Mean[1] forest value scale scores of camping specialization segments

Statement	Specialization segments					ANOVA F values
	Veterans	Loyalists	Regulars	Escapists	Beginners	
Bio-centred statements:						
Whether or not I get to visit the forest as much as I like, it is important to know that forests exist in Alberta	4.90[a,c]	4.72[a,c,d]	4.69[a]	4.85[b,c]	4.51[d]	13.16*
Forest give humans a sense of peace and well-being	4.72[a]	4.43[a,b,c]	4.34[b,c]	4.64[a]	4.26[c]	18.20*
Forests let us feel close to nature	4.62[a,d]	4.47[a,b,c]	4.37[b,e]	4.64[c,d]	4.28[b]	15.92*
Wildlife, plants, and humans have equal rights to live and develop	3.63[a]	4.06[a,b]	3.88[a,b]	4.06[b]	3.84[a,b]	2.97**
Forests are sacred places	3.69[a,b]	3.56[a,b]	3.52[a]	3.80[b]	3.39[a]	5.38*
It is important to maintain our forests so that future generations will enjoy the same benefits that we enjoy	4.85[a,b]	4.69[a,b,c]	4.66[a]	4.78[b]	4.58[c]	6.25*
Humans should have more respect and admiration for out forests	4.72[a]	4.58[a,b,c]	4.38[b,c]	4.55[a]	4.31[c]	5.74*
Forests rejuvenate the human spirit	4.15[a,b]	4.22[a,b]	4.03[a]	4.36[b]	3.95[a]	14.27*

Table 12. Mean[1] forest value scale scores of specialization segments (continued)

Statement	Specialization segments					ANOVA F value
	Veterans	Loyalists	Regulars	Escapists	Beginners	
Human-centred statements:						
Forests should be managed to meet the needs of as many people as possible	3.67	4.14	3.76	3.84	3.77	1.11
As many uses (for example, forestry, wildlife habitat, recreation, and oil and gas) should be made of as much forested public land as possible	2.77[a,b]	2.70[a,b]	2.81[a]	2.53[b]	2.78[a,b]	2.44**
Forests exist mainly to serve human needs	1.97[a,b]	2.00[a,b]	2.04[a]	1.82[b]	2.13[a]	3.39*
Forests that are not used are a waste of our natural resources	1.49[a]	1.83[a,b]	1.70[a]	1.64[a]	1.96[b]	4.10*
The primary use of forests should be for products that are useful to humans	1.92[a,b]	2.08[a,b]	2.05[a,b]	1.93[b]	2.24[a]	3.41*
If forests are not threatened, we should use them to add to the quality of human life	3.32	3.83	3.44	3.57	3.60	2.19***
Forests have a right to exist without being managed by humans	3.81	3.67	3.49	3.66	3.57	1.38

[1] Rated on a scale of 1 to 5, where 1 = strongly disagree and 5 = strongly agree. Any two means that do not share a superscript are significantly different at $p < 0.05$ using Tukey's HSD test.

* $p < 0.01$. ** $p < 0.05$. *** $p < 0.10$.

Table 13. Mean[1] forest management preference scores by specialization segment

Statement	Specialization segment					ANOVA F value
	Veterans	Loyalists	Regulars	Escapists	Beginners	
Sustainability statements:						
Our forests are being managed successfully to meet our present and future needs	2.74	3.09	2.90	2.73	2.95	2.48**
Forestry practices generally produce no long term adverse effects on the environment	2.32[a,b]	2.20[a,b]	2.23[a]	2.02[a]	2.33[b]	3.46*
Enough harvested trees are being replaced by planting new ones or by natural seeding to meet our future timber needs	2.53[a,b]	2.80[a,b]	2.62[a]	2.38[a]	2.72[b]	3.71*
Protection statements:						
Typical examples of Alberta's forest regions (for example boreal and aspen parkland) should be excluded from development such as forestry, oil and gas, and tourism	3.58[a,b]	3.57[a,b]	3.26[a]	3.55[b]	3.16[a]	5.86*
Legislation should be established to protect endangered species of plants and wildlife in our forests	4.28[a,b]	4.25[a,b]	4.18[a]	4.36[b]	4.11[a]	3.17**
Forest management should emphasized a variety of plants and animals	3.95[a]	4.08[a,b]	4.07[a,b]	4.26[b]	4.01[a]	6.90*
Some existing protected areas such as parks should be opened for logging	1.49[a,b]	1.53[a,b]	1.51[a]	1.44[a]	1.72[b]	3.68*

Table 13. Mean[1] forest management preference scores by specialization segment (continued)

Statement	Specialization segment					ANOVA F value
	Veterans	Loyalists	Regulars	Escapists	Beginners	
Timber management statements:						
Providing jobs and economic development is more important than setting aside forests from logging	1.95[a]	2.17[a,b]	2.14[a,b]	1.95[b]	2.33[b]	5.54*
Setting aside forests from logging is not desirable if it means lower wages or fewer jobs	2.24[a,b]	2.41[a,b]	2.44[a]	2.23[b]	2.63[a]	5.08*
Forests should be managed mainly for timber and lumber products	2.08[a,b]	1.83[a,b]	1.97[a]	1.78[a]	2.16[b]	6.67*
The economic benefits from forestry practices usually outweigh any negative consequences	2.41[a,b]	2.33[a,b]	2.25[a]	2.11[a]	2.51[b]	5.10*
Logging forests is acceptable if the forest is not harmed	3.55	3.31	3.44	3.39	3.57	1.13
When making forest decisions, the concerns of communities close to the forest should be given a higher priority than other communities	3.66	3.51	3.35	3.31	3.45	1.47
Clear-cut logging should be banned on public land	4.00[a]	3.80[a,b]	3.60[b]	3.84[a]	3.65[a,b]	2.43**
Economic stability of communities is more important than setting aside forests from logging	2.34[a,b]	2.44[a,b]	2.40[a]	2.13[b]	2.60[a]	7.52*

[1] Rated on a scale on 1 to 5, where 1 = strongly disagree and 5 = strongly agree. Any two means that do not share a superscript are significantly different using Tukey's HSD test.

* $p \leq 0.01$.

** $p \leq 0.05$.

Table 14. Mean scores[1] of Provincial Recreation Area management preferences by camping specialization segment

Management items	Specialization segment					ANOVA F value	Total sample
	Veterans	Loyalists	Regulars	Escapists	Beginners		
Showers	3.34[a,b]	3.08[a,b]	3.39[a,b]	3.27[a]	3.58[b]	2.23***	3.34
Flush toilets	3.16[a,b]	2.78[a]	3.09[a]	3.03[a]	3.42[b]	3.75*	3.13
Stores selling supplies	2.63	2.06	2.28	2.23	2.49	2.44**	2.31
Higher camping fees & free firewood	2.41	2.91	2.86	2.92	2.79	1.11	2.85
Bundles of firewood for sale	1.76[a,b]	1.61[a]	2.04[a,b]	2.22[b]	2.21[b]	3.06**	2.10
Fast food stand	1.63[a,c,d]	1.11[b]	1.39[a,b,c]	1.30[b,d]	1.55[a,c]	4.21*	1.39
Security patrols	3.3	3.47	3.5	3.58	3.73	1.43	3.56
Maps of the area showing trails, fishing areas, ...	4.35	4.2	4.33	4.4	4.32	0.49	4.35
Facilities for other activities such as hiking, fishing, biking, ...	3.74	3.92	3.99	4.03	4.05	0.69	4.00
Commercial lodges	1.79[a,b]	1.50[a]	1.62[a]	1.60[a]	2.01[b]	5.46*	1.69
Hotels or motels	1.56[a,b]	1.08[a]	1.42[a]	1.38[a]	1.79[b]	8.51*	1.47

[1] Rated on a scale of 1 to 5, where 1 = not at all desirable and 5 = very desirable. Any two means that do not share a superscript are significantly different using Tukey's HSD test.

* $p \leq 0.01$. ** $p \leq 0.05$. *** $p \leq 0.10$.

Table 15. Characteristics of forest social value segments

Characteristic	Forest social value segments			Statistics	
	Human-centred n = 342	Moderate n = 204	Bio-centred n = 232	F/χ^2	*p*
Women (%)	35.5	38.1	39.7	1.097	.578
Some university education (%)	23.9	30.4	33.2	6.306	.043
Household income ≥$70,000 (%)	31.3	31.9	31.9	0.031	.984
Membership in conservation organization (%)	21.3	29.1	23.1	4.303	.116
Dependent on forest sector (%)	21.3	16.4	16.1	3.230	.199
Edmonton or Calgary residents (%)	28.4	32.4	46.1	19.911	.000
Local residents (%)	39.5	39.2	21.6	23.04	.000
Mean age (years)	41.3	41.0	37.9	6.57	.0015
Mean bio-centre score	50.42	52.89	58.62	423.30	.0001
Mean knowledge score	8.57	8.66	8.67	0.13	.8740

Table 16. Mean[1] forest management preference scores by forest social value segment

Statement	Forest social value segments			ANOVA F value	*p*
	Human-centred	Moderate	Bio-centred		
Sustainability statements:					
Our forests are being managed successfully to meet our present and future needs	3.08[a]	3.00[a]	2.40[b]	43.26	.0001
Forestry practices generally produce no long term adverse effects on the environment	2.44[a]	2.40[a]	1.57[b]	78.56	.0001
Enough harvested trees are being replaced by planting new ones or by natural seeding to meet our future timber needs	2.83[a]	2.71[a]	1.99[b]	54.02	.0001
Protection statements:					
Typical examples of Alberta's forest regions (for example boreal and aspen parkland) should be excluded from development such as forestry, oil and gas, and tourism	3.09[a]	3.24[a]	3.86[b]	46.97	.0001
Legislation should be established to protect endangered species of plants and wildlife in our forests	3.96[a]	4.28[b]	4.65[c]	59.43	.0001
Forest management should emphasized a variety of plants and animals	3.91[a]	4.15[b]	4.40[c]	53.33	.0001
Some existing protected areas such as parks should be opened for logging	1.72[a]	1.60[a]	1.14[b]	45.48	.0001

Table 16. Mean[1] forest management preference scores by forest social value segment (continued)

Statement	Forest social value segments			ANOVA F value	*p*
	Human-centred	Moderate	Bio-centred		
Timber management statements:					
Providing jobs and economic development is more important than setting aside forests from logging	2.35[a]	2.27[a]	1.60[b]	63.71	.0001
Setting aside forests from logging is not desirable if it means lower wages or fewer jobs	2.60[a]	2.58[a]	1.90[b]	47.19	.0001
Forests should be managed mainly for timber and lumber products	2.17[a]	2.05[a]	1.51[b]	56.56	.0001
The economic benefits from forestry practices usually outweigh any negative consequences	2.54[a]	2.49[a]	1.72[b]	65.24	.0001
Logging forests is acceptable if the forest is not harmed	3.49[a]	3.64[a]	3.11[b]	17.99	.0001
When making forest decisions, the concerns of communities close to the forest should be given a higher priority than other communities	3.44[a]	3.52[a]	3.10[b]	11.18	.0001
Clear-cut logging should be banned on public land	3.52[a]	3.63[a]	4.07[b]	18.23	.0001
Economic stability of communities is more important than setting aside forests from logging	2.56[a]	2.48[a]	1.95[b]	36.57	.0001

[1] Rated on a scale on 1 to 5, where 1 = strongly disagree and 5 = strongly agree. Any two means that do not share a superscript are significantly different using Tukey's HSD test.

Table 17. Mean scores[1] of Provincial Recreation Area management preferences by forest social value segment

Management items	Forest social value segments			ANOVA F value	*p*
	Human-centred	Moderate	Bio-centred		
Showers	3.40	3.32	3.26	0.91	.4040
Flush toilets	3.27[a]	3.07[a,b]	3.02[b]	3.45	.0321
Stores selling supplies	2.45[a]	2.26[a,b]	2.10[b]	5.96	.0027
Higher camping fees & free firewood	2.90	2.75	2.79	0.78	.4600
Bundles of firewood for sale	2.02	2.19	2.13	1.24	.2914
Fast food stand	1.46[a]	1.41[a]	1.25[b]	4.84	.0082
Security patrols	3.51	3.59	3.59	0.40	.6682
Maps of the area showing trails, fishing areas, ...	4.37[a,b]	4.22[a]	4.48[b]	3.99	.0189
Facilities for other activities such as hiking, fishing, biking, ...	4.04	3.95	3.99	0.34	.7118
Commercial lodges	1.72[a]	1.80[a]	1.52[b]	4.89	.0078
Hotels or motels	1.46[a,b]	1.59[a]	1.36[b]	3.60	.0277

[1] Rated on a scale of 1 to 5, where 1 = not at all desirable and 5 = very desirable. Any two means that do not share a superscript are significantly different using Tukey's HSD test.