FOREST RECREATION AREA CAMPERS IN THE ROCKY-CLEARWATER FOREST OF ALBERTA

B.L. McFarlane, P.C. Boxall, and J.M. Gartrell

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ABSTRACT

Understanding recreational users of the forest is essential to integrating social values in successful integrated resource management. This study examines campers at forest recreation areas in the Rocky-Clearwater Forest of Alberta to determine total campground use and user characteristics. Camping fee envelopes were modified to provide a relatively inexpensive means of data collection. Data were collected from the 33 campgrounds that collected fees during the 1994 camping season. Data were then linked with Statistics Canada census data to obtain estimates of socioeconomic characteristics. Geographic information systems technology was used to determine and map market areas. Results showed that the campgrounds are used primarily by Albertans who live within a 1- to 2-hour drive of the forest. July received more visits than the other months. The campgrounds are used mostly as one-night stopovers or as weekend camping destinations. Cluster analysis identified two subgroups of campers, suggesting that visitors are not a homogeneous group and may have differing recreational needs and opinions of forest management. The study employed existing systems for data collection and provided accurate use data and information on user characteristics. Existing systems and data bases should be examined more critically for user information that will assist management efforts in understanding social values associated with the forest.

RÉSUMÉ

Pour incorporer les valeurs sociales dans l'aménagement intégré des ressources forestières, il est essentiel de comprendre l'utilisation récréative qui est faite de ces ressources. Cette étude porte sur l'utilisation des emplacements de camping dans les aires de loisirs de la forêt Rocky-Clearwater en Alberta et sur les caractéristiques des campeurs qui s'y installent. De légères modifications aux enveloppes où sont déposés les droits de camping ont permis de recueillir des données, à peu de frais. Le rapprochement des données tirées de 33 terrains de camping où des droits sont imposés, au cours de la saison de 1994, et des données de recensement de Statistique Canada a permis d'obtenir une estimation des caractéristiques socioéconomiques. La technologie des systèmes d'information géographique a servi à cerner et à cartographier les secteurs fonctionnels. Les résultats révèlent que la plupart des campeurs sont des Albertains qui vivent dans un rayon de 1 heure à 2 heures de route de la forêt, que le mois de juillet est le plus occupé et que les campeurs s'installent généralement pour une nuit ou pour une fin de semaine. L'analyse typologique a permis de cerner deux sous-groupes de campeurs, ce qui semble indiquer que les visiteurs ne forment pas un groupe homogène et peuvent avoir des besoins variés en matière de loisirs et différer d'opinion en ce qui concerne la gestion des forêts. La collecte des données s'est effectuée à l'aide de systèmes éprouvés et a fourni des renseignements fiables sur l'utilisation ainsi que sur les caractéristiques des utilisateurs. Il conviendra d'approfondir l'analyse des bases de données et des systèmes actuels, afin d'en tirer l'information sur les utilisateurs qui aidera les gestionnaires à mieux comprendre les valeurs sociales liées à la forêt.

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The exclusion of certain manufactured products does not necessarily imply disapproval nor does the mention of other products necessarily imply endorsement by Natural Resources Canada.

INTRODUCTION

Broadening the range of uses and values considered in forest management is now an essential and challenging part of the successful management of public lands (Bengston 1994). In order to supply a range of uses and values, managers must consider not only timber but also recreation and other nontimber uses. In Alberta, managing for nontimber resources has gained increasing importance as integrated resource management strategies are undertaken on public lands to deliver a range of values and opportunities to all Albertans (Alberta Energy and Natural Resources 1984).

Understanding recreational use of the forest is essential to understanding and integrating nontimber considerations in successful resource planning. An essential component to understanding recreational use is on-site measurement of use: how many recreational users there are; how these users are distributed geographically and over time; and the social characteristics of the users. These data are fundamental to understanding more sophisticated issues such as predicting future recreational patterns, providing baseline data for future comparisons, and analyzing trends in recreational use patterns (Manning 1986).

Hunting, fishing, using off-highway vehicles, camping, hiking, and horseback riding are some of the more popular recreational activities that occur on forested public lands in Alberta. Considering the full range of recreational uses within integrated resource management can be an issue. This study incorporates the concept of indicator uses, in much the same way as indicator species are used in biological dimensions of forest management (e.g., Biodiversity Science Assessment Team 1994). These indicator uses are flexible, in that the combination of uses relevant for one forested area may be different than the combination of uses for another forested area.

The focus of this study is on collecting information on one activity—camping at Alberta Environmental Protection forest recreation areas. Camping is a prominent activity on public land and campers are usually multi-users, in that they engage in other activities, such as fishing and hiking, while staying in the forest. Therefore, camping may be a significant indicator of nontimber use.

Information collection is an expensive process. To help control costs, an existing information collection mechanism was modified to gather data on total campground use and user characteristics. There were five goals:

1. to modify current camping registration procedures to gather more meaningful data on forest use;
2. to establish a recreation use data base;
3. to link the recreation use data with socioeconomic data from the national census;
4. to illustrate how these data can be used by managers in integrated resource management; and
5. to develop travel cost models that estimate the economic value of camping.

This report addresses the first four goals. The economic models will be presented in subsequent publications.

METHODS

Study Area

The Rocky-Clearwater Forest[1] was chosen as the study area because of its long history of natural resource use, current demands for extractive and non-extractive uses, and the existence of historical data on recreational use. The forest is situated in the foothills of the Rocky Mountains (Fig. 1) between Rocky Mountain House in the east, Banff and Jasper national parks in the west, the Pembina River in the north and the Clearwater River in the south. It covers approximately 1.8 million ha, and is made up primarily of publicly owned forested land.

[1] Since this study occurred, the Rocky-Clearwater Forest has been incorporated into the Southern East Slopes Region.

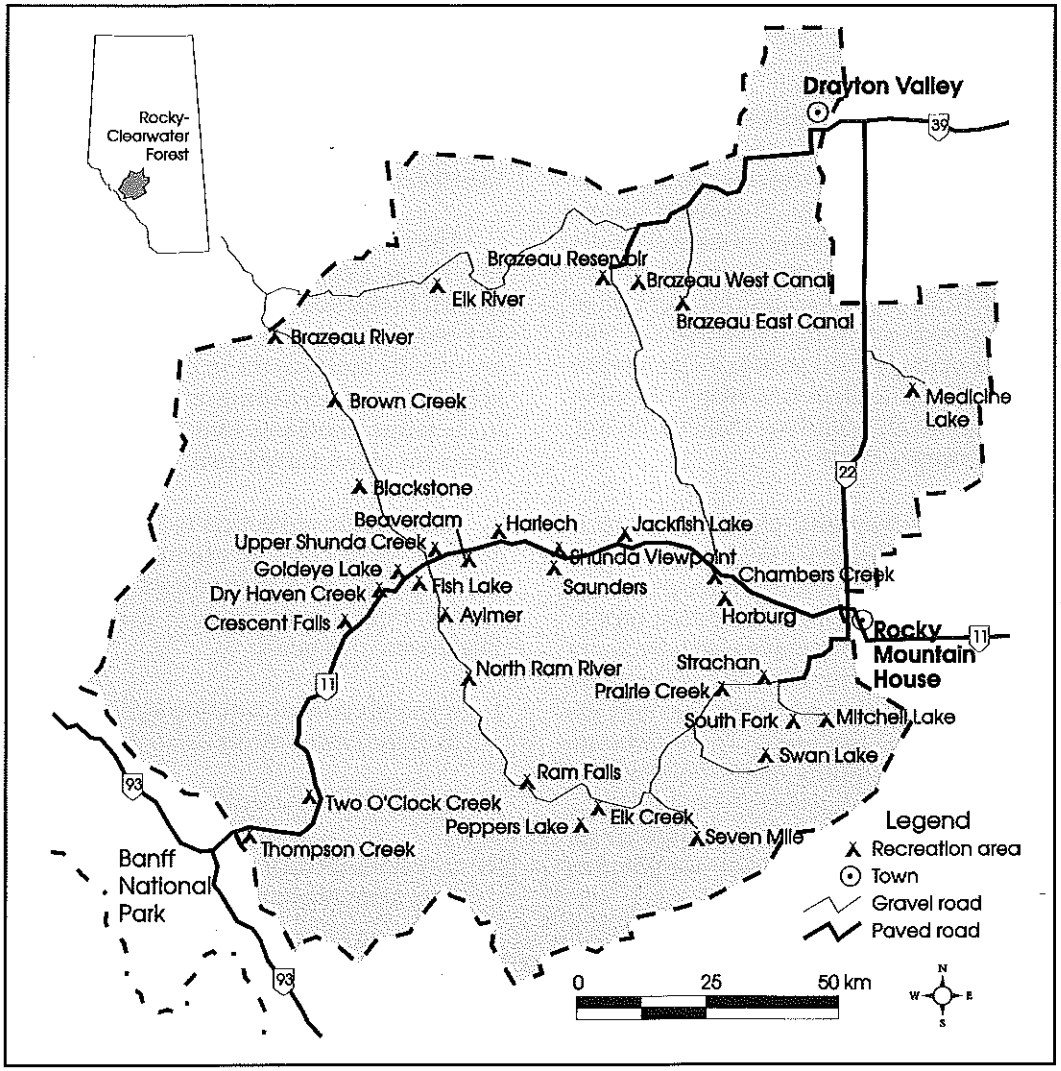

Figure 1. Location of the Rocky-Clearwater Forest and forest recreation area campgrounds.

The forest lies within the lower foothills of the boreal and subalpine forest regions (Rowe 1972). Several ecosystems are represented within the forest including alpine meadows, montane valleys, and boreal forest (Alberta Environmental Protection 1993). Characteristic species in the region include white (*Picea glauca* [Moench] Voss) and black spruce (*Picea mariana* [Mill.] BSP), alpine fir (*Abies lasiocarpa* [Hook.] Nutt.), lodgepole pine (*Pinus contorta* Dougl. ex Loud. var. *latifolia* Engelm.), and trembling aspen (*Populus tremuloides* Michx.) and balsam poplar (*Populus balsamifera* L.) near the eastern sections. Topography varies greatly across the forest, from low rolling rounded hills in the east to mountainous topography with steep slopes and high elevations nearing the Rocky Mountains in the west.

The main access route into the forest is by Highway 11, the David Thompson Highway, which crosses the forest in an east–west direction. The only other paved access route to the forest is Highway 22, which runs in a north–south direction in the eastern portion of the forest. Most other access is by graveled road. The main graveled route is the Forestry Trunk Road, which runs in a north–south direction in the western portion of the forest.

The major towns in the area are Rocky Mountain House and Drayton Valley. Rocky Mountain House has a population of 5465 (Statistics Canada 1991), and lies just outside the forest on its eastern boundary. Residents of Rocky Mountain House have easy access to the forest via Highway 11. Drayton Valley, with a population of 5980, is in the northeast corner

of the forest, with access via Highway 22 or a graveled road.

Another settlement of note within the forest is Nordegg, about midway along Highway 11. Established in 1911, Nordegg was once a prosperous coal mining town that had a population of about 2500 in the 1940s (Joe Baker, Nordegg Historical Society, personal communication, January 1995). Today, the winter population of Nordegg is about 60 and little remains of the original town. Guided tours of the mine site are conducted from May to October. Nordegg is a service center for visitors to the area, with a visitor information center and mine museum, a gas station, restaurant and bar, and a hotel. Basic provisions can be purchased at the gas station. It is proposed that the Municipal District of Clearwater will take over ownership of Nordegg from Alberta Environmental Protection. This could result in further economic and tourism development for Nordegg and the surrounding area.

The two major urban centers in the province are Edmonton and Calgary, with populations of 616 740 and 710 675, respectively (Statistics Canada 1991). Each is about a 2-h drive from the forest. There are three Indian reserves in the forest: the Sunchild, O'Chiese, and Big Horn reserves.

The area has spectacular scenery and an abundance of timber, mineral, fish and wildlife, and recreational resources. Natural resources first attracted settlers to the region during the 1700s and continues to attract people today. The first settlers established fur trading posts at Rocky Mountain House in 1799. When the fur trade ended, people continued to exploit the opportunities offered by the resources of the area.

The Rocky Mountain House area had a prosperous forest industry during the early 1900s (Rocky Mountain House Reunion Historical Society 1977). Today, most forestry operations are conducted under two forest management agreements. Weyerhaeuser Canada Ltd. has one in the northern part of the forest; Sunpine Forest Products has the other in the south which extends into the Bow-Crow Forest. In 1992, the annual allowable cut for the forest was more than 1.3 million m^3 (Alberta Environmental Protection 1993). The Sunpine forest management agreement was enlarged recently by about 599 000 ha and a new linear veneer lumber plant has been established near Strachan (Dave Coish, Alberta Environmental Protection, Land and Forest Service, personal communication, January 1995).

The oil and gas industry is another prominent industrial user of the area. Drilling occurred without much success until 1955 when widespread exploration and commercial discoveries occurred (Rocky Mountain House Historical Society 1977). Since that time there has been rapid development and extensive exploration. Today the area produces thousands of barrels of oil per day. Rocky Mountain House, which was once supported only by the forest industry, now gains most of its economic activity from the oil industry. A sour gas processing facility was established in 1971 at Strachan, about 35 km southwest of Rocky Mountain House.

Other industrial activities involve agriculture and hydroelectric power. Grazing activity in the Rocky-Clearwater Forest dates back to the early 1900s. Approval is required for grazing, and in 1992, about 13% of the forest was allocated to grazing permits (Alberta Environmental Protection 1993). Two hydroelectric dams exist within the forest, the Brazeau and Bighorn dams.

About 6% of the forest is dedicated to protected areas that do not permit resource extraction (Alberta Environmental Protection 1993). These include the White Goat (276 km^2) and Siffleur wilderness areas (255 km^2) that are open to backpacking, mountain climbing, and camping. Hunting, fishing, motorized vehicles, and horses are not permitted in the wilderness areas. There are two ecological reserves, Kootenay Plains and Marshybank. In order to protect the ecological integrity of the reserves, activities such as operating motorized vehicles, horseback riding, camping, hunting, and fishing are not permitted. In 1992, there were also 10 areas in the forest with designated or proposed natural area status. These are relatively small, totaling 5111 ha and covering only 0.3% of the forest. Within a natural area, land use restrictions are determined on a site-by-site basis. Intensive recreational activity such as off-highway vehicle use and resource extraction can occur within natural areas (Bramm 1992).

The Alberta Government adopted the Eastern Slopes Policy on integrated resource planning in 1977, which was intended to guide land use, to accommodate current demands for renewable and nonrenewable resources in the area, and "to provide for the maximum delivery of the full range of values and opportunities" in the region to all Albertans (Alberta Energy and Natural Resources 1984).

Under the Eastern Slopes Policy, public lands in the Rocky-Clearwater Forest are designated into eight land use zones ranging from prime protection zones that protect environmentally sensitive terrain and valuable ecological and aesthetic resources to facility zones that support settlement and commercial development. Most forest recreation areas in the forest are located within general recreation or multiple use zones. General recreation zones retain a variety of natural environments within which a range of recreational opportunities may occur; multiple-use zones provide for the development of all resources.

Forest Recreation Areas

Forest recreation areas were first established at some of the more popular random camping sites in the early 1960s by the Alberta Forest Service in response to concern about wildfire and the environmental impact of random camping in the forest (Dave Coish, Alberta Environmental Protection, Land and Forest Service, personal communication, January 1995).

Although the level of development, quality of facilities, and variety of recreational opportunities are relatively homogeneous across the campgrounds within the two categories, some campgrounds have special attributes such as designation as a Watchable Wildlife Viewing Site (Alberta Forestry, Lands and Wildlife 1990) with viewing platforms and interpretive signs (e.g., Brazeau Reservoir), special scenic attractions (e.g., Ram Falls), or lakes stocked with trout (e.g., Goldeye Lake).

Figure 2. A typical forest recreation area campsite.

In general, forest recreation areas differ from campgrounds found at provincial or national parks in that they are less developed, providing fewer services and facilities. Forest recreation areas provide a semi-primitive camping experience and are classified as providing rustic or basic services. All campgrounds have drive-in sites with a picnic table, fire ring, garbage containers, and firewood. Rustic campgrounds have random or designated tenting sites, pit toilets, may not have a drinking water supply, and have fewer patrols and less maintenance and servicing than basic campgrounds. Basic campgrounds have vault toilets, gravel tent pads, bear-proof garbage containers, and water pumps (Figs. 2, 3, 4).

In 1992, the Alberta Forest Service began charging a camping fee of $5.50 per night for rustic and $7.50 for basic campgrounds. In 1992, visitor use of campgrounds decreased by 50% from the previous year (Alberta Environmental Protection 1993). In 1994, the fee was increased to $7 and $9, respectively.

Figure 3. Water supply at a forest recreation area campground.

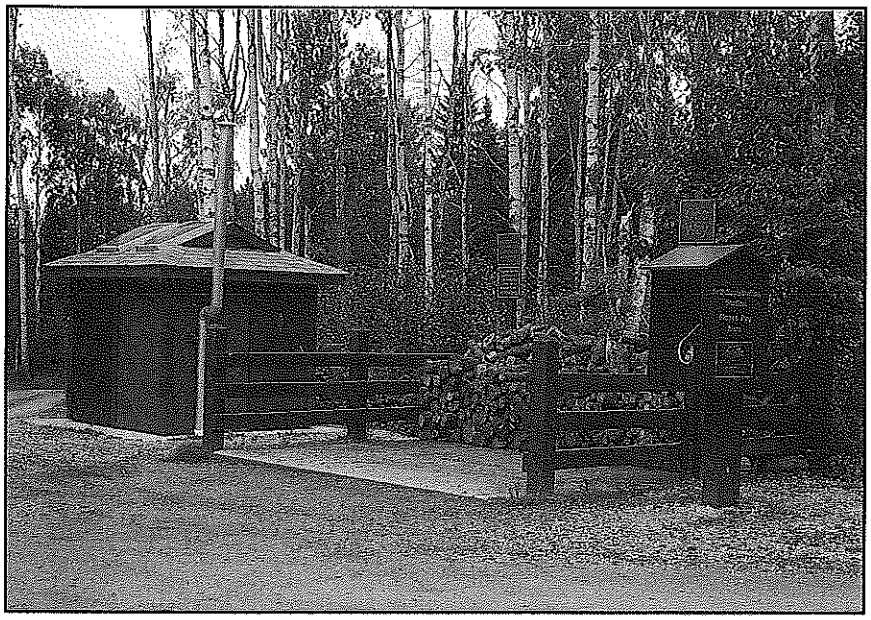

Figure 4. Toilets, firewood, and registration kiosk at a forest recreation area campground.

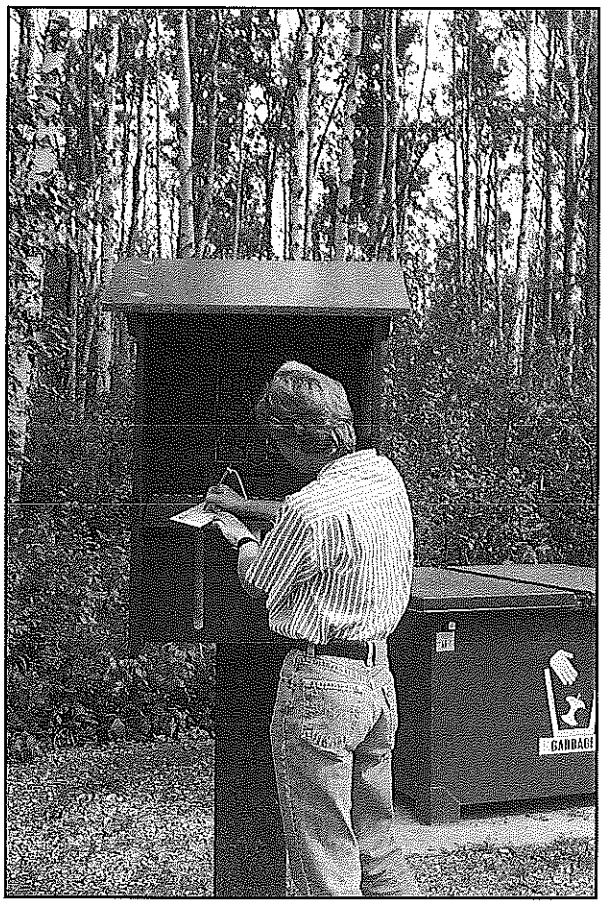

Figure 5. Self-registration kiosk.

Data Collection

Data were collected using a self-registration system. Campers are required to register their stay at forest recreation areas by using a registration envelope to pay their camping fee. They are asked to respond to a few questions on the envelope and deposit it at a registration kiosk (Fig. 5). Using fee envelope data has been shown to be a reasonable method for studying campground use (Richards and Brown 1992). At first, only information necessary to verify payment was collected (e.g., vehicle license number, campsite number, number of camping nights, date, and total payment). In consultation with the Alberta Environmental Protection, camping fee envelopes were redesigned in 1994 to include information for estimating use (Fig. 6). The new design added questions on the number of people in the camping party, the number of previous visits to the forest recreation area in the last 10 years, and the respondent's postal code.

A limitation of using self-registrations as a source of information is that some campers may fail to register, but forest recreation area staff estimate that more than 90% of campers register. Periodic patrols of the campgrounds by staff help achieve this high compliance rate. Most forest recreation areas are patrolled daily to collect fee envelopes from the registration kiosks and ensure that campers have registered. Campgrounds are usually patrolled late in the evening and again early in the morning. To camp without registering generally requires that campers arrive late at night and leave early in the morning. The patrols generally reduce the opportunity for registration non-compliance.

Registration envelopes were gathered from all 33 forest recreation areas that collected fees in 1994 (Fig. 1). Envelopes were collected from mid-May to mid-October, the duration of the fee-collection season. Of the 18 985 envelopes that were collected, 18 350 were considered usable: 375 of the old-style envelopes were inadvertently distributed to various campgrounds and 260 envelopes had only the date and/or the amount paid sections completed.

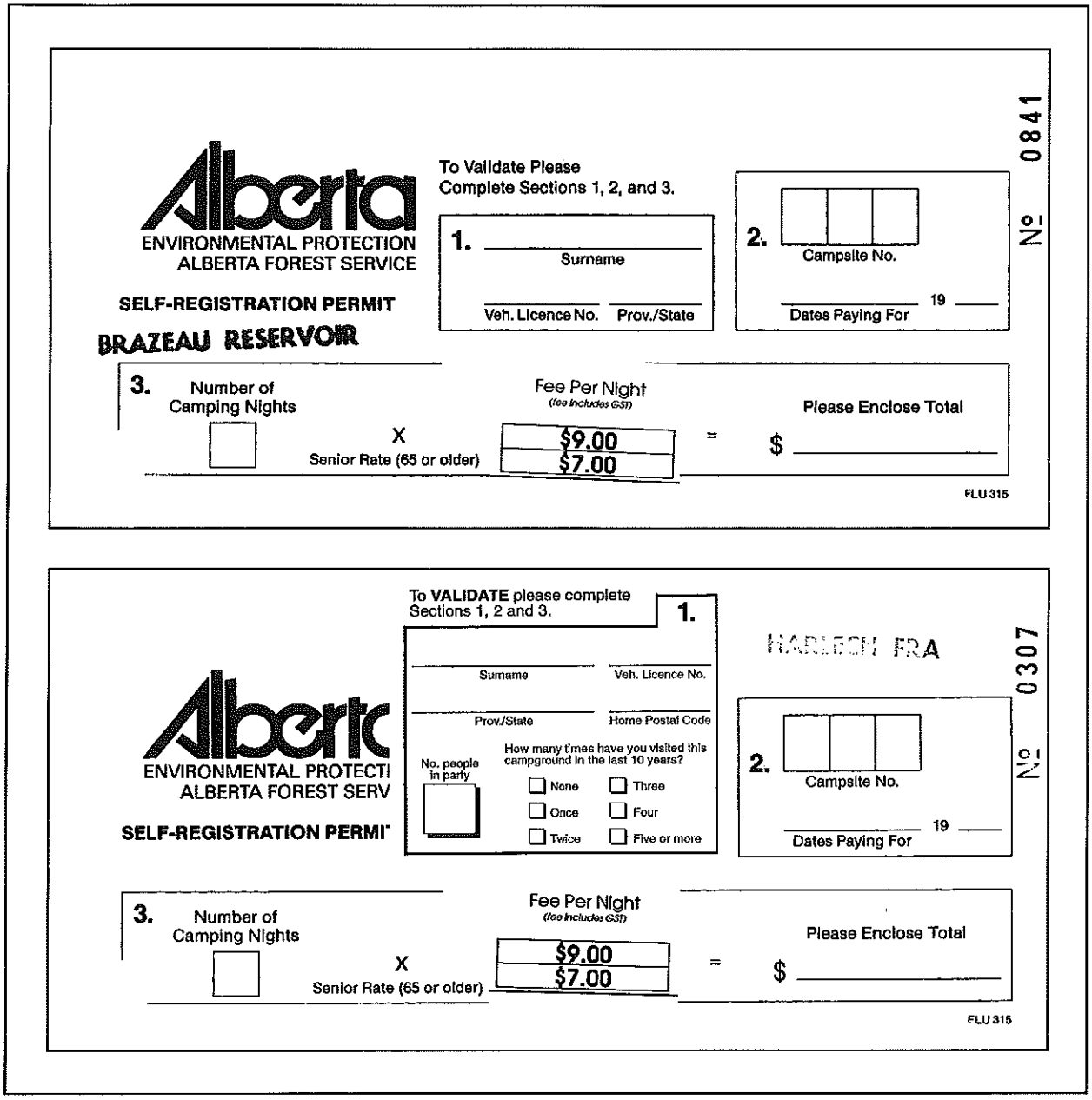

Figure 6. Self-registration permit before (top) and after (bottom) being redesigned.

Estimates of total trips to each of the campgrounds were determined by combining envelopes to represent unique trips. Because visitors on multi-day trips have the option of paying on a daily or a multi-day basis, not every envelope represented a unique trip. To determine the number of trips to the forest recreation areas, it was necessary to combine envelopes into single trips. This was only possible for envelopes with the vehicle license number, the date, and the number of days or fee paid sections completed. Envelopes were combined into a single trip if, for a given vehicle license number, the purchase date plus the number of days paid was only one day short of the next purchase date for the same location. If there had been a break of at least one day not paid for, then the next envelope was considered a new visit. Combining envelopes in this manner assumes that a camping party visiting more than one forest recreation area has taken more than one trip. For example, a camping party staying

one night at Fish Lake and the next night at Thompson Creek was considered to have taken two separate trips. This resulted in 15 704 trips reported by the 18 350 envelopes.

Multiple Trips

Vehicle license numbers were used to examine multiple trips to the forest recreation areas by individuals or households. The frequency of multiple trips was determined by examining the number of occurrences of a particular vehicle license number. This assumes that a vehicle license number is attributed to one individual or household, and that the individual or household always registered the same vehicle. While this may not always be true, the use of vehicle license numbers was the best indicator available for individual or household trips.

Socioeconomic Characteristics

The collection of a postal code for each camping party allowed an estimation of individuals socioeconomic characteristics. It was assumed that everyone in the camping party originated from the same postal code. Only records with an Alberta postal code were used in the socioeconomic analysis because census data for most postal codes outside the province were not available. Estimates for socioeconomic data were obtained from Statistics Canada 1991 census data. Data on total population, age structure, average household size, total number of one-parent families, education, unemployment rate, and household income were obtained from the 2A and 2B profiles of the census for each postal code.

Using the postal code conversion file from the census data, the postal code from each record was linked to the corresponding enumeration areas of the 1991 census. Of the 13 997 records with an Alberta postal code, 12 772 matched a postal code in the postal code conversion file. The remaining postal codes were either missing or invalid codes. Enumeration areas represent the smallest census geographic unit. Each postal code could consist of several enumeration areas because every enumeration area that partially or wholly intersected a postal code was included. Enumeration areas then had to be collapsed to obtain one census record for a particular postal code. It was not possible to weight socioeconomic data by the proportion of the enumeration area population intersecting a postal code. Thus, socioeconomic estimates for an individual were based on information from all individuals occurring in every enumeration area that corresponded to the individual's postal code. For example, to obtain the total population of a postal code, the total populations were summed across all enumeration areas that partially or wholly intersected the postal code. To obtain average household income, the mean of the average household income for all enumeration areas that partially or wholly intersected the postal code was used.

Trip Origin

Trip origin was determined from the province or state and classified as Alberta, other Canadian provinces, and other countries. For trips originating within Alberta, the first three digits of the postal code were used to classify each trip as originating from Edmonton, Calgary, Red Deer, Fort McMurray, Grande Prairie, Lethbridge, Medicine Hat, other cities or towns, and rural areas.

Alberta origins were delineated further into market areas using all six digits of the postal code and the postal code conversion file, which gives a latitude and longitude that represents a geographical location for each enumeration area centroid. If a postal code intersects more than one enumeration area, then there will be a corresponding number of enumeration area centroids and geographical locations. To represent each postal code as a single geographical point, each postal code that was linked to more than one enumeration area centroid was located at the geographic mean of the centroids, weighted by the total population for each enumeration area. The geographic means were then used in geographic information systems to determine market areas for the Rocky-Clearwater Forest. Market areas were mapped based on the number of trips originating from 100-mi^2 (259-km^2) blocks, defined arbitrarily using a grid system.

Camper Subgroups

Field observations of campers at forest recreation areas during the 1994 camping season suggested that the campgrounds could be attracting distinguishable subgroups of campers. For example, it was observed that Medicine Lake seemed to attract primarily local residents, many of whom had visited the campground several times in the past and were staying for several days. In contrast, Chambers Creek seemed to attract people who stayed only one night, many of whom had not visited the campground previously. The possibility of subgroups of campers was explored using cluster analysis. A

disjoint clustering procedure (FASTCLUS procedure, SAS Institute Inc. 1989) was used to delineate subgroups of campers using information on the registration envelope. Ten forest recreation areas, representative of the camping opportunities in the Rocky-Clearwater Forest and therefore most likely to attract different types of campers, were chosen for the analysis. Envelopes from these locations represented 75% of all trips to the forest. The forest recreation areas were

- Brazeau Reservoir (including the east and west canals)
- Medicine Lake
- Prairie Creek
- Chambers Creek
- Goldeye Lake
- Fish Lake
- Ram Falls
- Crescent Falls
- Two O'Clock Creek
- Thompson Creek

Three variables were clustered: the number of nights stayed, the number of previous visits to the forest recreation area in the last 10 years, and origin of the camping party. Origin was classified as tourist or resident for this analysis and coded as 1 = Alberta and 0 = outside of Alberta. Variables were standardized to a mean of zero and standard deviation of one for the analysis.

RESULTS

Campground Use

A total of 15 704 trips were made to the forest recreation area campgrounds in the Rocky-Clearwater Forest representing 28 544 user nights (one campsite occupied for one night) (Table 1). On average, visitors spent 1.80 nights at the campgrounds. The majority of users (53%) spent only one night and 40% spent two or three nights (Table 2). This suggests that forest recreation areas are used primarily as one-night stopovers or as weekend or long weekend trips. The distribution of trips across week days, weekends, and long weekends tends to support this. The largest proportion of trips occurred on weekends and long weekends (54%) (Fig. 7). The August long weekend (July 29–31) received more trips (907) than the other weekends and week days (Fig. 8). July received more trips than the other months, with a total of 5346 trips (Fig. 9). This represented 35% of the total camping trips to the forest. The distribution of trips to the individual forest recreation areas showed that Thompson Creek received the largest proportion (14%) of the total trips followed by Fish Lake (11%) and Medicine Lake (7%) (Table 1).

Multiple Trips

About 82% of the visitors made only one camping trip to forest recreation areas in the Rocky-Clearwater Forest during the 1994 camping season, based on the occurrences of vehicle license numbers (Table 3); however, because some vehicle license numbers had multiple occurrences, some individuals could have made as many as 20 camping trips to the area during 1994.

Visitor Characteristics

A total of 42 513 people camped at the forest recreation areas in 1994. Most of the camping parties (53%) were composed of two people and only 6% had more than five in their party (Table 4). The average party size was three. According to the data for the number of previous visits to the forest recreation areas in the last 10 years, 50% were first-time visitors, 27% had made one to four previous visits, and 27% had made five or more visits (Table 5). This could have implications for management of the campgrounds; the amount of experience visitors have with a campground has been shown to influence their management preferences. For example, vehicle-based campers with the most camping experience and most familiar with a campground were the most critical of management actions such as the introduction of camping fees and maintenance of vehicle access (McIntyre and Pigram 1992).

Socioeconomic Characteristics

Estimates of socioeconomic characteristics from the 1991 census showed that forest recreation areas campers appear to be fairly representative of the Alberta population (Table 6). A much smaller proportion of Edmonton and Calgary residents were represented at forest recreation areas compared with the general population. More than 50% of the province's population lives in these two cities but

Table 1. Distribution of user nights and camping trips for forest recreation areas

Forest recreation area	Total nights	Mean nights	Number of trips	Total trips (%)
Fish Lake	3 952	2.22	1 778	11.3
Thompson Creek	2 780	1.29	2 128	13.6
Medicine Lake	2 663	2.36	1 118	7.1
Goldeye Lake	1 961	1.89	1 032	6.6
Two O'Clock Creek	1 747	1.60	1 078	6.9
Ram Falls	1 560	1.71	904	5.8
Prairie Creek	1 346	2.14	627	4.0
Crescent Falls	1 235	1.67	736	4.7
Brazeau Reservoir	1 210	2.06	587	3.7
Chambers Creek	1 141	1.57	721	4.6
Peppers Lake	988	1.95	501	3.2
Swan Lake	932	2.26	409	2.6
Brazeau West Canal	915	2.08	439	2.8
Upper Shunda Creek	853	1.58	531	3.4
Strachan	758	1.95	383	2.4
North Ram River	618	1.74	351	2.2
Harlech	580	1.27	450	2.9
Seven Mile	514	1.71	296	1.9
Dry Haven Creek	297	1.40	207	1.3
Elk Creek	294	1.77	163	1.0
Jackfish Lake	292	1.53	185	1.2
Brazeau East Canal	278	2.16	129	0.8
South Fork	268	1.87	141	0.9
Brown Creek	229	1.58	144	0.9
Beaverdam	208	1.47	138	0.9
Shunda Viewpoint	203	2.24	90	0.6
Horburg	165	1.48	101	0.6
Blackstone	148	2.14	69	0.4
Brazeau River	105	1.31	79	0.5
Saunders	99	1.77	53	0.3
Aylmer	72	1.27	52	0.3
Mitchell Lake	71	1.65	43	0.3
Elk River	59	1.44	41	0.3
Total	28 544	1.80	15 704	100.0

only 31% of the campers were from Edmonton or Calgary. This could be a function of the distance required to travel to the Rocky-Clearwater Forest, especially for Calgary residents. Calgary residents live closer to the Bow-Crow Forest, which offers similar recreational opportunities, and they are within a 1.5-h drive of Banff National Park and Kananaskis Country, both of which offer many recreational opportunities in a mountain setting. Campground users had slightly lower household incomes but were slightly better educated and older than the general population.

Trip Origin

Most visitors (90%) were from Alberta, followed by other provinces (primarily British Columbia, 4% and Saskatchewan, 2%) (Fig. 10). About 2% of the visitors were from the United States and 1% were from other countries, primarily Germany, Switzerland, and the Netherlands. Thompson Creek received the largest proportion of foreign visitors, with 27% from outside of Alberta. Thompson Creek is located about 10 km from the Banff National Park boundary and provides easy access to the mountain parks. It

Table 2. Distribution of nights stayed at forest recreation areas

Number of nights	Frequency	Percent
1	8349	53.2
2	4320	27.5
3	1980	12.6
4	591	3.8
5	205	1.3
6	104	0.7
7	65	0.4
8	32	0.2
9	14	0.1
10	10	0.1
>10	31	0.2

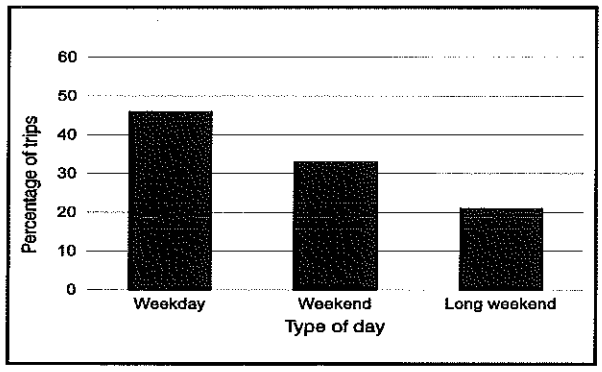

Figure 7. Distribution of camping trips by type of day.

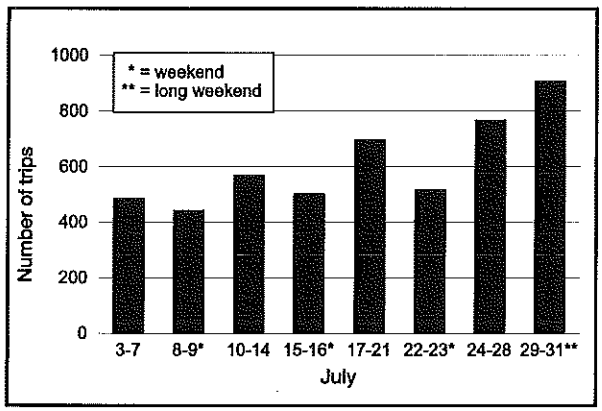

Figure 8. Distribution of camping trips during July 1994.

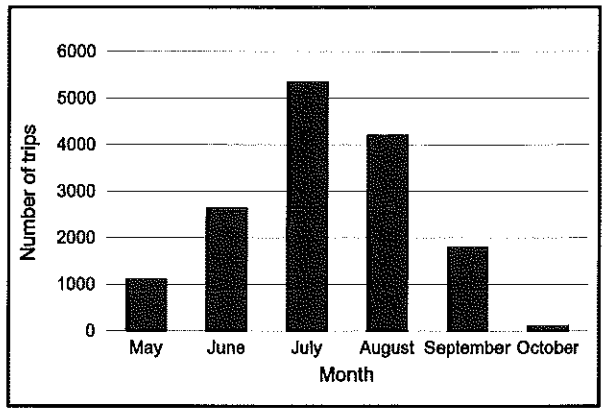

Figure 9. Distribution of camping trips by month.

Table 3. Distribution of multiple camping trips by individuals to forest recreation areas

Frequency of occurrences of vehicle license numbers	Frequency	Percent
1	8 363	81.5
2	1 314	12.8
3	360	3.5
4	143	1.4
5	46	0.4
>5	40	0.4
Total	10 266	100.0

Table 4. Distribution of number of people in camping party

Number of people	Frequency	Percent
1	619	4.3
2	7 613	52.5
3	1 977	13.6
4	2 417	16.7
5	1 038	7.2
6	488	3.4
7	151	1.0
8	97	0.7
9	39	0.3
10	18	0.1
>10	39	0.3
Total	14 496	100.0

Table 5. Distribution of previous visits in the last 10 years to forest recreation areas

Number of previous visits	Frequency	Percent
0	7 086	49.7
1	1 523	10.7
2	1 132	7.9
3	734	5.2
4	539	3.8
≥5	3 235	22.7
Total	14 249	100.0

Table 6. Comparison of socioeconomic characteristics of forest recreation area campers and the Alberta population

Socioeconomic variables	Forest recreation area campers	Alberta population
Mean people/household	2.8	2.7
University degree (%)	10.5	9.0
≥45 years old (%)	27.6	26.3
Metropolitan residents[a] (%)	30.9	52.2
Mean household income ($)	45 973	47 249

[a] Percent living in Edmonton or Calgary.

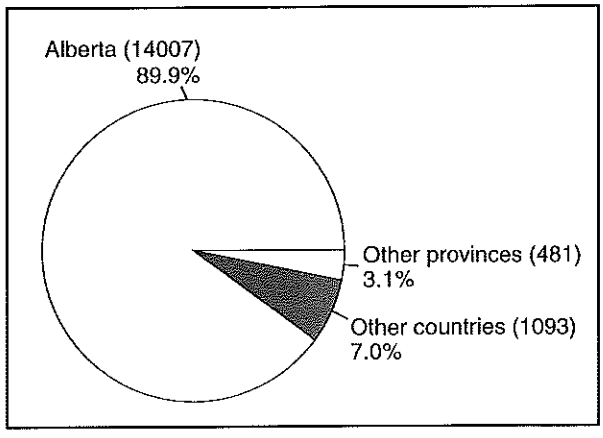

Figure 10. Origin of forest recreation area campers.

is probably used by many people en route to the mountain parks, as an alternative when campgrounds in Banff National Park are full, or as a less expensive camping alternative to Banff National Park. Brazeau East Canal and Elk River did not receive any visitors from outside Alberta. East Canal is not well marked and Elk River is in a relatively remote location. Data for origins within Alberta showed that a large proportion of trips (43%) were from rural areas; 23% were from Edmonton; 13% were from small cities or towns; 12% were from Red Deer; and 8% were from Calgary. The cities of Fort McMurray, Grande Prairie, Lethbridge, and Medicine Hat contributed a total of 1% of the trips. These results showed that the forest recreation areas are used more by residents of smaller cities, towns, and rural communities than by the residents of the two large urban centers of Edmonton and Calgary. Medicine Lake and Shunda Viewpoint received the largest proportion of trips from smaller cities, towns, and rural areas: 89% and 98%, respectively. The largest proportion of trips originating from Edmonton and Calgary occurred at Aylmer (56%), Horburg (52%), and Saunders (52%).

Using geographic information systems to map the market areas for the Rocky-Clearwater Forest showed that most trips originated from within a 1- to 2-h drive of the forest (Fig. 11).

Camper Subgroups

Two subgroups of campers were delineated from the cluster analysis. Cluster 1 comprised 9895 camping parties, or 88% of the sample. It had a higher proportion of its members from outside Alberta (12%); most stayed only one or two nights (Table 7); and a large proportion (43%) had visited the campground in the past (Table 8). Cluster 2 consisted of 1382 camping parties representing 12% of the sample. All members of Cluster 2 stayed longer than two nights, more of them were first-time visitors, and almost all (96%) were from Alberta. To test the hypothesis that different forest recreation areas attract different types of campers, the distribution of the two clusters across the forest recreation areas was examined. Cluster 1 campers were over represented at Chambers Creek, Thompson Creek, and Two O'Clock Creek; Cluster 2 campers were over represented at Brazeau Reservoir, Brazeau West Canal, Fish Lake, Goldeye Lake, and Medicine Lake (Table 9).

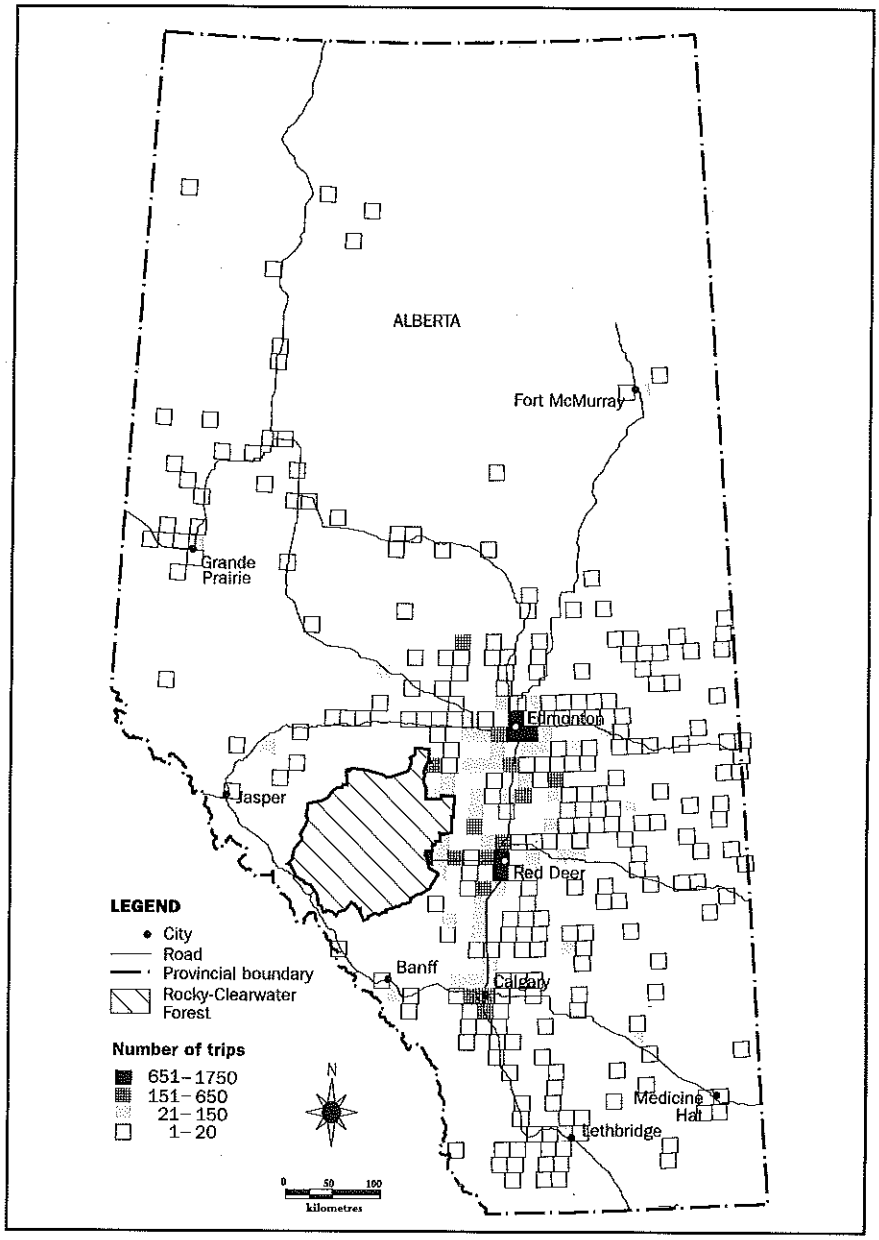

Figure 11. Market area map for camping trips to the Rocky-Clearwater Forest.

Table 7. Distribution (%) of nights stayed by camping clusters

Nights	Cluster 1 n = 9893	Cluster 2 n = 1382
1–2	90.9	0.0
≥3	9.1	100.0

Table 8. Distribution (%) of previous visits to forest recreation areas by camping clusters

Previous visits	Cluster 1 n = 8949	Cluster 2 n = 1251
0	46.6	54.2
1–4	27.6	31.0
≥5	25.8	14.7

Table 9. Distribution (%) of camping clusters at forest recreation areas

Forest recreation area	Cluster 1	Cluster 2	χ^2	p
Brazeau Reservoir	82.9	17.1	13.2	0.003
Brazeau East Canal	89.2	10.6	0.2	0.625
Brazeau West Canal	83.1	16.9	9.0	0.000
Chambers Creek	92.7	7.3	17.2	0.000
Fish Lake	80.5	19.5	103.5	0.000
Goldeye Lake	85.4	14.6	6.0	0.015
Medicine Lake	81.6	18.4	44.0	0.000
Thompson Creek	95.1	4.9	130.7	0.000
Two O'Clock Creek	92.9	7.1	29.0	0.000

These results suggest that Chambers Creek, Thompson Creek, and Two O'Clock Creek attract more tourists, campers who are using the forest recreation areas as stopovers, and campers who are familiar with the campgrounds. In contrast, Brazeau campgrounds, Fish Lake, and Medicine Lake may be attracting more campers who make the campground their camping destination and are first-time visitors. These results tend to confirm field observations and support the hypothesis that distinct subgroups of campers may be attracted to different forest recreation areas. The possible existence of subgroups visiting different areas suggests that managing forest recreation areas in a homogeneous fashion to provide the same experience at all campgrounds may not be meeting the desired experiences of all visitors. The existence of camper subgroups and their management preferences is an area to be explored further in future research.

DISCUSSION

A total of 42 513 people spent more than 28 500 nights at the forest recreation areas. This suggests that camping is an important recreational activity in the Rocky-Clearwater Forest and may be a significant nontimber land use indicator. This study demonstrated that whenever an agency has a user contact mechanism in place, such as mandatory registration, it can be used as a relatively inexpensive data collection system to assist management efforts in collecting information on nontimber use and user data. This data can be used to determine total use, temporal and spatial distribution, estimate socio-economic profiles of users, trends in campground use, and the economic values of nontimber resources. Future improvements to the data collection method used in this study could include using computer scanning technology to read fee envelope data directly into a data base.

The envelope data can assist management by identifying campgrounds and times that require high maintenance, clean-up, and provision of information. July received the highest use and weekends were always busier than weekdays. The August long weekend was the busiest weekend during 1994. Knowing when these peaks occur can assist managers in developing maintenance and clean-up schedules that correspond with highest use.

The results also provide insight on enhancing nontimber benefits from the forest by identifying potential improvements to recreational opportunities and information needs of campers. This study suggests that campers at forest recreation areas are not a homogeneous group but rather that there may be subgroups of campers, each with differing management preferences and information needs. The study identified two subgroups of campers that tend to visit different campgrounds and may have different management needs.

Campgrounds that are used primarily for short stopovers could be used by management or local tourism associations to provide tourism information on a regional level. Promoting the tourism opportunities in the area would encourage visitors to stay longer. Forest recreation areas that are a camping destination, rather than a stopover, may benefit campers by having information on recreational opportunities such as hiking or off-highway vehicle trails in the immediate area. The existence of camping subgroups and their campground and forest management preferences is an area that will be explored further in future research.

A mandatory registration system can also be used as a means of public involvement (Hendee and Lucas 1973). For example, it can help identify

stakeholder groups, where stakeholders live, their previous experience in the area, the number of people in the stakeholder group, and when and where they go in the forest. The camping envelope can be designed to gather opinions on specific management questions or to collect names and addresses to sample visitors by mail. A mail survey could collect more detailed information on use patterns, activities, management preferences, and attitudes.

SUMMARY

Redesigning a camping fee envelope used in a mandatory registration system provided information on campground use and user information. Adding three questions on visitor origin, familiarity with the campground, and camping party size gave valuable information on campground users. Linking the envelope data with the national census data expanded the data base to allow estimates of socioeconomic characteristics and the determination of geographical origins (market areas) for the Rocky-Clearwater Forest. Other information on the envelope gave an account of the spatial and temporal distribution of campground use in the forest.

A postal code analysis showed that forest recreation areas serve a local market. Most users were from rural areas, and from small cities or towns within a 1- to 2-h drive of the forest. This suggests that forest recreation areas provide an important camping experience for Albertans who do not live in the two large urban centers of Edmonton and Calgary. Most people camped in small parties of two or three people. Fifty percent of the visitors had not been to the campground in the last 10 years. Most visits occurred in July and on weekends, and most campers had short stays of one to three nights. Overall, forest recreation areas were used primarily as weekend camping destinations during July and August by Albertans who live near the forest.

By subjecting the data to multivariate analysis, two subgroups of campers were delineated. The two groups appeared to be attracted to different forest recreation areas. One group seemed to represent a stopover group and were over-represented at campgrounds located along Highway 11 near Banff National Park or Rocky Mountain House. The other group appeared to represent those who make the forest a camping destination. This group was over-represented at campgrounds that are not located on Highway 11 or have other recreational opportunities such as fishing, swimming, and hiking located in the campground. While this represents a preliminary analysis based on only three variables, it suggests that campers at forest recreation areas are not a homogeneous group and therefore may have differing management needs and preferences.

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