BRITISH COLUMBIA HYDRO AND POWER AUTHORITY

HAT CREEK PROJECT

Ebasco Services of Canada Ltd: Environmental Consultants; Bruce Howlett Incorporated Consultant - Hat Creek Project - Detailed Environmental Studies - Recreation Report - August 1978.

ENVIRONMENTAL IMPACT STATEMENT REFERENCE NUMBER: 21

BRITISH COLUMBIA HYDRO &
POWER AUTHORITY

HAT CREEK PROJECT

Detailed Environmental Studies

A5
Recreation Report

bhi - Bruce Howlett Incorporated
Consultant

August, 1978

ACKNOWLEDGMENT

This report was prepared with the assistance of Miriam Koral of Envirosphere Company.

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1.0 SUMMARY

In comparison to the region which surrounds it, the Hat Creek Valley is not an important recreation resource. The predominant land use is agriculture, access is comparatively poor, there are no developed recreation facilities, major water bodies are lacking, and scenic values are pleasant but far from spectacular. Crown land leasing and management policies call for continuation of agriculture, and recreational activity levels are correspondingly low. Without the Hat Creek project these conditions are expected to continue. The only recreational facilities nearby that attract significant numbers of visitors are Marble Canyon Park and Pavilion Lake located about 12 kilometres (7.5 miles) from the project centroid. The total number of recreation days for these two small sites combined almost equal the recreation days available in the entire Hat Creek Valley.

In the Thompson, Bonaparte and Fraser River areas lie major highways connecting northern and eastern British Columbia with the lower Mainland carrying large numbers of tourists and sightseers. Further to the east and north lie the myriad lakes and developed recreation facilities that provide destination points for thousands of anglers, hunters and other recreationists who come from the lower mainland and elsewhere beyond provincial boundaries. Recreation activity generated by residents in communities nearby the Hat Creek Valley is but a small part of recreation that takes place in this area.

Without the Hat Creek project, recreation in the Hat Creek Valley will increase, but at a slow rate, constrained as it is by the dominant agriculture patterns which are expected to continue. Plans for expansion of recreation facilities in the valley are few and comparatively small. Nearby, at Pavilion Lake and Marble Canyon Park recreational pressures are expected to increase in the next one or two decades and new public facilities are possible. Outside the valley, construction of the Coquihalla Highway within the next decade may direct sightseeing tourists away from the Cache Creek - Ash-

croft area resulting in a levelling of growth in recreation facilities in the immediate Thompson River Valley area in the 1980's. Beyond, recreation activities will likely grow in concert with increases in provincial population, income and leisure time, for the dominant users of facilities in the north, south and east of Cache Creek - Ashcroft are from B. C. Growth will probably continue to be asymmetrical, with the area west of the Hat Creek Valley and Fraser River experiencing little growth compared with the area east of the Hat Creek Valley and Thompson - Bonaparte Rivers. Ease of access is much better in the eastern portion and current highway plans point to that trend continuing.

With the project, recreational activity levels will rise dramatically, particularly during the construction stage when activity days will probably be twice the present local levels. Pressures will be especially high in the Hat Creek Valley where the resident work force will rise to exceed 2,000 before diminishing to a token force in the late 1980's. Recreational pressure on nearby areas will undoubtedly rise and strict management policies may be required to maintain wildlife populations at satisfactory levels. Pressures will spread outward into the popular areas east and north of the nearby towns which will also rise in population to accommodate the resident work force. However, these incremental demands may be absorbed with the increases expected from Provincial growth as a whole.

The actual loss of recreational area because of the project will be comparatively small. Those lands which are removed by project actions are predominantly agricultural or agriculturally related and are associated with low density hunting and backroad travel as adjuncts to farming and ranching. The Hat Creek fishery, which is also quite small compared to nearby lake fishing, will be severely altered, particularly during construction. Conceivably it could be restored at the project operation stage. Sightseeing, which provides enjoyment to many travelling Highway 12 to Marble Canyon and Pavilion Lake, may well increase as curiosity seekers include a visit to the plant and mine site in their itinerary. In the valley itself, any air quality impacts which could affect vegetation could in turn influence hunting and sightseeing.

The value of recreational resources lost is difficult to calculate for the activities directly affected by the plant, mine and other components are easily transferred to nearby areas with equal or better potential. If increases in recreational activities are considered to be a benefit, then the project will create major net benefits for there will be far more people in the area available to partake in recreation than if the project were not to proceed. It is these increased numbers that may call for mitigative measures, for the pressures they create will in some cases exceed the capacity of nearby facilities and induce great pressure on nearby recreational resources.

1.1 TERMS OF REFERENCE

The terms of reference for the Recreation Appendix A-5 require that data on consumptive recreational activities covered by other consultants be incorporated; that distinctions be made between local and tourist (non-local) use; and that indoor recreational facilties be treated separately in Appendix C-2 (b).

An inventory of existing recreational activity is required by type, use, area and number of user days. Recreation capability without the project is to be determined by examining existing development plans and future management policies. The cost of developing the recreation potential of the area without the project is to be estimated.

Changes in recreational activity induced by the project by type of activity, use areas and number of user days are to be determined for the construction, operation and rehabilitation phases. The cost of developing the recreational potential of the area with the project is to be determined and mitigation-compensation measures are to be recommended.

2.0 INTRODUCTION

Recreation is a phenomenon of the age. Increased population, wealth and leisure time coupled with a heightened appreciation of the outdoors have resulted in an explosive growth in recreation activities. Technology has aided the growth, sometimes with dramatic results as a flood of motorized campers, motor boats, guns, fishing equipment, snowmobiles and other equipment have revolutionized recreation patterns. Government expenditure for highways and back roads, parks, campgrounds, picnic sites and other "support" facilities have kept pace, enhancing and spreading the opportunities for outdoor pursuits. At the same time new recreational acitivities have spawned and grown with remarkable speed. Trail biking, snowmobiling, cross-country skiing, backpacking and many other activities were either unknown or attracted few Canadians 10 to 20 years ago.

Occuring simultaneously with the growth in recreation activities has been their spread across the land. Virtually no place is immune from the dedicated hunter equipped with a 4-wheel drive vehicle, the intrepid trail biker and the backpacker. Inevitably this has brought losses to the natural environment. Animal populations have been affected; habitat damaged; the quality of recreational experience diminished. Government has reacted by closing areas to use, reducing bag limits and raising fees. It is remarkable how quickly this has all taken place.

This study examines recreation in one area of the Province - the Hat Creek Valley and the region which surrounds it. Within the limits of available data the type of activities people pursue, the frequency and location at which they take place, and the propects for their continuance or change are presented. Next, the effects of the proposed Hat Creek project on recreation are assessed and the changes to be expected are described and quantified.

The scope and detail of the study varies with geography. In general, the closer to the project site the greater the detail. Major physical

disturbances will occur as a result of construction and operation of the project, and recreation which takes place within that area will be altered dramatically. Beyond the physical bounds of the project itself impacts are more diffuse and indirect - increased recreation demands and automobile traffic caused by workers are cases in point.

Recreation is not a simple phenomenon to deal with. It comes in different forms, appeals to different people, occurs at different times of day, month and year and is influenced by the age of the participant. The study of recreation in this report concentrates on activities taking place outdoors, and at a place. The place may be very specific in location (such as at a beach) or widespread (such as a hunting area). Activities of different types are defined in terms of "activity days", and because one person may partake in more than one activity in one day there may be more activity days than participants. Activity days can however be assigned economic values and from these an understanding of the benefits both lost and gained can be determined.

The data base underlying the study is scanty. Some original studies of local recreation patterns have been undertaken and these are used extensively. Other data come from government sources, most of which deal with ~~areas~~ much larger than the Hat Creek Valley. Studies by others have been used to supplement government data and provide original information for some important activities, notably hunting and fishing.

Recreation is important to British Columbia. Not only do residents partake of the opportunities offered by nature, but visitors do as well. The economic benefits derived therefrom are major and fully deserving of concern, for if the recreation resource is damaged the effects can be widespread. The impacts that the Hat Creek project will have on recreation for both the present and future years are part of that concern.

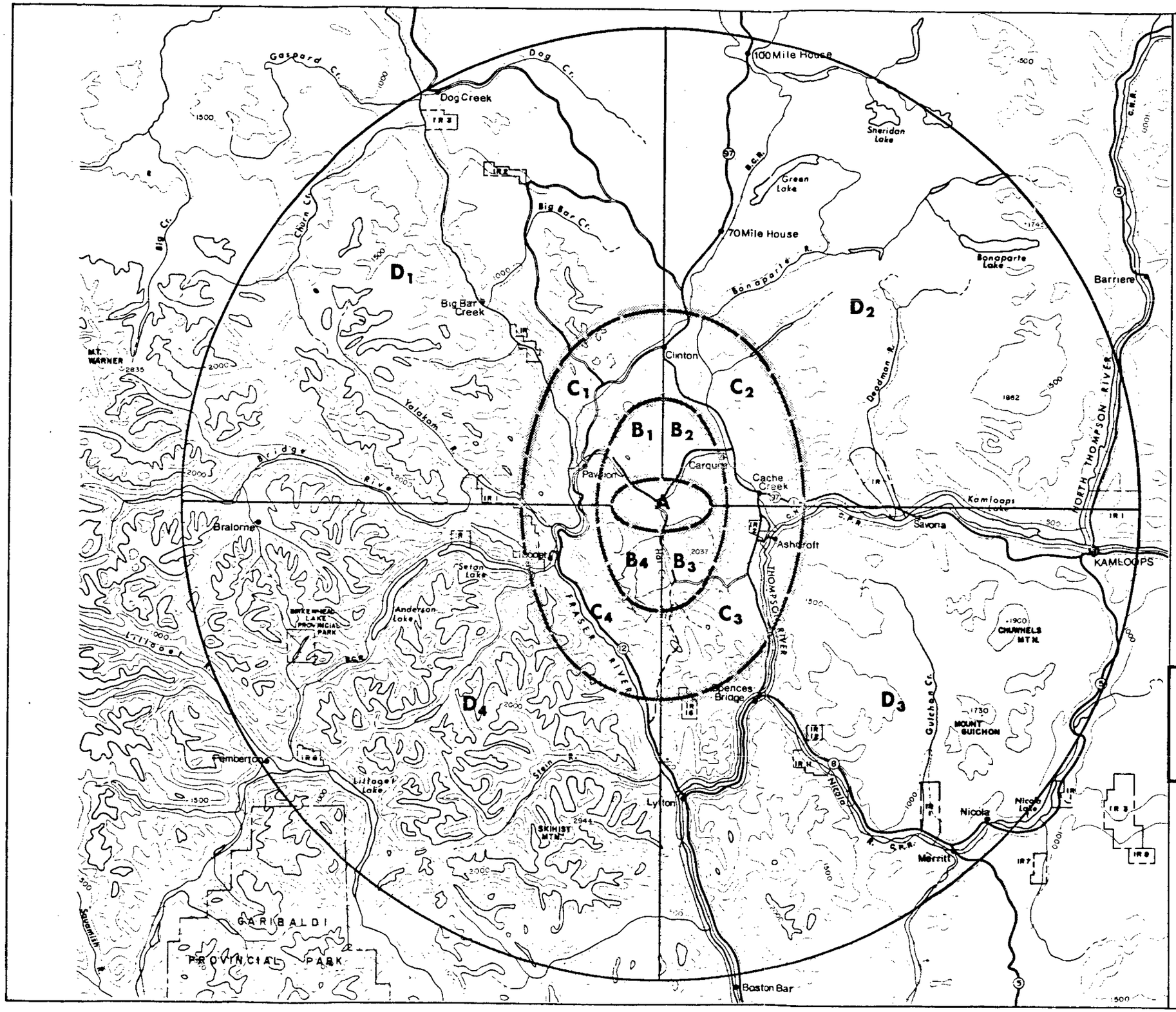
3.0 METHODOLOGY

An interdependency exists between the natural environment, recreation facilities and recreation activities. This interdependency is modified by access, by the man-made environment, by government policies, and by private and public investments in recreation facilities. The methodology adopted for this study examines natural environment assets, recreation facilities and recreation activities and in turn, forecasts their continuance and describes how they will be affected by the Hat Creek project.

3.1 ANALYSIS AREAS

Because the influence and impacts of the project will tend to diminish with distance, an integral part of the methodology is the examination of recreational phenomena by geographic area - to the extent feasible and practicable. Four areas have been delineated, each of which (except the first) has been divided into quadrants centering on the approximate mid-point of the project site. These geographic areas are shown on Figure 3-1 and were selected to reflect different impact areas associated with the project. Area A includes the plant, mine site, ash disposal areas, reservoirs and all major physical impact areas. Exceptions include transmission facilities, a water line and access road which begin within Area A and terminate in areas beyond. Because of the physical disturbances expected in Area A, changes in any existing recreation activities will be great.

Area B encompasses the Hat Creek Valley and surrounding ranges and hills. Area C includes the area's major highways and the largest concentration of human habitation nearest the project. Population, social and economic impacts will probably be found to occur most significantly in this area. Area D extends beyond Area C to a limit of 100 kilometres (62 miles), and includes a number and variety of recreational facilities, some of which will probably be used by workers employed at the Hat Creek project. Area A is about 12,560



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SCALE - 1:750,000

10 0 Kilometres 10 20 30 40 50

CONTOUR INTERVAL - 500 METRES

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
HAT CREEK PROJECT

DETAILED ENVIRONMENTAL STUDIES

ANALYSIS AREAS

FIGURE 3-1

hectares (31,036 acres) in extent, Area B 89,500 hectares (221,155 acres), Area C 274,800 hectares (679,031 acres) and Area D 690,800 hectares (1,706, 967 acres). The description and analysis procedure followed is keyed to the geographic areas beginning first with Areas A and B. Area C is treated separately (to the extent relevant and possible within the constraints of available data), follwed by Area D. Because of Area D's large areal extent and the recreational impacts it experiences from people living outside the immediate project region, it is treated in more generality than any of the preceding three areas.

3.2 PROCEDURE

For each of the geographic areas described, a common format is generally followed which deals in succession with a series of topics including recreational assets, facilities, activities, and institutional constraints, all of which influence recreational patterns. Current data is presented, and where available, past trends are described. Once current conditions have been described, two future scenarios are presented: one without the Hat Creek project and the other with the project in place and operating. The impacts on all recreational topics expected to be caused by the project are then described and quantified wherever possible following which suggestions for mitigation or compensation are made. Topics discussed include the following:

(a) Setting

The general character, or setting of the area is briefly described, pointing out major natural characteristics, land use patterns, land ownership, and the governing land use authority.

(b) Natural Environmental Assets

Particular natural environmental characteristics that are conducive to recreational activities are presented for each area. Particular attributes

that attract recreationists to certain sites are located and described.

(c) Recreational Facilities

Facilities that directly or indirectly influence recreational activities, including campgrounds, motels, picnic areas, access and similar features are presented next, distinguishing public from private, with indications of past growth provided where information is available. Limitations on the provision of future facilities because of government policies or changes in private investment patterns are also indicated where data are available.

(d) Activities

Participation in recreational activities that take place within each geographic analysis area is described by type, including the place of residence of participants and the total number of activity days for the year where data can be secured. Activity data are scanty, however limited survey information directly pertaining to local use is available. These data have been supplemented by information obtained from Provincial agency sources wherever relevant. Past trends in recreation activities are generally unobtainable for small areas and Provincial data are used as general guides for recreation trends wherever information for prior years is available. Data that are inferential of recreation patterns are used where useful to supplement the understanding of recreation activities. Constraints on present and future activities brought about by existing land use patterns, governmental regulations and policies are also described together with information on future population growth and future recreation facilities that may increase recreation activities.

(e) Land Capability and Constraints

Canada Land Inventory (CLI) capability classifications and other capability interpretations (where available) are presented as one indication of the capacity for future recreation activity. Present land use patterns and government land management policies are compared with capability levels to de-

termine the extent to which recreation potentials may be realized.

(f) Forecast Without the Project

Assuming the Hat Creek project were not to proceed, forecasts are made of recreational facilities and activities both within and outside the Hat Creek Valley. Topics bearing on future recreational activities include the persistence of existing land use patterns, population growth, changes in activity participation rates, known proposals for recreation facility developments, changes in the supply of wildlife and fish and regulatory responses that may influence harvest levels (where available), changes in access to recreation areas, and other factors.

(g) Forecast With the Project

Conditions brought about by the Hat Creek project that will likely change recreation patterns are determined from descriptions of the project components, their operational characteristics and the induced recreational pressures brought about by the increased work force required by the project.

(h) Mitigation - Compensation

To offset project impacts on recreation resources suggestions are made for mitigation or compensation actions to reduce impacts or replace the opportunities lost.

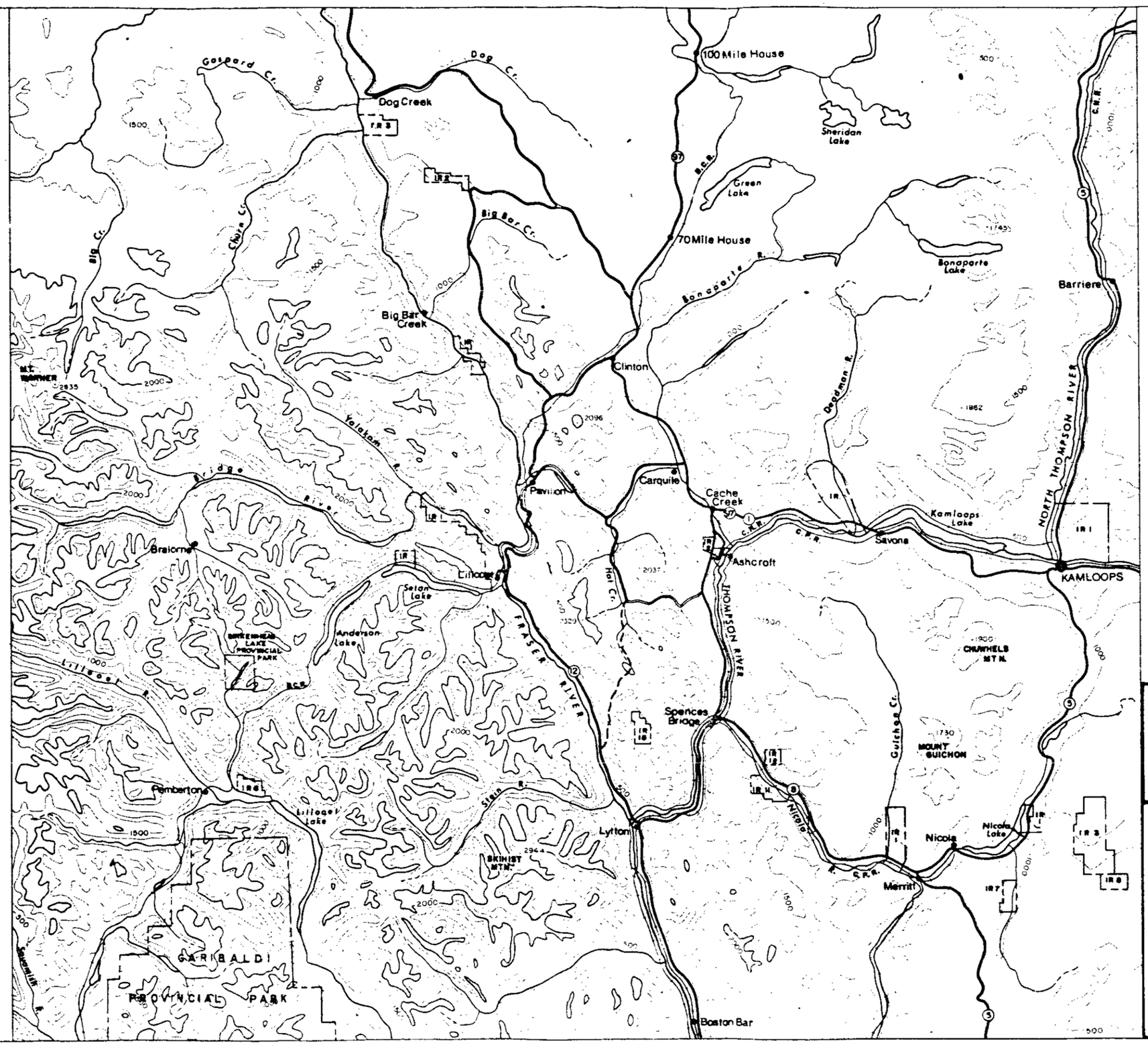
4.0 AREAS A AND B - THE HAT CREEK VALLEY AND ENVIRONS

4.1 SETTING

Recreation encompasses a wide variety of activities all of which are highly dependent on the natural setting for their success. Certain kinds of activities can only take place if the natural setting is appropriate. Snowmobiling for example, requires terrain that is predominantly open and not too steep; downhill skiing requires a mixture of steep to moderately steep topography of the right aspect and with enough difference in elevation to make for lengthy downhill runs. Water is probably most important of all. It is relatively scarce in the landscape and in addition to the scenic qualities it exhibits, water provides a focus for a variety of recreational pursuits from enjoyment of the view to fishing, boating, swimming and water skiing.

Because recreation is so highly dependent on the setting, an understanding of the natural attributes of the Hat Creek Valley and adjacent areas is an important part of understanding its present and potential recreational use. The areas of greatest interest are A and B which are bound by the Fraser, Thompson and Bonaparte Rivers between Clinton on the north and Lytton on the south. It is within this zone that the principal physical impacts of the Hat Creek project will likely occur. General terrain features are shown in Figures 4-1, 4-2 and 4-3.

Apart from the deeply incised Fraser River Valley on the west and the less dramatic Thompson and Bonaparte River Valleys on the east, the most significant landform found in the area is the Hat Creek Valley itself. This elongated bowl-like valley is made up of flat to rolling terrain which becomes increasingly steeper as it rises to the

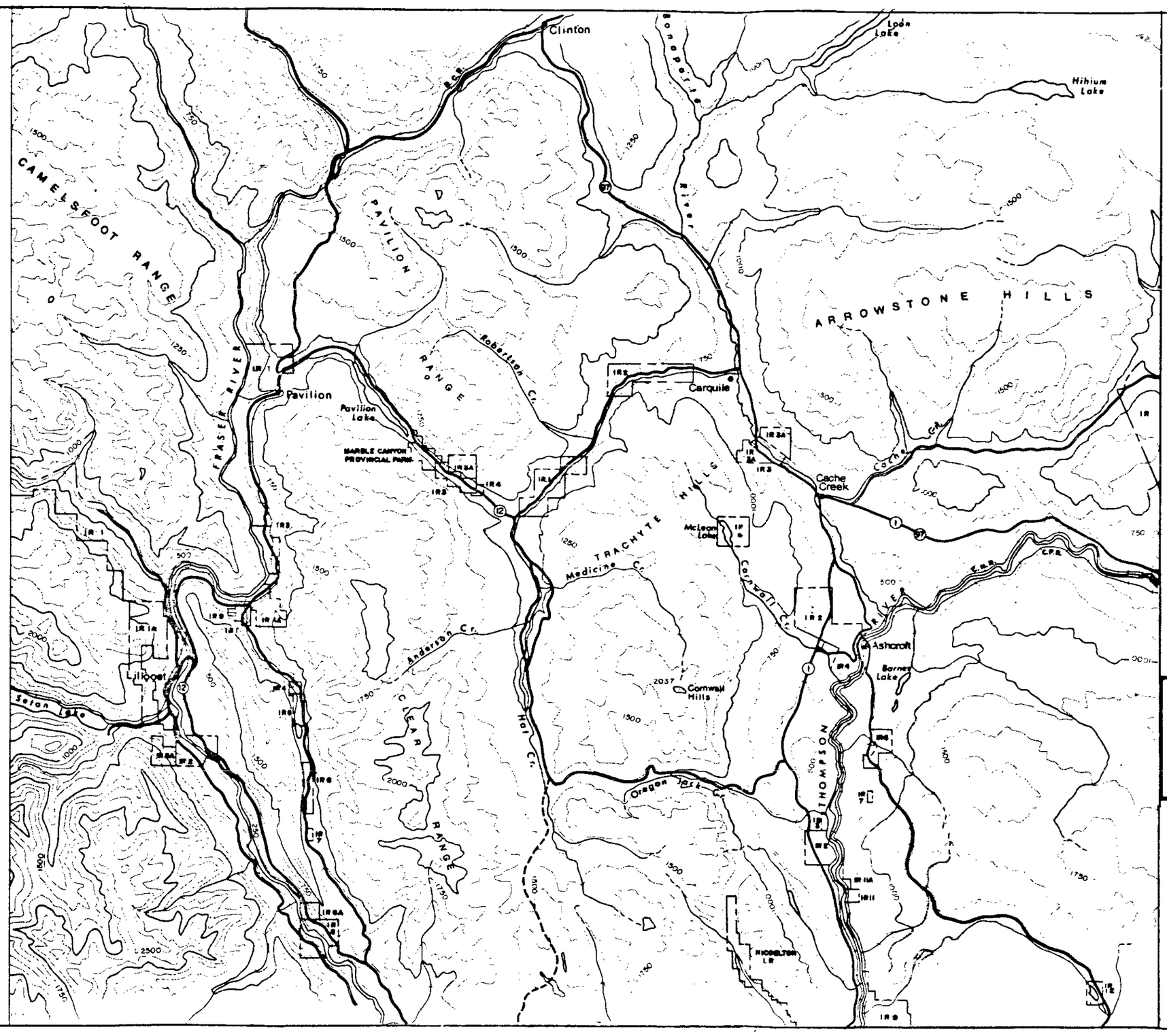


BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
HAT CREEK PROJECT

DETAILED ENVIRONMENTAL STUDIES

SETTING
GENERAL TERRAIN - REGION

FIGURE 4-1


Clinton
Lac La Hache
Bonaparte River
Loon Lake
Hihium Lake
CAMELSFOOT RANGE
FRASER RIVER
PAVILION MOUNTAIN RANGE
Robertson Cr.
Pavilion
Pavilion Lake
MARBLE CANYON PROVINCIAL PARK
IR 1
IR 2
IR 3
IR 4
IR 5
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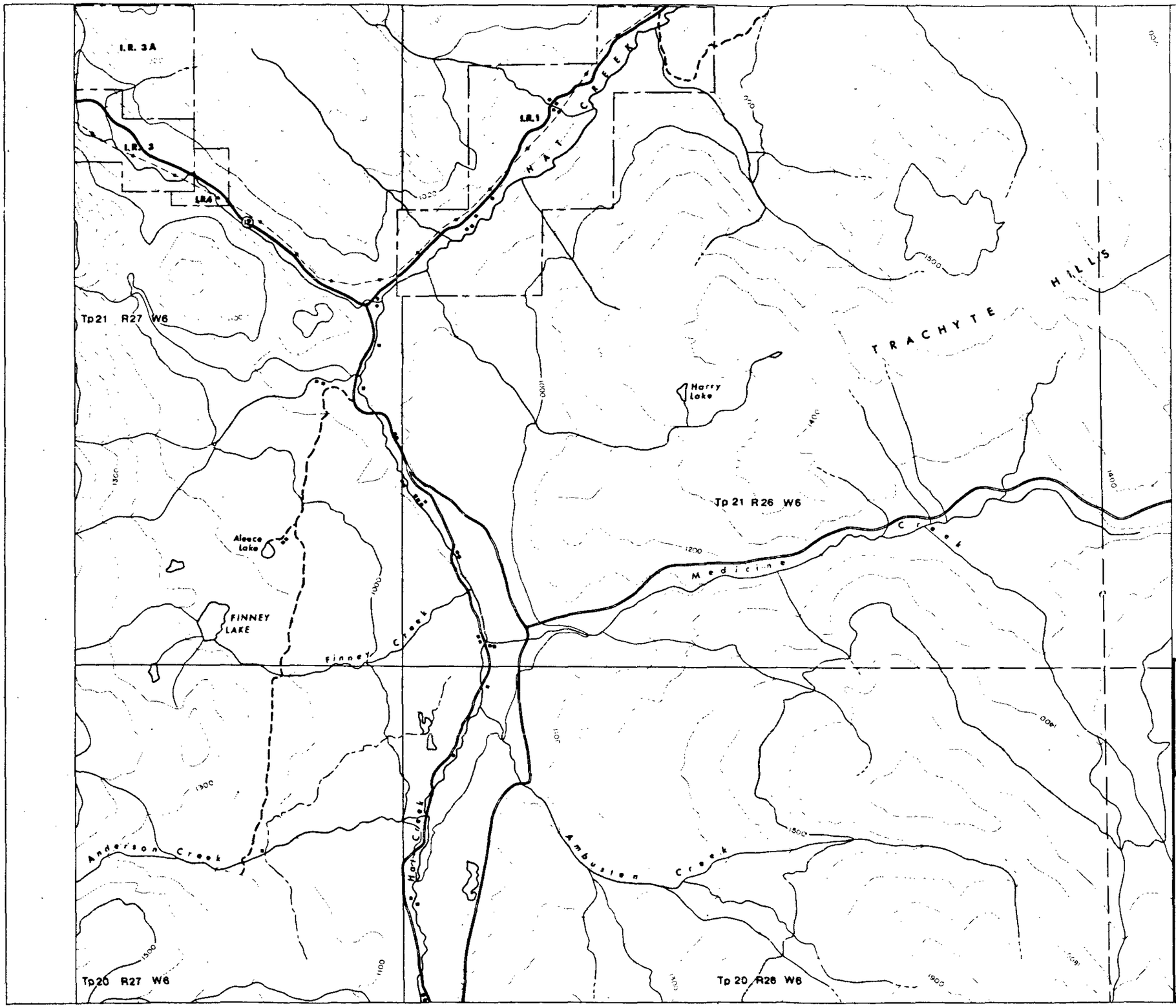


N

SCALE - 1:50,000

0 Kilometres 1 2 3

CONTOUR INTERVAL - 100 METRES

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
HAT CREEK PROJECT

DETAILED ENVIRONMENTAL STUDIES

SETTING GENERAL TERRAIN-SITE

FIGURE 4-3

crests of the Clear and Pavilion Ranges on the west and north, and the Cornwall and Trachyte Hills on the east. The pastoral quality of the valley is enhanced by the irrigated farms, ranches, open pastures and small lakes and creeks scattered on both sides of Hat Creek from Highway 12 south to Oregon Jack Creek. Various types of vegetation are found in the valley ranging from scrub grassland to coniferous forests and alpine meadows. The scattered forests adjacent to the farms and ranches gradually merge to cover the sides of the surrounding hills and mountains. Three principal points of access connect Hat Creek Valley with the Fraser and the Thompson-Bonaparte River Valleys: between Carquile and the junction of Hat Creek Road a shallow valley divides the Trachyte Hills and the Pavilion Range carrying Hat Creek east to its confluence with the Bonaparte River; from the Hat Creek Valley Road junction west Highway 12 continues through the dramatically scenic Marble Canyon and on past Pavilion Lake to the Fraser River; to the south, access to the Hat Creek Valley is provided along Oregon Jack Creek which flows east from the vicinity of the Hat Creek headwaters to join the Thompson River southwest of Ashcroft.

Water bodies are few and small. Hat Creek, the principal stream in the area, is comparatively short and similar to many other creeks found outside the valley. Pavilion and McLean are the principal lakes. Pavilion Lake is sufficiently large to provide an important fishery but is not comparable in size to other lakes outside the area such as Loon and Green Lakes.

(a) Land Use

Agricultural uses including irrigated hay production, pasture and rangelands dominate the floor of the Hat Creek Valley from the junction of Hat Creek Road and Highway 12 south to Oregon Jack Creek road and beyond. Northest from the junction along Highway 12 to Carquile similar agricultural uses are found, some situated on Indian reservation lands.

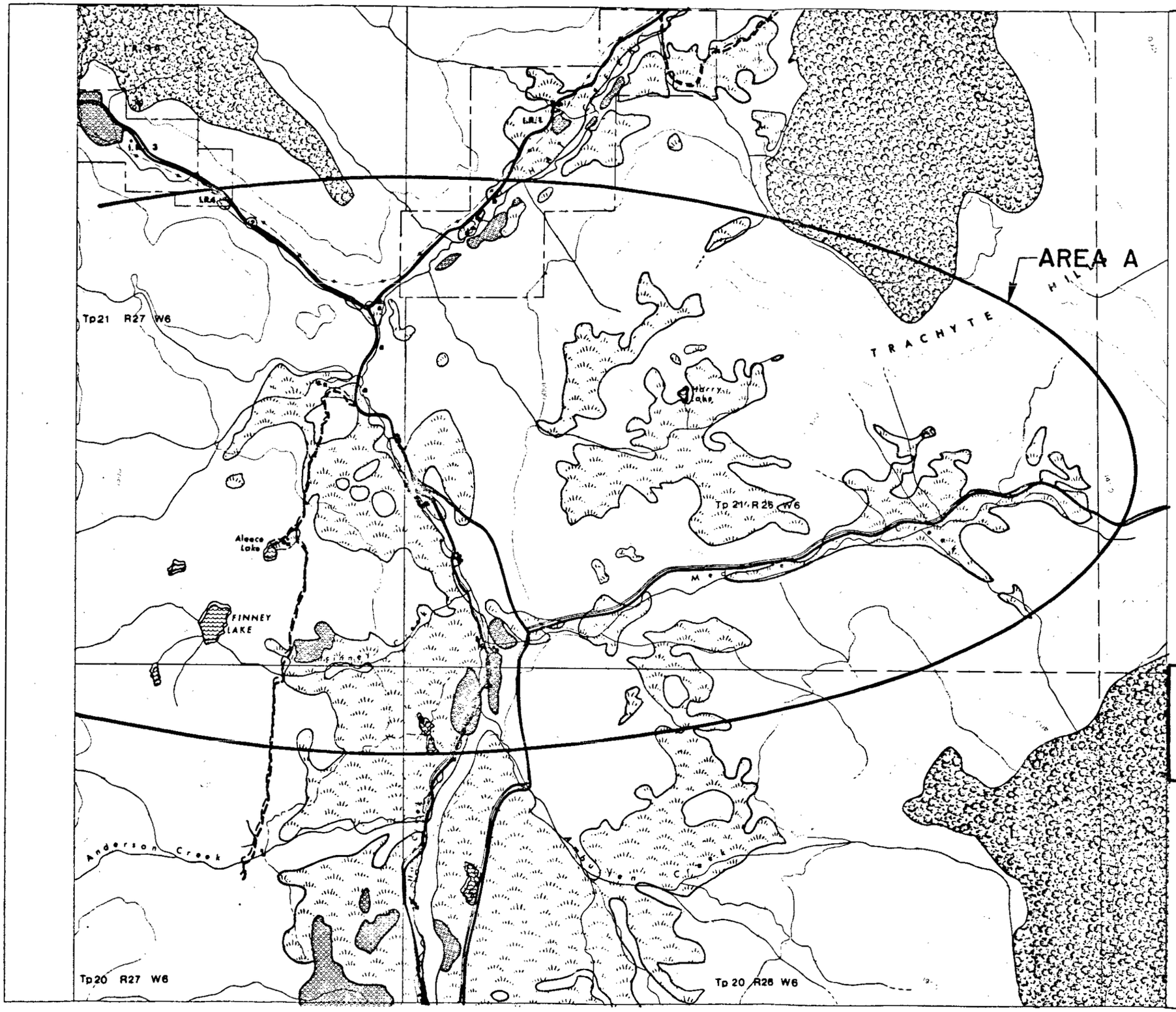
Homes are few in the Hat Creek Valley. The total population 15 years and over is estimated at 19[4-1]. Forest lands cover the higher elevations of the surrounding hills and mountains, enhancing the sense of enclosure found within the valley. Aside from local roads and Highway 12, the only other land uses of importance are private cottages and a campground at Pavilion Lake, a limestone quarry, and Marble Canyon Provincial Park located alongside Highway 12 northwest of the Hat Creek Valley. Land use within the valley environs is shown on Figures 4-4 and 4-5.

The dominant agricultural land use pattern of the valley discourages and restricts active recreational activities to those of a dispersed type such as hunting and backroad travel. In comparison, campgrounds and cabins at Pavilion Lake and Marble Canyon Provincial Park provide for localized higher intensity activities such as camping, picnicking and swimming.

(b) Land Management and Ownership

The vast majority of lands in the Hat Creek Valley are Crown-owned. Some privately owned farm lands exist along Hat Creek south of Highway 12. Indian reservations, which fall under Federal jurisdication, are found along Highway 12 northeast and northwest of the junction with Hat Creek Road, at McLean Lake, and along Oregon Jack Creek. Most of the private holdings are used for agricultural purposes with extensive irrigation on both private and Indian reservation lands along the Creek from its headwaters to the junction with the Bonaparte River. Some private lands are posted against hunting.

All Crown lands fall within the jurisdication of the Provincial Lands Branch which leases large areas alongside private lands for agricultural purposes. Beyond the leased areas, grazing permits are in effect with limits set on the number of animal months allowed, dependent



LEGEND

- HOMES AND OTHER STRUCTURES
- IRRIGATED LAND (IMPROVED PASTURE)
- FOREST
- GRASSLAND
- ROAD
- TRAIL
- LAKE

REMAINING AREAS ARE FORESTED GRASSLAND

N

SCALE - 1:50,000

0 Kilometres 1 2 3

CONTOUR INTERVAL - 100 METRES

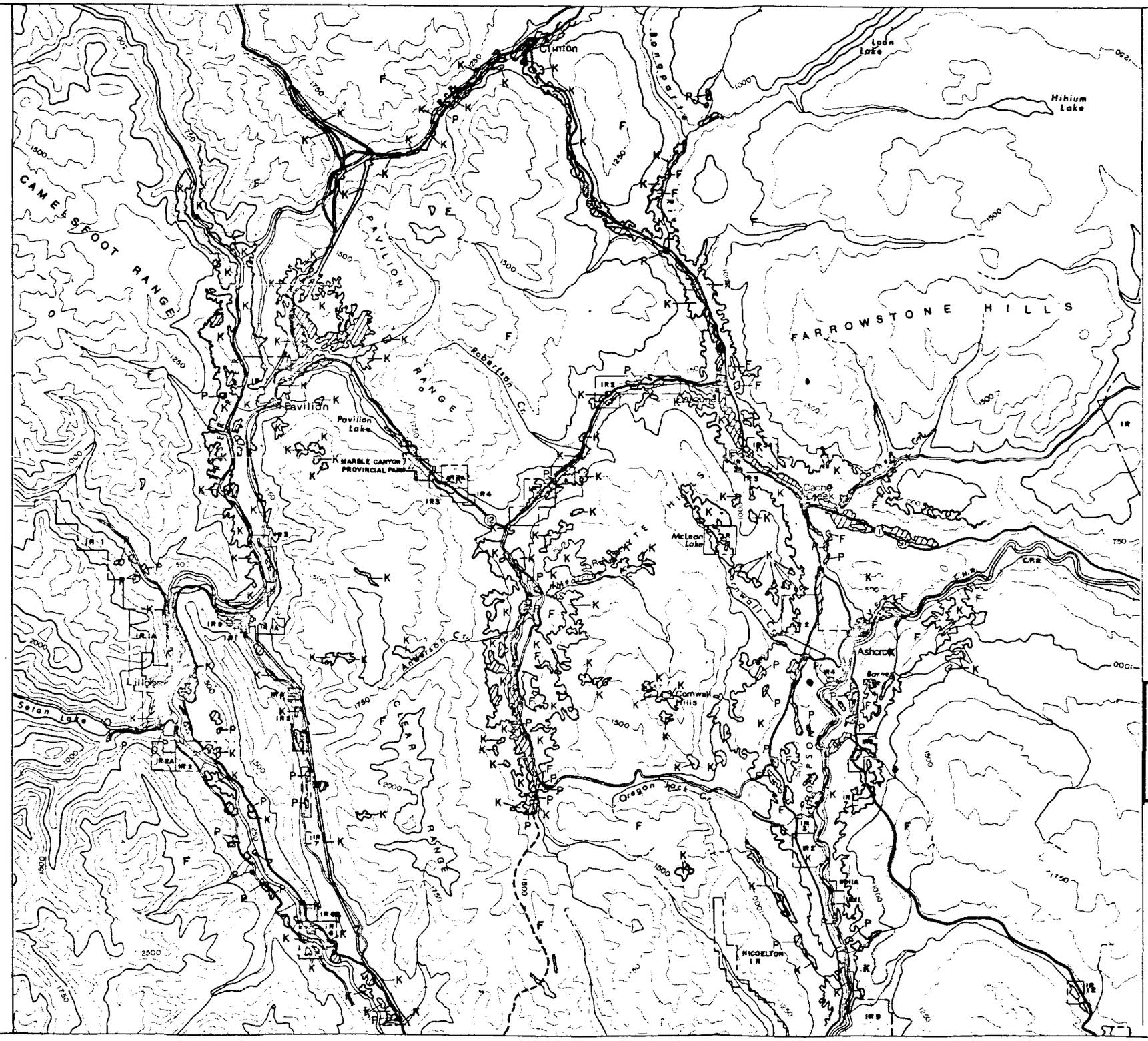
BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
HAT CREEK PROJECT

DETAILED ENVIRONMENTAL STUDIES

LAND USE AREA A AND ENVIRONS

(SOURCE: CANADA LAND INVENTORY, 1967)

FIGURE 4-4



LEGEND

- BUILT-UP AREAS
- F - FORESTED LAND - PRODUCTIVE AND NON PRODUCTIVE
- K - OPEN GRASSLAND
- (O) - OUTDOOR RECREATION
- (P) - IMPROVED PASTURE AND FORAGE CROPS

N

SCALE - 1:250,000

5 0 Kilometres 5 10 15

CONTOUR INTERVAL - 250 METRES

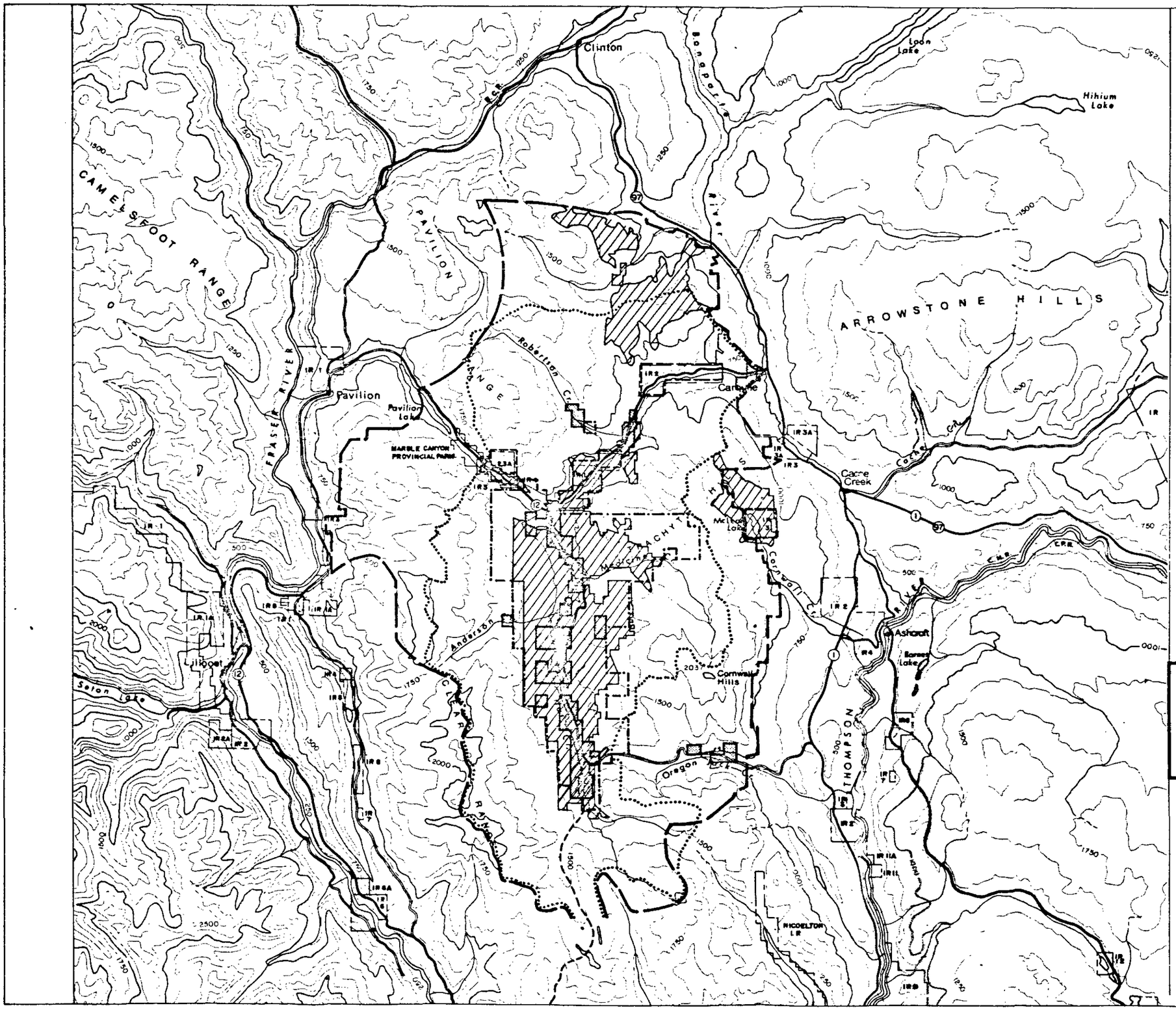
BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
HAT CREEK PROJECT

DETAILED ENVIRONMENTAL STUDIES

LAND USE AREAS A, B, C

(SOURCE: CANADA LAND INVENTORY, 1967)

FIGURE 4-5



LEGEND

- LEASED LAND
- DEEDED LAND
- AGRICULTURAL RESERVE LAND
- INDIAN RESERVE
- PERMITTED LAND BOUNDARY
- HAT CREEK WATERSHED

N

SCALE - 1:250,000

5 0 Kilometres 5 10 15

CONTOUR INTERVAL - 250 METRES

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
HAT CREEK PROJECT

DETAILED ENVIRONMENTAL STUDIES

LAND MANAGEMENT AND OWNERSHIP

FIGURE 4-6

on area characteristics. The Parks Branch administers Marble Canyon Provincial Park, located in Marble Canyon south of Pavilion Lake. Land management and ownership patterns are shown in Figure 4-6.

Both the dominant agriculture land use pattern of the Hat Creek Valley and the leasing and management programs in effect on Crown lands reinforce the valley's strong agricultural base and enhance the continuance of agriculture as a dominant force. Agricultural pursuits, although compatible with some low density recreational activities, act to limit others because of restrictions on access to Crown lands which often must be made across private lands. The management philosophy underlying the leasing of Crown lands and issuance of grazing permits also act to restrict the range of possible recreational activities. Under ordinary circumstances this pattern would likely persist into the future, limiting dominant recreational activities to hunting, backroad travel, sightseeing and limited fishing.

A significant portion of the land within the Hat Creek Valley, particularly in the valley bottom, lies within the British Columbia Agricultural Land Reserve (ALR). As the term implies, this land has been reserved by the B. C. Government solely for agricultural purposes. Agricultural reserve lands within the valley are currently being used as pasture and grazing land by farmers in the area. However, the British Columbia Land Commission (BCLC), which has authority over ALR's, has made allowances for certain permitted uses including ecological and wildlife reserves, fish farms, and if they are established by a regional district or municipal authority, public parks. In addition, a conditional permit can be obtained from the BCLC for open land recreational uses where not more than five percent of the land registry parcel, or five acres (whichever is less) is physically altered for development(4-2). This would include such recreational uses as campgrounds, fishing and hunting camps, game farms and golf courses. A conditional use permit can be obtained by either a public or private recreational developer.

4.2 RECREATIONAL ASSETS

The area encompassed within the general bounds of Areas A and B has a variety of natural environmental assets, some of which are conducive to recreational pursuits of one type or another.

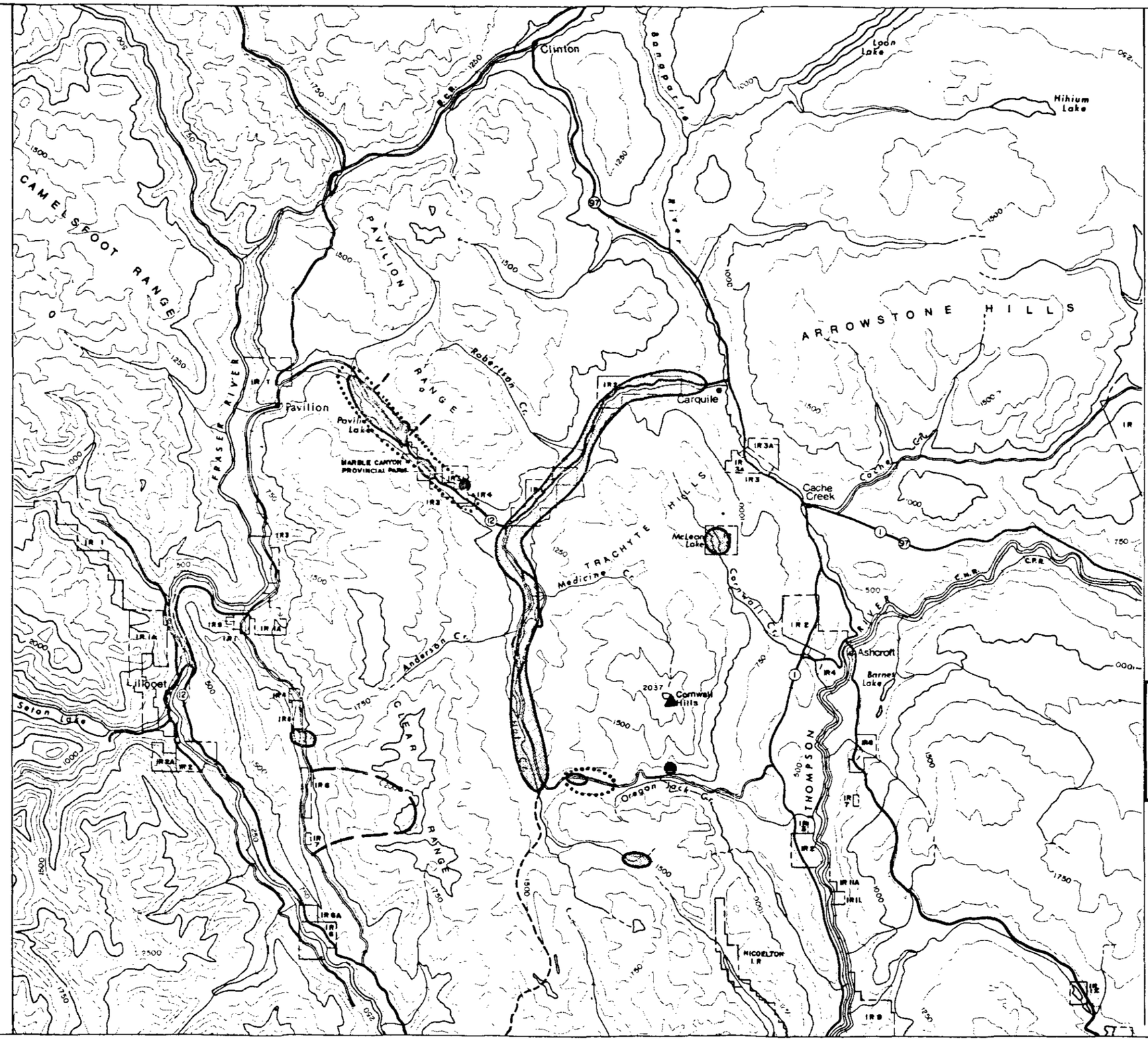
In a Province where spectacular scenery is almost commonplace the senic values of the Hat Creek area are comparatively ordinary, with a few notable exceptions. In general, the Hat Creek Valley cannot be considered as a destination for sightseers (particularly non-local residents) although its pastoral charm provides a pleasant diversion. Marble Canyon, Pavilion Lake, and to a much lesser extent Langley Lake and the Oregon Jack Creek Valley do provide the contrast, diversity, presence of water and rapid change in elevation that make for dramatic scenery. These small areas pale in comparison with the grandeur of the Fraser River and Thompson River Canyons however, both with much better access than the Hat Creek Valley with its unpaved country roads. The Pavilion and Clear Ranges and the Cornwall and Trachyte Hills provide a backdrop to the Hat Creek Valley and are used by hikers and others who visit the Cornwall lookout and other viewpoints in the area. Although the Hat Creek Valley itself is not an important scenic resource, Marble Canyon, Pavilion Lake and portions of the surrounding hills and mountains do have significant scenic values.

There are no sites of historic importance in the valley. The Cariboo Trail lies along the Fraser River Canyon and does not pass through the area. However, pictographs found in Marble Canyon and along Oregon Jack Creek provide visible evidence of man's presence in prehistoric times.

For the gem hunter, the Hat Creek Valley possesses identified sites for agate, amber (scattered amongst the surface coal rubble) and opalite, particularly along Medicine Creek.

In addition to their scenic attributes, many of the lakes and streams in Areas A and B support fish and provide an important recreational resource for anglers. Hat Creek supports rainbow trout and mountain whitefish despite beaverdams, natural barriers, diversions for irrigation and the intrusion of livestock in the upper reaches. Tributaries to Hat Creek support a negligible fishery whereas several lakes, including some that are stocked, provide angling opportunities. Those listed as angler lakes by the Fish and Wildlife Branch include McLean, Blue Earth, Crown, Langley, Pavilion and Turquoise within the central portions of Areas A and B, and Botanie Kwotlenemo and Pasulko toward the periphery. Only Pavilion and McLean Lakes appear adequate in size for boating. A private boat launching ramp is available at Pavilion Lake with access from Highway 12. McLean Lake is much more difficult to approach, with access over back roads. McLean Lake lies within an Indian reservation and access can be limited depending on tribal policies and actions.

The flat to rolling terrain of the Hat Creek Valley and surrounding hills are conducive to land based recreation activities including backroad travel, snowmobiling and cross country skiing. At the higher elevations in the Pavilion and Clear ranges, hiking is possible with established trails available in some locations. At the lower elevations the valley's vegetative pattern is dominated by agriculture with hay fields and pasture occupying the valley floor, gradually merging with grazing and timber lands as elevations increase. A variety of animal life of interest to hunters is supported within the various vegetative zones including waterfowl and upland game consisting of ruffed, spruce and blue grouse. Also of interest are big game including mule deer, moose, bear and California Bighorn Sheep. Figure 4-7 portrays a number of natural recreational assets found within the Hat Creek Valley and adjacent areas.


Clinton
Loon Lake
Hihium Lake
Bonaparte River
CAMELSFOOT RANGE
PAVILION MTN.
FRASER RIVER
Pavilion
Pavilion Lake
Robertson Cr.
MARBLE CANYON PROVINCIAL PARK
PAVILION RANGE
ARROWSTONE HILLS
Carquile
Cache Creek
McLean Lake
TRACHYTE HILLS
Medicine Cr.
Cornwall Cr.
CNR
Lillooet
Seton Lake
Anderson Cr.
CLEAR RANGE
Cornwall Hills
2037
Ashcroft
Barnes Lake
THOMPSON
Oregon Jack Cr.
NICOMEN I.R.
IR 1
IR 1A
IR 2
IR 3
IR 3A
IR 4
IR 5
IR 6
IR 6A
IR 7
IR 8
IR 9
IR 10
IR 11
IR 11A
IR 11B
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IR 13
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4.3 FACILITIES

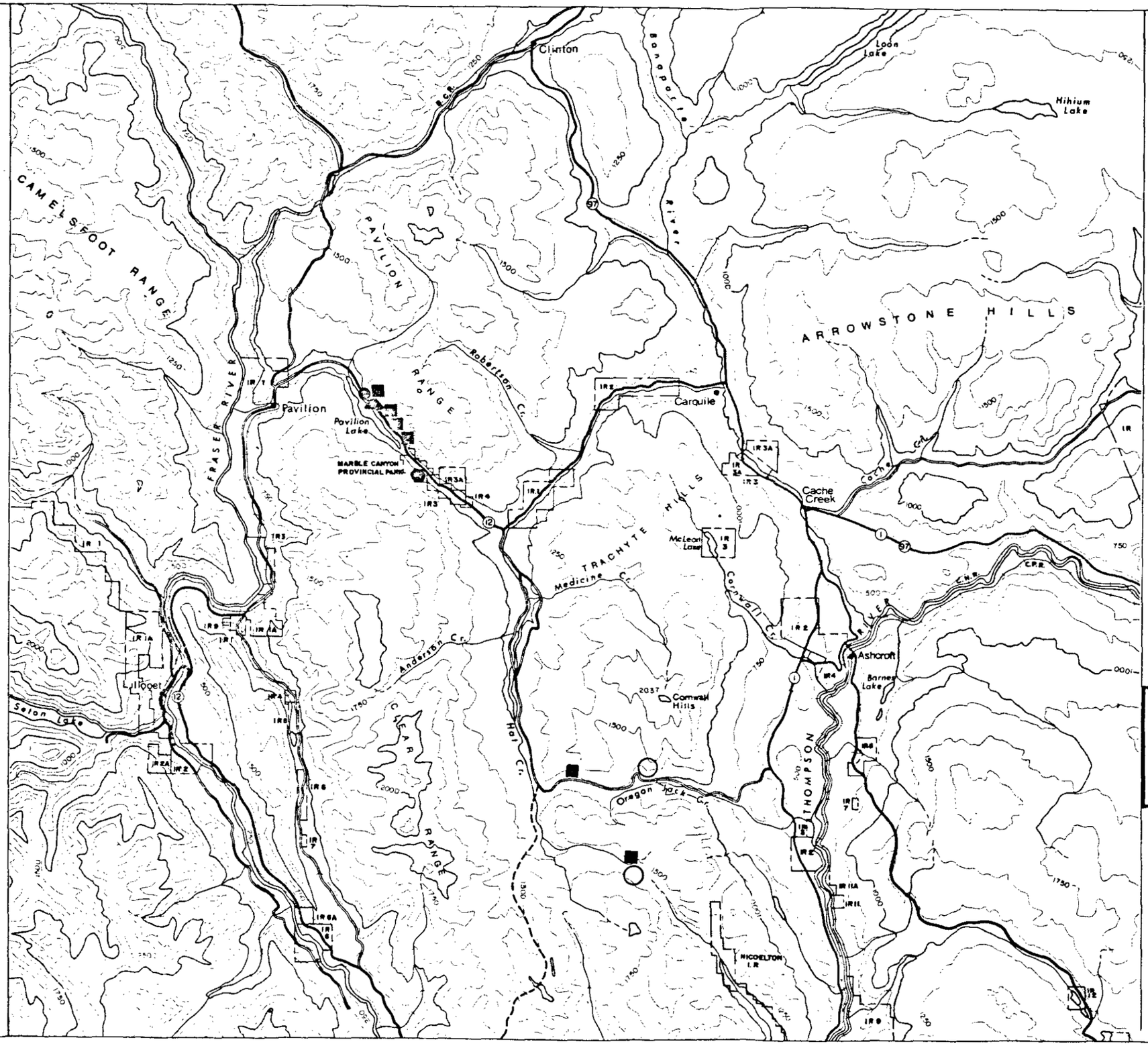
Recreational facilities represent investments that enhance the opportunity for recreational activities to take place. In addition to access roads, the Hat Creek Valley and adjacent areas contain both public and private facilities, though few in number compared with areas outside the valley.

The only private facility in the area is Vic's Lakeshore Camping located on Pavilion Lake. Vic's has 4 cabins, 18 camper-trailer sites and a boat launching ramp. Nearby are 24 private cottages, occupied predominantly by people from the Lower Mainland, the same area that provides the bulk of users for Vic's which is open for five months from Spring through Fall.

Closer to the project site the Parks Branch maintains Marble Canyon Park, located adjacent to Turquoise and Crown Lakes. Established in 1956, Marble Canyon has 8 developed and 10 undeveloped campsites, with 10 picnic tables. A beach is provided but there are no launching ramps, trails or nature programs.

A review of selected annual Directories of B. C. Tourist Accommodations back to 1960 indicated no significant change in the number of accommodation units available in Areas A and B. Physical development constraints have tended to limit the provision of new facilities at both Marble Canyon and Pavilion Lake. Future possibilities for public recreation development can be inferred from the designation of recreation reserves by the Parks Branch. Six such reserves are found in Areas A and B including four at Pavilion Lake. Final site reports for Pavilion Lake reserves indicate that there is little or no potential for development because of the lack of useable land. Blue Earth Lake is indicated as possessing moderate potential for picnicking and camping, but road and grazing conflicts occur. The recreation potential at Langley Lake is indicated as "very low".

Recreational facilities in Areas A and B are shown in Figure 4-8.



LEGEND

- PRIVATE CAMPGROUND AND CABINS
- PARKS BRANCH CAMPGROUND
- BOAT LAUNCHING RAMPS
- RECREATION RESERVE
- FOREST SERVICE CAMPGROUND

N

SCALE - 1:250,000

5 0 Kilometres 5 10 15

CONTOUR INTERVAL - 250 METRES

BRITISH COLUMBIA
HYDRO AND POWER AUTHORITY
HAT CREEK PROJECT

DETAILED ENVIRONMENTAL STUDIES

RECREATION FACILITIES AREAS A AND B

FIGURE 4-8

4.4 RECREATION ACTIVITIES

Activities are a basic indication of the impact of recreational use on the natural environment. The environment may provide the means for activities to take place and facilities may enhance the opportunities for people to participate, but it is the number of people who actually partake in recreational activities that is important in determining impact significance.

Recreation, for this study, is defined as a set of specific outdoor activities which can, in some instances, take place simultaneously. Activities can range from fishing and hunting to sightseeing, swimming, boating, skating, hiking and others.

In future years new activities will probably come into being as man's innovative capacity to expand recreation opportunities by using new technological devices continues. Importation of activities pursued elsewhere may also occur. As examples, all-terrain vehicles and trail bikes were unknown in the past and cross country skiing was pursued only in Scandinavia. These devices and activities are now common within British Columbia. New types of activities are constantly being developed and this trend will likely continue. One important outgrowth of these developments is the increased pressure on the natural environment which sometimes results.

Even with a broad list of recreational activities, subcategories can occur within broad headings. Hunting for example, may be subdivided by species of animal hunted. Fishing may be similarly arrayed. Some activities take place simultaneously: for example, sightseeing or viewing may be combined with activities such as trail riding or picnicking. Seasonality is also an important variable. Although most fishing takes place in summer, ice fishing occupies some fishermen during winter. Both fishing and hunting are further restricted to specific months or seasons by government regulations. Other activities cannot take place unless weather conditions are appropriate - swimming, boating and cross country skiing are cases in point.

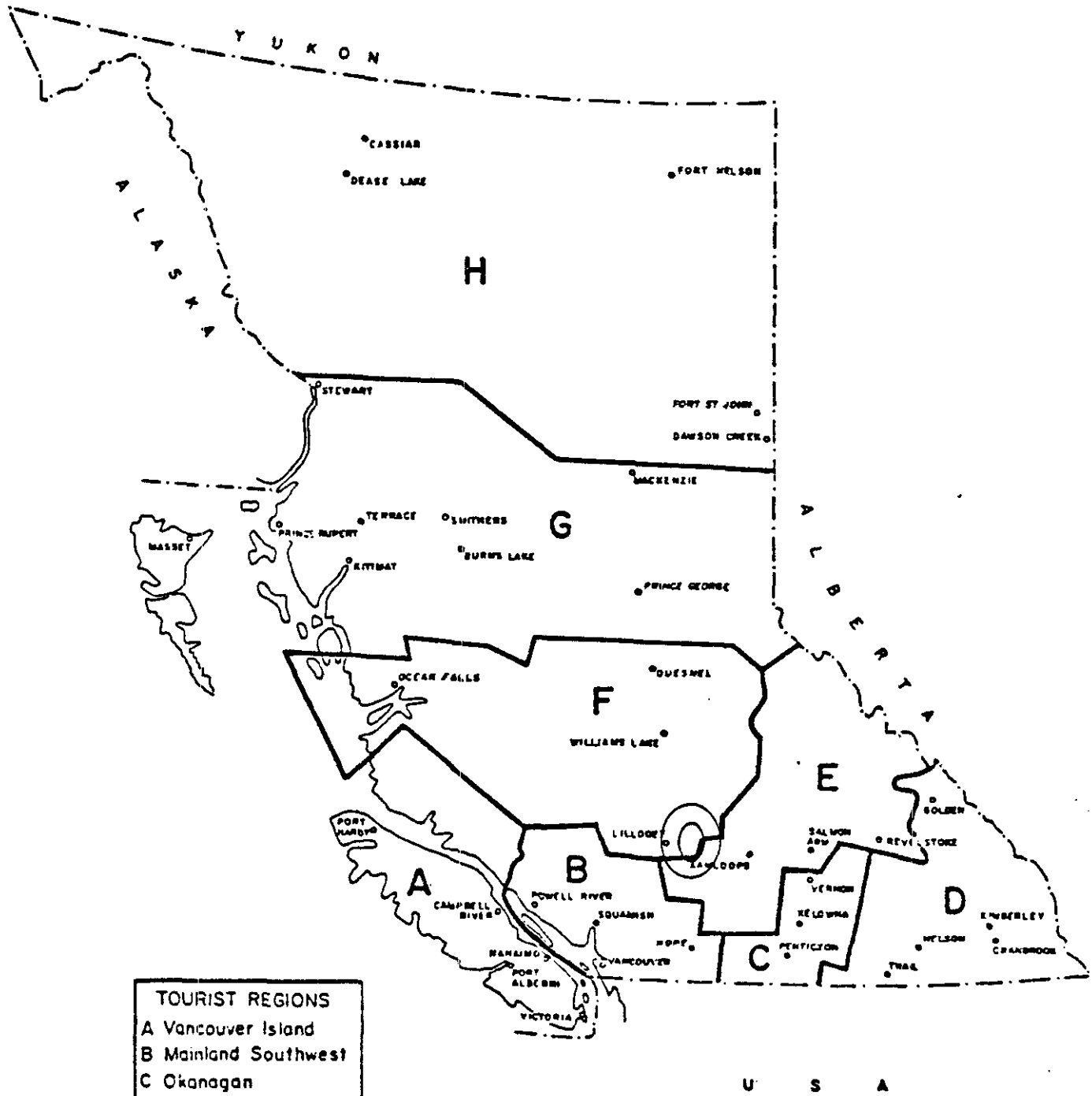
The bulk of recreation activities takes place during the summer. This is the period when the weather is most conducive to a variety of outdoor activities, access to recreation sites is comparatively easy, tourism is at its peak, school is out and holidays are most common. In this respect, recreation is a phenomenon of "peaks" with facility use at maximum generally for only a few months. At other times, physical facilities are usually operating at less than capacity and in winter months they may not be operating at all.

Winter recreational activities appear to be gaining an ever larger following as skiing, snowmobiling and other pursuits gain in popularity. Because of seasonality, facilities that serve winter activities are also subject to major variations with little or no use during summer periods.

Recreation in the Hat Creek Valley does not exist in isolation. Since the resident population of the valley is so small, (only 35 residents) few local activities are generated. Hat Creek Valley recreation is predominantly dependent on people who reside outside the area but who visit it from various communities such as Cache Creek, Ashcroft, Clinton, Lytton and Lillooet (the larger communities located in Area C, just outside the valley); adjoining regions, of which Kamloops is the major population center; or from other parts of B.C., Canada, or the United States. Some background information on recreation activities is available for the central portion of B. C., of which the valley is a part. Recreation characteristics for the larger area, known as the Cariboo-Chilcotin region, in some respects reflect recreation use in the study region.

(a) The Cariboo-Chilcotin Region

For analysis purposes Tourism British Columbia has divided the Province into the regions shown on Figure 4-9. A large portion of the Hat Creek Valley area falls within Area F, known as the Cariboo-Chilcotin.



TOURIST REGIONS
A Vancouver Island
B Mainland Southwest
C Okanagan
D Kootenays
E Thompson-Columbia
F Cariboo-Chilcotin
G Yellowhead North
H Peace River-Liard

SOURCE: BRITISH COLUMBIA RESIDENT TOURISM STUDY 1976

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY	EBASCO SERVICES OF CANADA LIMITED; Environmental Consultants	FIGURE 4-9
	BRITISH COLUMBIA TOURIST REGIONS	
	THE HAT CREEK PROJECT – Detailed Environmental Studies	

A mathematical model used to compute data for the Cariboo-Chilcotin Fact Book indicated that the Cariboo-Chilcotin region had 299,000 visitors in 1976 with 170,000 or 57% from B. C. and 129,000 or 43% from elsewhere in Canada and from the U.S. A full breakdown of the number of visitors to the area and their origin is provided in the first column of Table 4-1.

In 1976, Tourism British Columbia (B. C. Ministry of Travel Industry, undertook a survey of B. C. resident tourism both within and outside the Province[4-3]. Data from that survey, shown in Table 4-2, indicated that the Cariboo-Chilcotin was the destination of 234,000 person trips from all areas of the Province including trips generated within the region itself. This figure represents 5% of all in-Province resident tourism. Only 182,000 person trips originated in the Cariboo-Chilcotin, of which 61,000 (about one-third) terminated in the region. The most popular B. C. destination for Cariboo-Chilcotin residents leaving the region was the Lower Mainland. About 36,000 trips were made there or about 20% of all trips outside the region. The Lower Mainland is also the most important source of trips into the region from all areas of B. C., accounting for 89,000 trips or 38% of all trips terminating in the area.

The Cariboo-Chilcotin is also a destination area for visitors who live beyond the boundaries of B. C. as shown in Table 4-2. Forty-three percent, or 129,000 visitors in 1977 arrived in the Cariboo-Chilcotin from non-B.C. locations, with 20% from Canada and 23% from U.S. and overseas[4-4]. An earlier tourist visitor study undertaken in 1974, while not providing numbers of visitors from outside the Province, did indicate home residence in percentages for out-of-Province visitors[4-5]. These data are also presented in Table 4-2.

In-Province tourism to the Cariboo-Chilcotin dropped in total numbers between 1976 and 1977 according to the Tourism B.C. data. However, the proportion of visitors from all B. C. areas remained approximately the same. Tourism data for the region is not available to discern

ORIGIN	REGION VISITED (PERSON TRIPS '000) A	B	C	D	D	F°	G	H	ALL TRIPS IN B.C.
Vancouver Island	572	447	29	23	29	21	24	1	1,146,000
Lower Mainland	609	930	345	67	164	89	99	18	2,331,000
Okanagan	25	143	64	9	40	12	15	0	308,000
Kootenay	12	54	47	161	18	2	11	0	305,000
Thompson-Columbia	12	125	47	12	62	19	15	1	293,000
Cariboo-Chilcotin	25	36	23	6	11	(61)	18	2	182,000
Yellowhead 16	25	72	23	15	37	30	193	18	413,000
Peace-Liard	0	0	6	0	11	0	12	25	54,000
Total	1270	1789	584	292	365	234	394	66	4,994,000

(The figure enclosed in the bracket represents "local trips, i.e., trips made within the Cariboo-Chilcotin region by residents of the region.)

Source: B. C. Resident Tourism Survey 1976

° Cariboo-Chilcotin

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY

EBASCO SERVICES OF CANADA LIMITED: Environmental Consultants

PERSON TRIPS BY REGION, B C RESIDENTS, 1976

THE HAT CREEK PROJECT - Detailed Environmental Studies

TABLE 4-1

Area of Origin	1977 Cariboo-Chilcotin Fact Book (Visitors) (1)	B.C. Resident Tourism 1976 (2) (person trips)	Visitors 1974 (%) (3) (Visitors)
B.C.:			
Vancouver Island	15,000	21,000	
L. Mainland	64,000	89,000	
Okanagan	9,000	12,000	
Kootenay	2,000	2,000	
Thompson-Shushwap	14,000	19,000	
Cariboo-Chilcotin	44,000	61,000	
Yellowhead	22,000	30,000	
Peace-Liard	-	-	
Subtotal	170,000	234,000	
Non-B.C.:			
Alberta	48,000		} 36*
Other Canada	12,000		
U.S.	61,000		64
Overseas	8,000		
Subtotal	129,000		100
Total all visitors	299,000		NA

Sources:

(1) Cariboo-Chilcotin Tourism Fact Book 1977, Tourism British Columbia. Data is given in visitors.

(2) British Columbia Resident Tourism Survey 1976, Tourism British Columbia. Data is given in person trips.

(3) Visitors '74, Department of Travel Industry. This publication deals only with non-British Columbia resident visitors.

*In 1974, 36% of non-British Columbia tourists were from Canada; 64% were from the United States and overseas.

whether year-to-year fluctuations are substantial or if general trends are steadily upward. Highway volume data at selected points in the region has, over the years, indicated a steady upward trend. Thus visitor data for 1977 may not be representative of longer term visitor numbers due to a depressed economy and poor weather. Selected monthly traffic volume data at count stations on Highways 1 and 97 in the region nearby the Hat Creek Valley are shown in Table 4-3. A comparative indication of summer traffic volumes on highways in the area in 1976 is shown on Figure 4-10.

The bulk of travel in the area can be assumed to be recreation oriented. Ministry of Highways roadside surveys undertaken in July and August 1972 in the immediate vicinity of Cache Creek on Highways 1 and 97 indicated social-recreational trips accounted for 80 to 88% of all trip purposes. The 1976 Resident Tourism Survey indicated that 80% of trips to the Cariboo-Chilcotin were for pleasure. Fifty-nine percent of all trips were vacation trips and 69% were weekend trips. The average length of stay for B. C. residents in the region is calculated to be 3.9 nights and for non-B.C. visitors at 2.4 nights. Twenty-one percent of B.C. visitors to the Cariboo-Chilcotin came in a recreation vehicle (R.V.) the highest percentage of any region in the Province. In 1972, about 26% of vehicles on Highway 97 north of Cache Creek were in campers or had trailers in tow, according to Ministry of Higways data.

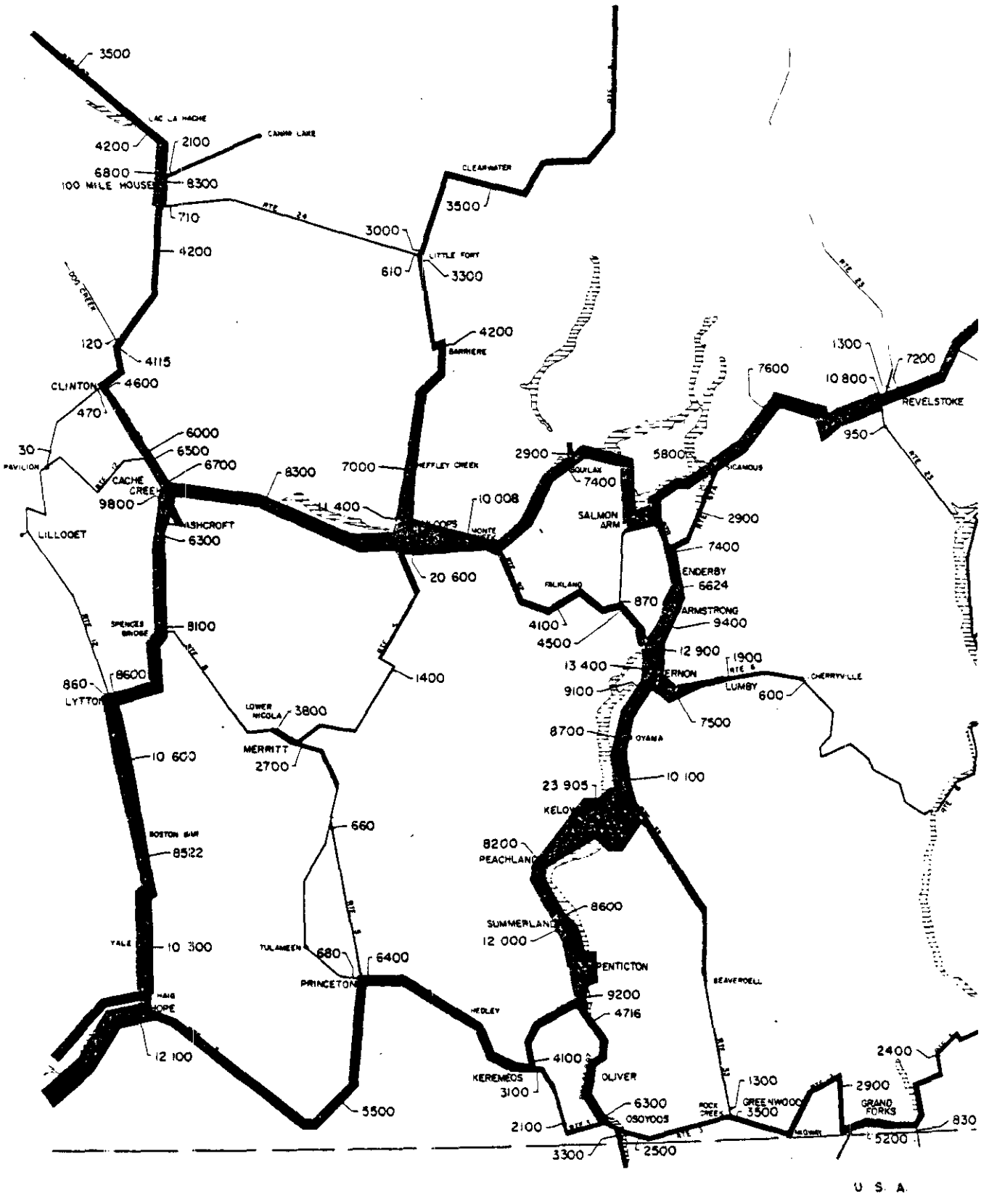
Table 4-4 shows that most B. C. residents traveling to the Cariboo-Chilcotin stayed at hotels, motels, resorts or private and government campgrounds. A higher percentage of B. C. visitors stay at motels, resort lodges and government campgrounds in this area than any other region in the Province. Only 29% of B. C. visitors stay with friends, the lowest percentage of any Provincial region.

(b) Recreation Activities in the Cariboo-Chilcotin Region

Table 4-5 summarizes activity profiles for B. C. and for the Cariboo-Chilcotin obtained from visitor studies undertaken by Tourism

	Count Station Location														
	Highway 1-vicinity of Boston Bar					Highway 1, near Kamloops					Highway 97, north of Clinton				
Year	Jan.	Apr.	June	Aug.	Oct.	Jan.	Apr.	June	Aug.	Oct.	Jan.	Apr.	June	Aug.	Oct.
1963	819	1463	2407	2782	1829	1054	1903	2867	4050	2051	602	999	1493	1941	1464
1964	794	1568	2484	3695	2231	1087	1942	2747	4295	2340	676	966	1320	2400	1740
1965	909	1825	2836	4128	2798	1231	2478	3215	4933	2843	717	---	1736	2358	1826
1966	898	1989	2690	4753	3010	1384	2927	3637	5350	3153	733	1491	1870	2617	1922
1067	1272	2072	3561	4695	3143	1688	2720	3808	5619	3221	807	1246	---	---	---
1968	1356	2763	3096	5476	3220	1894	3300	3504	5405	3137	---	---	---	2819	1857
1969	1120	3339	4388	6426	3731	1557	3141	3990	6099	3446	---	---	2524	3050	2198
1970	1492	2834	4676	6459	4072	2410	3450	4652	6686	4382	843	1397	2382	2933	2063
1971	1557	4122	5372	7218	4557	2251	3635	5241	7259	4468	---	1882	2587	3443	2469
1972	1922	3621	5707	7803	5044	2430	---	5525	7592	4691	946	1871	2658	3453	2449
1973	2372	4895	6179	8591	5258	3127	5361	---	---	---	1109	2313	2994	3729	2287
1974	2490	5139	5667	7509	5009	---	5741	7133	9528	5836	---	2350	3173	3962	2789
1975	2542	4177	6374	8986	5277	3485	5066	7113	9277	5497	1242	1991	3042	4002	2606
1976	2659	5113	6467	8481	5669	3789	6198	7058	10014	6569	1256	2295	3147	4005	2942

Source: Ministry of Highways and Public Works



SOURCE: MINISTRY OF HIGHWAYS AND PUBLIC WORKS

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY	EBASCO SERVICES OF CANADA LIMITED; Environmental Consultants	FIGURE 4-10
	AVERAGE DAILY TRAFFIC FLOW JULY-AUGUST 1976	
	THE HAT CREEK PROJECT – Detailed Environmental Studies	

MAIN MODE OF ACCOMMODATION	REGION VISITED							
	A	B	C	D	E	F°	G	H
Hotel	8%	16%	8%	11%	5%	7%	12%	15%
Motel	11%	8%	17%	12%	8%	19%	14%	0%
Resort Lodge	1%	1%	2%	3%	1%	6%	3%	0%
Government Campground	4%	4%	7%	5%	9%	15%	7%	0%
Commercial Campgrounds	4%	2%	9%	2%	6%	5%	2%	12%
Cabin	7%	12%	8%	3%	10%	6%	10%	2%
Friends	57%	51%	45%	54%	48%	29%	46%	63%
Elsewhere	8%	5%	4%	10%	13%	13%	6%	8%
Total	100%	100%	100%	100%	100%	100%	100%	100%
Sample Size	388	528	174	82	93	62	183	19

Source: British Columbia Resident Tourism Survey 1976

° Cariboo-Chilcotin region

Activity	B.C. Total % B.C. Residents 1976 (1)	Visitors 1974 (2)	Cariboo-Chilcotin % B.C. Residents 1976 (3)	Visitors 1963 (4)
Visiting friends & relatives	72	31	55	6
shopping	48	52	29	-
sightseeing	45	72	37	60
watching sports; theatre	34	-	26	-
boating, canoeing	22	12	26	9
fishing, hunting	21	-	47	-
fishing	-	19	-	24
camping	20	26 (R.V.)* 17 (tent)		
historic sites	12	-	15	31
downhill skiing	6	-	0	-
cross country skiing	-	-	3	-
golf	5	-	8	-
picnicking	-	35	-	-
swimming	-	34	-	13
attending festivals	-	9	-	2

(1) Source: British Columbia Resident Tourism 1976; Tourism British Columbia

(2) Source: *Visitors '74, A Study of Visitors to British Columbia in the Summer* of 1974; Department of Travel Industry

(3) Source: British Columbia Resident Tourism 1976; Tourism British Columbia

(4) Source: Visitors '63, A Study of Visitors to the Province of British Columbia, Canada, in the summer of 1963; B.C. Government Travel Bureau

*Recreational Vehicle

B. C. in past years. B. C. resident activities for the Cariboo-Chilcotin compared with other areas of the Province are shown in Table 4-6. Current information on non-B.C. visitor activities for the Cariboo-Chilcotin is not available, although inferences can be drawn from non-resident activity patterns for the Province and for B. C. residents who visit the area. The most recent data on non-B.C. resident activity patterns in the area is from a 1963 survey of visitors to the Province.

Visiting friends and relatives and shopping are important non-recreational activities for B. C. residents (it is interesting to note that while 55% of B. C. residents visit friends and relatives in the Cariboo-Chilcotin area, only 29% stay with them). Sightseeing, fishing and hunting are the dominant activities in which residents participate, followed by watching sports, boating and visiting historic sites. Table 4-7 provides an estimate, or range, of activity days for various types of outdoor recreation based on estimates of the number of nights spent in the area multiplied by an assumed percentage of persons engaging in an activity.

The data in Table 4-7 provide a gross indication of the extent of recreation activity within the Cariboo-Chilcotin area. Data are not available for all activities for both B. C. and non-B.C. residents in every case. The data are useful however in gaining some insight into the relative importance of activities in the area.

To summarize, B. C. residents make up the bulk of the visitors to the Cariboo-Chilcotin (57%) and the majority of person nights (931,000 compared to a calculated 309,000 for non-B.C. residents). Recreation is the dominant reason for visiting the area; heavy use is made of campgrounds, motels and resorts; campers and travel trailers provide 20% of the transportation (and implicitly the accommodation) and the average stay is almost 4 nights. The Cariboo-Chilcotin Fact Book reports the total expenditure per person per night to be $19.62.

ACTIVITY	A	B	C	D	E	F°	G	H
Visiting Friends and Relatives	70%	71%	64%	63%	62%	55%	45%	89%
Boating, Canoeing	24%	10%	16%	16%	40%	26%	15%	5%
Fishing, Hunting	23%	8%	16%	16%	38%	47%	22%	11%
Downhill Skiing	1%	8%	3%	6%	3%	0%	4%	0%
Cross Country Skiing	0%	1%	2%	4%	0%	3%	1%	0%
Golf	4%	2%	1%	2%	1%	8%	5%	0%
Camping	17%	11%	24%	23%	24%	37%	15%	32%
Visiting an Historic Site	17%	11%	9%	16%	14%	15%	5%	16%
Spectator Sport, Theatre	34%	34%	26%	27%	34%	26%	32%	16%
Sightseeing	52%	40%	46%	40%	35%	37%	28%	32%
Shopping	54%	47%	48%	40%	41%	29%	31%	47%
Business Meeting	6%	12%	13%	12%	9%	15%	8%	0%
Accompanying Someone on Business	4%	6%	8%	4%	3%	3%	1%	0%
Convention	2%	5%	4%	4%	0%	0%	3%	0%
Sample Size	388	528	174	82	93	62	183	19

Source: British Columbia Resident Tourism Survey, 1976.

°Cariboo-Chilcotin

	B.C. Residents*			Non B.C. Residents*			Total Activity Days
	Est. % Particip.	Est. No. Particip.	Activity Days[oo]	Est. % Particip.	Est. No. Particip.	Activity Days[oo]	
Sightseeing	37	62,900	245,000	72	92,800	223,000	468,000
Watching Sports, etc.	26	44,200	172,000	-	-	-	-
Boating, Canoeing	26	44,200	172,000	12	15,500	37,000	209,000
Fishing & Hunting	47	79,900	312,000	-	-	-	-
Fishing	-	-	(107,400)[o]	19	24,500	59,000	-
Camping	37	62,900	245,000	43	55,500	133,000	378,000
Historic Site Visit	15	25,500	99,000	31	40,000	96,000	195,000
Downhill Skiing	0	0	0	-	-	-	-
Cross Country Skiing	3	5,100	20,000	-	-	-	(20,000)+
Golf	8	13,600	53,000	-	-	-	-
Picnicking	-	-	-	35	42,200	108,000	-
Swimming	-	-	-	34	43,900	106,000	-
Attending Festivals	-	-	-	9	11,600	28,000	-

* Derived from visitor data in Cariboo-Chilcotin Fact Book, 1977 (numbers rounded to the nearest thousand)

o 1969-70 data from Pearse Bowden, the Value of Fresh Water Sport Fishing in B.C., 1971.

\+ It is assumed non-B.C. residents do not travel to the Cariboo-Chilcotin for cross country skiing.

ooActivity days per participant are assumed at 3.9 for B.C. residents and 2.4 for non B.C. residents based on length of stay reported in the Cariboo-Chilcotin Fact Book, 1977.

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY

EBASCO SERVICES OF CANADA LIMITED: Environmental Consultants

ESTIMATED RECREATIONAL ACTIVITY DAYS FOR CARIBOO-CHILCOTIN REGION, 1977

THE HAT CREEK PROJECT – Detailed Environmental Studies

TABLE 4-7

(c) Hat Creek Valley (Areas A and B)

Information on current recreation activities in the Hat Creek Valley within Areas A and B was obtained from four primary sources: a local recreational activity study (Appendix A to this report); data from Provincial agencies; other Hat Creek consultant reports on hunting and fishing; data on travel and accommodations obtained from analyses of tourist facilities derived from Provincial agencies and accommodation guides; and information on highway volumes obtained from the Ministry of Highways. A study of the number, location and growth of accommodation facilities in the study area is also presented in Appendix B to this report.

At best, the data collected can provide a basis for the approximation of the total amount of recreation activity that can be assumed to occur. Definitive information is lacking on many activities although the dominant types are treated. It should be borne in mind that recreational activity levels will fluctuate by day, month, season and year. The data therefore are representative of conditions and actual numbers can and will vary.

(i) Activity Levels

It is estimated that 22,400 activity days of all types take place in the Hat Creek Valley including the Hat Creek headwaters, Oregon Jack Creek and the Cornwall lookout area north to the general vicinity of Carquile. About 51% of all activity days are generated by residents from nearby communities within Area C, with the balance from other areas of British Columbia and elsewhere. Local recreational activity at Marble Canyon Park and Pavilion Lake is assumed to be day use only due to the proximity of these sites to local residents' homes. Total activity days at Marble Canyon Park in 1976 include an estimated 2900 day use visitors and approximately 6350 overnight visitors[4-6]. In comparing day use with overnight visitors at other

Provincial parks within the study region, the day use estimates at Marble Canyon may appear low. However, no Parks Branch overnight counts at Marble Canyon Park are available. It is conceivable that day use could equal or exceed overnight use, as is generally the case at Lake La Jeune and Monck Parks. Activity days at Pavilion Lake are estimated to be about 8650, based on data contained in Appendix A. This figure is below the total angler days estimated for Pavilion Lake by the Fish and Wildlife Branch and is thought to represent a lower threshold of activity levels at this lake. Activity levels for the Hat Creek Valley are shown in Table 4-8.

The types of recreational activities local residents engage in within the Hat Creek Valley and at Pavilion Lake and Marble Canyon are shown in Table 4-9. Of all activity days expended by local area residents, 14 per cent occur within the general locale of Areas A and B. The most important activity is back road travel defined to include hiking, trail biking, horseback riding, gem and rock collecting and driving for pleasure. However, facilities and opportunities are few or non-existent for horseback riding and trail biking in Areas A and B, thus the predominant activity is assumed to be driving for pleasure, sightseeing, rock collecting and hiking.

Hunting is the next most popular local activity within the general bounds of Areas A and B. Most significantly, almost half of all local community hunting activity is estimated to take place in the Hat Creek vicinity spread throughout all parts of the area. Angling in the valley and nearby lakes is comparatively unimportant for local fishermen, accounting for only 8.8% of all angling days. Angling activity is localized, occurring predominantly at Pavilion Lake and in Hat Creek itself. Of minor importance are Blue Earth Lake and Marble Canyon Park.

Local resident "lake and shore" activities, which include picnicking, swimming, boating, water skiing and camping occur only at Pavilion Lake and Marble Canyon in Areas A and B with Pavilion Lake being by far the dominant site. Only 8.2% of all local community "lake and shore" activity days take place at Pavilion Lake and Marble Canyon Park with the balance occurring in Areas C and D.

	Percent		Local	Estimated Total
	Local	Non-Local	Activity Days	Activity Days
Upper Hat Creek incl.headwaters, Blue Earth Lake, and Oregon Jack	89	11	3,033	3,410
Cornwall Lookout	45	55	407	900
Lower Hat Creek Valley	44	56	7,960	18,090
Total Hat Creek Valley			11,400	22,400
Marble Canyon (day use)	24	76	695	2,900
Pavilion Lake	33	67	2,854	8,650

Source: Appendix A, Existing Outdoor Recreational User Patterns.

1976

Area	Angling	Hunting	Lake & Shore	Back Road	Other	Total
Oregon Jack Creek	-	102	-	-	99	201
Cornwall Lookout	-	356	-	-	50	406
General Area[o]	56	13	-	247	25	341
Upper Hat Creek	-	318	-	-	457	775
Headwaters	-	4	-	-	-	4
Blue Earth Lake	114	127	-	-	1	242
General Area[o]	132	4	-	1,284	50	1,470
Pavilion Lake	1,070	318	1,060	-	406	2,854
Marble Canyon	101	389	192	-	13	695
Hat Creek	1,493	533	-	-	-	2,026
Harry Lake	-	76	-	-	99	175
McLean Lake	-	381	-	-	-	381
General Area[o]	51	1,250	-	3,714	362	5,377
Total	3,017	3,871	1,252	5,245	1,562	14,947
% of Total Activity Days	20.2	25.9	8.4	35.1	10.4	100.0
% of Total Activity Days For Entire Study Region	8.8	48.6	8.2	16.0	9.4	14.3

Source: Appendix A, Existing Outdoor Recreational User Patterns.

[o]Estimated

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY

EBASCO SERVICES OF CANADA LIMITED: Environmental Consultants

DISTRIBUTION OF RECREATION DAYS IN THE HAT CREEK VALLEY BY SUB-AREA AND ACTIVITY - RESIDENTS OF HAT CREEK, CLINTON, ASHCROFT, CACHE CREEK

THE HAT CREEK PROJECT - Detailed Environmental Studies

TABLE 4-9

"Other" activities comprise a variety of pursuits such as skiing, skating, canoeing, nature study and others not included in the previous categories. Less than 10% of all such activities engaged in by local residents take place in Areas A and B. "Other" activities occur predominantly at Pavilion Lake, Upper Hat Creek, Harry Lake and Oregon Jack Creek with the balance somewhat dispersed throughout the area.

Detailed information on specific activities occuring in the Hat Creek Valley vicinity and at Pavilion Lake and Marble Canyon are presented in the following sections.

(ii) Angling

Data on angling, or fishing, is perhaps more complete than for any other recreation activity in the region. The Fish and Wildlife Branch have data on the estimated number of anglers by lake and stream; detailed studies of the fisheries resource and its current level of use have been prepared for this project; and a home interview survey gathered data on angling by local residents (Appendix A to this report).

Fishing does occur along Hat Creek, although as far as is known no fishing occurs at Harry, Aleece and Finney Lakes, which are the primary water bodies in the vicinity of the plant and mine site. Access for fishing in Hat Creek can be obtained at road crossings or across private property, but because much of the access occurs across actively farmed lands, fishing is probably less active than if Hat Creek were accessible within Crown lands. Perhaps more important is the availability of other competing fishing resources outside the Hat Creek Valley, of which there are many with generally higher fishing productivity compared to Hat Creek.

Direct evidence of fishing activity in Hat Creek was obtained from several sources. Field surveys and helicopter flights of several days duration were undertaken for the Fisheries and Benthos Study during September

1976 but found no fishermen present. Field trips to the area by staff fisheries biologists during the Spring and Summer of 1977 were similarly unrewarding in finding fishermen on the Creek. B. C. Fish and Wildlife personnel at Kamloops reported 250 to 1000 angler days per year on Hat Creek with fishing by children from the Indian Reserve and residents from Cache Creek occuring in the lower reaches (4-7). No data breakdown on angler days was available for these areas. Several land owners near Hat Creek indicated they fished for rainbow trout with some success. Workers at the Hydro camp have also caught fish.

A home interview of Hat Creek residents (Appendix A) (which involved interviewing all valley residents) indicated that valley residents fished for only 5 days in Hat Creek, all of which took place in the general area that falls within the farmed portion of the upper valley (Area B-3 and B-4). However, the survey indicated that residents of nearby communities fished Hat Creek between Anderson Creek and its junction with the Bonaparte for 1544 angler days. Above this area along Hat Creek, no residents of local nearby communities were found to fish Hat Creek directly, but 132 were listed as fishing the "general area." Data on angling are contained in Table 4-9.

The extent to which Hat Creek is used for fishing by people who live beyond the Hat Creek Valley and the local communities nearby is thought to be small, although no direct data is available. Fishermen arriving in the area from the Lower Mainland, other B. C. areas, out of Province, and outside of Canada will in all likelihood be attracted to sites with known fishing reputations such as the numerous lakes to the east of the Hat Creek Valley, streams associated with these lakes, and the Thompson and Fraser Rivers.

In the estimate of out-of-area use contained in Appendix A, the total number of angler days for all local area residents on Hat Creek exceeds the highest estimate of total angler days from all areas estimated by Fish and Game personnel (1676 versus 250-1000). This implies either that local angler day use estimates were over reported in Appendix A or that Fish and Game estimates are low.

A more direct comparison of local versus non-local angling effort can be obtained by studying a larger geographic area which includes nearby lakes. Table 4-10 compares data obtained from the Fish and Wildlife Branch with data on total recreation days by local residents based on the recreational user pattern survey (Appendix A).

The principal finding from Table 4-10 is that of total angling in the Upper Hat Creek Valley vicinity only about 20% occurs from local residents. In the Lower Hat Creek area (including all major nearby lakes), about 12% of total angling stems from local residents. In both cases, therefore, the bulk of angling activity stems from people who reside outside the Hat Creek Valley and nearby communities.

There are differences in the data for Hat Creek itself however. For the entire length of Hat Creek, the Appendix A Survey data indicates 1493 angler days of local activity compared with 250 to 1000 total days estimated by the Fish and Wildlife Branch (4-7). These angling proportions are reversed from those which apply to nearby lakes.

In addition to Hat Creek and nearby small lakes other important fishing sites near the plant and mine site are Pavilion Lake and Crown and Turquoise Lakes in Marble Canyon Park, all of which are located in Area B-1. Ten thousand angler days of fishing occurred on Pavilion Lake in 1976, making it one of the major fishing areas within 40 kilometres of the project site. In addition to its present level of use Pavilion Lake is capable of supporting a substantial increase in use pressure. From 1930 to 1975, Pavilion Lake has been stocked with an average of 49,188 rainbow trout annually (4-7).

Crown and Turquoise Lakes, located within Marble Canyon Provincial Park, and thus somewhat closer to the Project site, sustained 12,000 angler days in 1976. Crown Lake has been stocked annually since 1936 with an annual average of 3598 rainbow trout. Turquoise Lake has been stocked with about 3870 trout annually. The potential for increased fishing pressure at both lakes

Location	Angler Days		
	Local*	Non-Local	Total#
Upper Hat Creek			
Hat Creek	-		250**
Langley Lake	-		1,000
Blue Earth Lake	114		1,200
General Area	132		
Total	246	(1,958)+	2,450**
Percent	20	80	100
Lower Hat Creek and Vicinity			
Pavilion Lake	1,070		10,000
Marble Canyon	101		12,000++
Hat Creek	1,493		750**
Harry Lake			
McLean Lake			150
General Area	51		
Total	2,715	(20,185)+	22,900**
Percent	12	88	100

*Appendix A, Existing Outdoor Recreational User Pattern Study

**Assumes 250 angler days in upper Hat Creek; 750 in lower Hat Creek

+Fish and Wildlife totals minus Appendix A survey data

++Includes Crown and Turquoise Lakes

#Fish and Wildlife estimates from "Hat Creek Fisheries and Benthos Study" (no distinction is made between upper and lower Hat Creek)

was not estimated [4-7].

Total angling activity in Area B-1 is estimated at 22,000 angler days by the Fish and Wildlife Branch. The User Pattern Study (Appendix A) indicated that 1171 angler days occurred at Pavilion Lake and Marble Canyon Park, thus only about 5% of the total fishing pressure on these lakes stems from local residents. Of the two areas, local anglers prefer Pavilion Lake comprising about 10% of the total use pressure. A comparsion of total fishing pressure at Marble Canyon Park and those attending Marble Canyon Campground indicates that if the camping party size is assumed to be 3.0 persons and that if all who camp also fish, only 7413 angler days would occur. The difference between the number estimated by the Fish and Wildlife Branch and attendance data may be due to day use visitors and off-season or non-summer use.

In the future, angling pressure at Crown and Turquoise Lakes is not assumed to increase because of the small size of the lakes and the difficulities encountered by the Parks Branch in expanding campsites. At Pavilion Lake, increased fishing pressure is possible according to the Fish and Wildlife Branch, but again, access limitations may prevent increases unless some small roadside pull-off areas can be provided for day users, or if Vic's Campground experiences greater use of existing facilities. There are no known plans to create or expand public or private facilities at Pavilion Lake. Detailed studies by the Parks Branch of development possibilities at recreation reserves on Pavilion Lake have reached negative conclusions.

Langley Lake, located in Area B-3, is not stocked although 1000 angler days are attributed to it by the Fish and Wildlife Branch. Blue Earth, also located in Area B-3, is stocked with an average of 2000 fish and annual angler days are listed at 1200 [4-7]. Because these lakes are remote yet provide comparatively easy access for local residents, growth in angling pressure is assumed to rise in proportion to growth in the local population of nearby communities including Cache Creek, Ashcroft and Clinton.

(iii) Hunting

Within the area bounded by the Fraser, Thompson and Bonaparte Rivers from Clinton to Lytton* hunting takes place for several species of wildlife, including big game such as deer, moose and bear, and birds including upland game and waterfowl. Hunters include both local residents and non-local hunters who enter the area from other parts of the Province and from outside British Columbia.

No specific studies have been made of hunting in the Hat Creek Valley although inferences can be made from data gathered for larger areas. Data in Appendix A indicate that local area residents hunted for 3858 activity days in the Hat Creek Valley and nearby areas in 1976. Of these, 911 hunter days were expended in the Upper Hat Creek Valley and 2947 in the Lower Valley-Pavilion Lake area. If the surrounding mountain areas are included in the total (approximately the same area as B. C. Game Management Area 3-17), 4515 local hunter days took place.

Waterfowl are hunted at several lakes in the Valley and nearby areas. The Wildlife report for this project however, indicates two conflicting estimates of the number of birds taken. In Management Area 3-17 data are available for ducks only, and while the Canadian Wildlife Service estimated 882 birds taken in 1976, Fish and Wildlife Branch data indicate that only 195 were taken. The Wildlife Report provides no information on hunter days expended on waterfowl but does indicate the number of duck hunters at 69 in Area 3-17 during 1976. Previous data for a much larger area including Area 3-17 indicated an average of 1.49 waterfowl were taken per hunter day. Using this ratio as a general guide, the number of waterfowl hunter days in the entire Hat Creek basin region could vary from 103 (assuming 69 hunters each bagging 1.49 birds) to 131 (assuming 195 birds taken) to 592 (assuming 882 birds taken). Without further definitive information to support any of the estimates, it is assumed that the total number of hunter days for waterfowl falls at the middle of the

*designated as Game Management Area 3-17 by the B. C. Fish and Wildlife Branch.

range, or 350 hunter days.

The residence of the 69 waterfowl hunters is predominantly within about 100 kilometres of the project site (4-8). No data are available on hunters resident in Cache Creek, Ashcroft, Clinton and Lillooet.

Four upland game species are also hunted in Management Area 3-17 including blue grouse, ruffed grouse, spruce grouse and chukar. The Wildlife report indicates 3,499 upland birds taken by 1,389 hunters in Area 3-17 in 1976. No data are provided on hunter days for upland game in Area 3-17. However, it appears that the average hunter bags about 2.5 birds.

A review of Provincial hunting regulations indicates that open season for blue, spruce and ruffed grouse extended from September 15 to December 19 (78 days). Except for the first month, bag limits are set at 10 per day for grouse and 8 per day for chukar. If an average hunter takes only 2.5 birds, pressure on the resource would appear to be well below the maximum possible within the length of open season and bag limits set by regulations (4-9).

It is not possible to calculate the number of hunter days expended on upland game hunting. If an assumption is made that each hunter takes one day to bag 2.5 birds, approximately 1389 hunter days would be expended in Management Area 3-17. If upland game hunting is combined with big game hunting, the number of hunter days that could be assumed to be devoted to upland game would be considerably lower.

According to the Wildlife Report upland game hunters, in general, come from farther away than do waterfowl hunters. About 60% of upland game hunters come from the Thompson-Okanagan region compared with over 90% of waterfowl hunters. No data are available on hunters from nearby communities.

In addressing big game hunting the Wildlife Report indicates that 124 deer, 20 moose, 6 black bear and 3 mountain goat were taken in Management Area 3-17 in 1976. Hunter days expended in taking these animals were 4,872

for deer (39.3 days per animal), 511 for moose (25.5 per animal), 150 for bear (25 per animal), and 62 for goat (20.7 per animal).

Data are also provided on the number of hunters by game species. found in Area 3-17. Success ratios (animals per hunter) indicate that many hunters were unsuccessful in bagging their quarry, with the lowest success rate found for deer hunters. Success rates (animals per hunter) were 0.13 for deer, 0.23 for moose, 0.21 for bear and 0.17 for goat.

The residence of big game hunters is markedly different from bird hunters. Approximately 46% of big game hunters in Area 3-17 came from the Lower Mainland and about 47% from the Thompson-Okanagan Region. No data are provided on hunters resident in nearby communities.

Total hunter days for Management Area 3-17 (which extend beyond the confines of Hat Creek Valley itself) for game birds and animals is estimated at 7334 in 1976, based on data derived from the Wildlife Report combined with estimates of game bird hunting.

The Outdoor Recreational User Pattern Report (Appendix A) indicates that 4515 hunter days were expended by local residents in approximately the same location as Area 3-17 in 1976, thus over 61% of total activity would be by local residents. Considering the rural character of the valley and that some of the farmland is posted, with access often across farmlands (which may tend to discourage non-local hunters unfamiliar with the area), the derived ratio of local to non-local hunters may not be unreasonable.

Data from the Wildlife Report indicate that about 54% of all hunters who frequented Area 3-17 lived in the Thompson-Okanagan region. Assuming this proportion is correct, it is possible that in the user pattern survey of reported local hunting activity in the Hat Creek Valley and adjacent areas a correlation exists between hunter numbers and hunter days. For estimated hunter days in the Hat Creek Valley and adjacent areas, see table 4-11.

Species	Hunter Days
Waterfowl*	350
Upland game*	1389
Big game°	5595
Total	7334

° Source: Wildlife Report

*Estimated using data provided in Wildlife Report

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY	EBASCO SERVICES OF CANADA LIMITED: Environmental Consultants	TABLE 4-11
	ESTIMATED HUNTER DAYS IN THE HAT CREEK VALLEY AND ADJACENT AREAS	
	THE HAT CREEK PROJECT - Detailed Environmental Studies	

(iv) Boating and Swimming

Swimming and boating are recreation activities that could take place at Marble Canyon Park and Pavilion Lake. Boating however, is not possible at Marble Canyon since it lacks a launching ramp.

Total swimming activity at Marble Canyon cannot be directly estimated. Local use, according to the User Pattern Study (Appendix A) for "lake and shore" activities (which includes swimming and picnicking) is estimated at 192 activity days. Assuming an equal split between the two, about 96 swimming days and 96 picnic days would occur through local use. Camping at Marble Canyon amounted to 2118 party nights in 1976 (4-6). Assuming 3.0 persons per party, 6354 person nights occurred at the Park. Assuming one-half of these people swam, 3277 swimmers made use of Crown Lake for swimming. Total swimming days therefore could amount to about 3370.

Boating does take place at Pavilion Lake. According to the User Pattern Study, 1062 local residents went to this site for "lake and shore" activities. Because Marble Canyon is closer to local communities (and is free) it is reasonable to assume that local resident swimming and picnicking takes place at Marble Canyon and boating occurs at Pavilion Lake. A maximum estimate of local boating use at Pavilion Lake would therefore be 1060 activity days. This is very close to the number of days local residents fish at Pavilion Lake (1070). Thus it is reasonable to assume that all local residents who fish Pavilion Lake do so from boats, using Vic's boat launching ramp for access.

Vic's had 3447 visitors in 1976 (4-10), and assuming all visitors boated and/or fished, an additional 3447 boater activity days would occur at Pavilion Lake from that source. In addition, there are 24 private cabins at Pavilion Lake. Assuming an occupancy level of 4 per cabin, with use extending over 90 days per year, 8640 activity days could be generated by cabin users. If all cabin users boat (and fish from boats) every day, there would be 8640 boaters days on Pavilion Lake from that source. If all three sources of boat-

ing (and angling) are added together, a maximum of approximately 13,000 boater days would occur on the lake. This figure must be considered high, for it is doubtful that every person at the lake would boat every day. The Fish and Wildlife Branch has estimated 10,000 angler days at Pavilion Lake and this figure is considered to be a more accurate representation of total boating activity (4-7).

Swimmming also occurs at Pavilion Lake but the amount is unknown. It is reasonable to assume that visitors to Vic's Campground as well as cottage residents swim even though the Lake lacks a developed beach area. Pavilion Lake is larger, deeper, and likely colder than either Crown or Tourquoise Lake, thus swimming is not considered to be a prevalent activity. It is assumed that approximately one quarter of total estimated activity days at Pavilion Lake (or about 3000) are devoted to swimming, in addition to boating and fishing.

(v) Camping

Camping in the Hat Creek Valley and adjacent areas can only occur at government campsites at Marble Canyon Park or at Vic's Lakeshore Camping. Marble Canyon Park, which operates over capacity due to campers using picnic table sites for overnight stays, had 2118 parties for four for the six years between 1971 and 1976 (4-6). Assuming 3.0 persons per site, there were 6354 camper nights at the park during 1976. Camping is free. Vic's Campground, with 4 cabins and 18 campsites reported 3447 visitor days, all of whom are assumed to have stayed overnight (4-11). Party size was estimated at an average of four, with expenditures of $30 per party. Total camper nights in the Hat Creek vicinity, both public and private, total approximately 9800. Sixty-two percent of campers at Marble Canyon are from B. C. with the balance from the rest of Canada, the U. S. and elsewhere. Seventy-one percent of visitors to Vic's campsite are from B. C. with 58% from the Lower Mainland.

The Appendix A report includes camping as a subsection of the "lake

and shore" category, but camping data are not specifically broken out. The data indicate 1060 "lake and shore" days at Pavilion Lake and 192 at Marble Canyon. The proportion of these days spent camping is not estimated, although it can be assumed that comparatively few, if any, would be local campers,for most live within a very short driving distance of the Park. In general, campers will tend to camp only when they are some distance from home. Thus it can be reasonably assumed that the vast majority of campers are non-local residents.

(vi) Sightseeing

Sightseeing is an activity in which most people participate, often in association with other activities. The number of sighteers on and adjacent to the Hat Creek Valley can only be determined by inference from other data sources.

In the Upper Hat Creek Valley, Cornwall lookout is a known location that is visited for the panoramic view afforded at the site. Data on people who signed in indicated 449 visitors in 1976, of which 168, or 37%, originated locally. The number signing in however may be below the actual number of visitors and a mid-range figure of 750 may apply with an upper limit of 1382. Data in Appendix A indicate 1431 local activity days in "backroad travel" in the Upper Hat Creek area, of which sightseeing is a part. Some of these people may visit Cornwall lookout. Assuming the ratio of local visitors to total Cornwall lookout visitors holds for other sightseeing activities, a potential 3867 sightseers, including backroad travelers, could visit the Upper Hat Creek area.

At the northern end of the valley the majority of sightseers follow Route 12 between Highway 97 and Lillooet. Highway volumes for July and August at two points on the Highway from 1965 to 1976 are presented in Table 4-12. Volumes at the easterly location probably involve some local trips to and from farms in the Hat Creek Valley including trips to Cornwall lookout. Thus, volumes at the westerly station are probably more indicative of tourist sightseeing. Trip purpose data for 1972 indicated that 80 to 85% of trips on the principal highways in the area were social-recreation (4-11). Applying the same ratio

	0.6 miles East of Pavilion-Clinton Rd.	0.1 miles West of Highway 97
1965	125	-
1966	140	320
1967	190	340
1968	140	330
1969	120	280
1970	440	-
1971	280	460
1972	260	470
1973	470	690
1974	370	880
1975	430	750
1976	-	760

Source: Ministry of Highways and Public Works

to Highway 12, there could have been as many as 62,000 sightseers in 1975 passing through Marble Canyon in the two summer months, assuming 3.0 persons per vehicle.

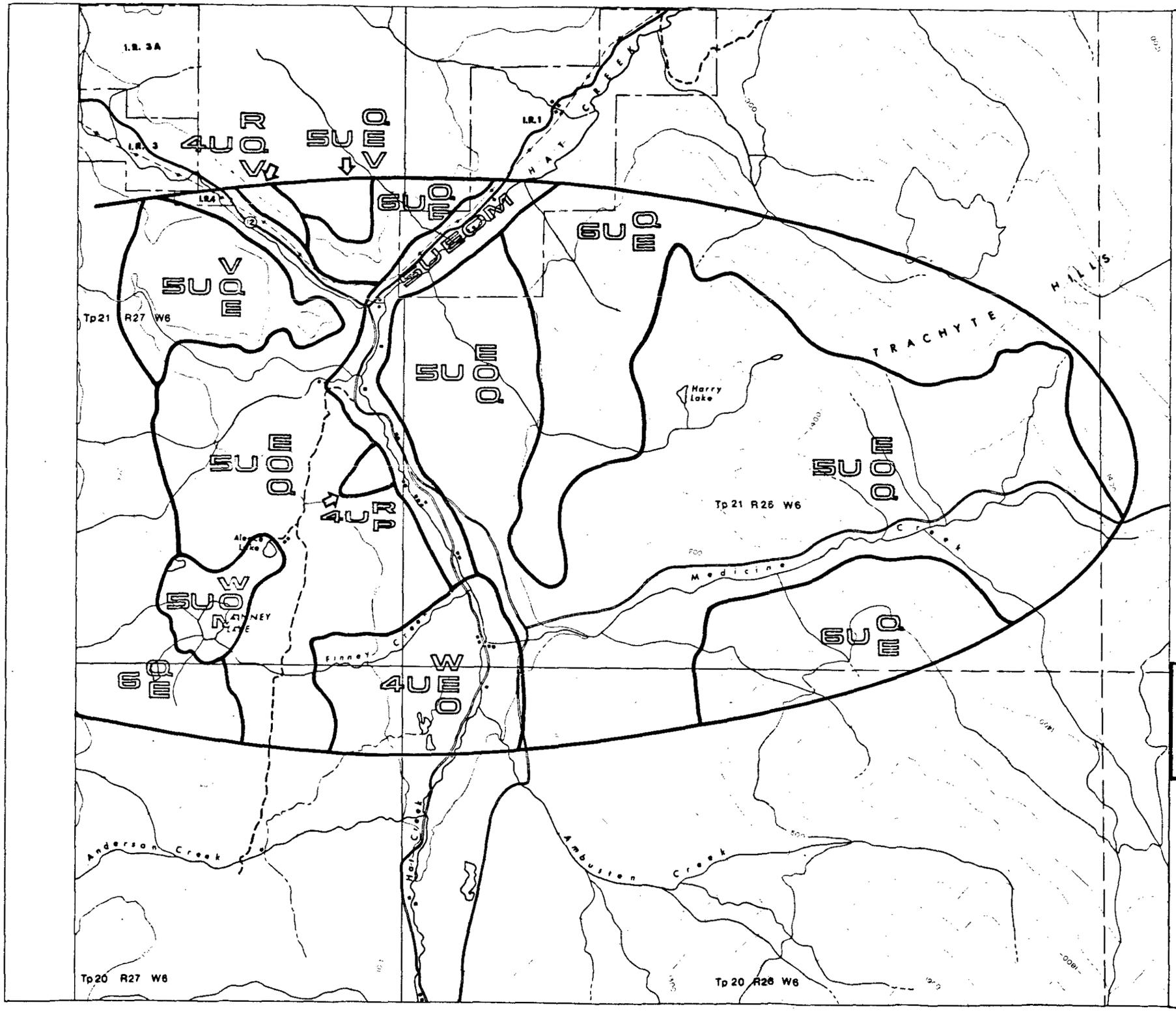
Local backroad travel in the general Lower Hat Creek-McLean Lake-Pavilion Lake area was calculated to account for 3,714 activity days for both local and non-local recreationists, according to data derived from the Appendix A report. This activity is assumed to be independent of sightseeing occurring on Highway 12.

(viii) Cottaging

Apart from the 24 private cottages on Pavilion Lake in Area B-1, there are no government cottage leases within the study area except for lakes in Area D.

Recreational cottage site leases are issued for a three-year period within which time a cottage is to be constructed for occupancy not more than six months per year. Cottages are not intended to substitute for permanent homes. Once a cottage is constructed, leases can be renewed for 15-year periods.

The Lands Branch, in consultation with other Provincial agencies, investigates sites for future cottage subdivisions. Once all interested parties are in agreement, subdivisions can be developed with lots subsequently advertised and sold. No subdivisions are presently pending in the study area but some 34 subdivisions already exist in Areas C and D, encompassing 405 leases, virtually all of which are developed (4-12). A review of leaseholders at a sample of sites indicated that approximately one-half of the leaseholders were from the Lower Mainland.



N

SCALE - 1:50,000

0 Kilometres 1 2 3

CONTOUR INTERVAL - 100 METRES

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
HAT CREEK PROJECT

DETAILED ENVIRONMENTAL STUDIES

RECREATION CAPABILITY AREA A

(SOURCE: CANADA LAND INVENTORY, 1967)

FIGURE 4-11

4.5 CAPABILITY AND CONSTRAINTS

(a) Capability

Current recreational use in Areas A and B is not necessarily indicative of future use patterns. Two additional factors should be considered: the demand for recreation, and the capability of the land to accommodate increased pressure. Future demand for recreation in the Hat Creek Valley and environs is discussed in a later section of the report. The capability of the area to accommodate recreational pressure has been derived from the Canada Land Inventory (CLI).

(i) Canada Land Inventory

Capability mapping for recreation is designed to provide an estimate of the quantity, quality, and location of outdoor recreational lands. The basis of the recreation classifications is the relative quantity of recreational use that a land unit can attract per year under perfect market conditions, without undue deterioration of the resource base. For instance, a multi-purpose beach would be able to sustain more visitors than an alpine meadow. For purposes of uniformity however, recreation capability rankings do not take into account present use or accessibility. Absolute capacity levels (persons per hectare) are not included in CLI ratings.

On both a federal and provincial level, recreation capability information is being used in the preparation of provincial and regional land-use plans, park planning, and the disposition of crown lands. Crown lands in British Columbia comprise approximately 93 percent of the area of the Province. On a more detailed level, capability information is useful for the preliminary zoning for various recreational uses within large parks, for the designation of lakeshore cottage lots, and for the reservation of water frontage for public use.

There are seven recreation capability classes, ranging from Class 1, which is very high capability for outdoor recreation, to Class 7, which is very low capability. Class 7 lands occupy very small areas of British Columbia and include lands where recreation use is almost non-existent, whereas Class 6 lands occupy over 80 percent of many capability maps. Users of capability maps are not guided solely by numerical class ratings, however. Twenty-three features are also used in CLI designations to describe a wide range of activities (see Appendix C). The type, order and relationship of features for each land unit are often a better indicator of the significance of recreation than the capability class. Numerical ratings are more useful in assessing how a particular recreation feature compares with similar features elsewhere.

There are deficiencies in the use of CLI classifications, in particular recreation capability rankings, which pose limitations to their reliability as a planning tool. As mentioned previously, recreation capability rankings ignore present use and accessibility. A high capability designation of an area for intensive recreation activities is virtually meaningless in remote locations where no road system is planned or where private property and conflicting land uses prevail. Classifications can only be useful if they are actively incorporated in an unbiased management program. At present, CLI capability classifications lend themselves to the maximization of several particular land use objectives including recreation, agriculture, or forestry, depending on a particular agency's interests in an area. In some instances, areas have simultaneous capabilities for two or three users. The classifications are therefore merely indicative of what might be desirable in an area, while actual conflicts in use are often resolved more pragmatically by taking into account social and economic values. These values are also subject to change over time.

A relatively innovative form of capability mapping called biophysical mapping has been recently introduced on a federal and provincial level. Biophysical mapping is a classification system designed to transcend the CLI's value ratings by addressing the purely physical characteristics of the land.

This classification system differentiates and classifies segments of the land according to four criteria--landform, topography, soil and vegetation. Differentiations are made for land surfaces which possess internal uniformity and which differ from surrounding land segements. These mappings are expected to serve as the basis for future management of land for agriculture, forestry, recreation and wildlife resources. Although this system is currently being used for wildlife and forestry impact assessments for the environmental report of the Hat Creek Project, it is not being used for the recreation study because of insufficient correlations between biophysical areas and recreational activities. Biophysical mapping also has a shortcoming in common with CLI capability classification system - it does not incorporate the key element of an area's accessibility, nor does it resolve the problem of any given area simultaneously having high capability ratings for different prospective uses.

For the purpose of this study, land acreages within CLI recreation capability classes were measured for that portion of Area A shown in Figure 4-11. Land areas for recreation capability designations shown in Figure 4-11 are contained in Table 4-13. Capabilities are described for Areas B and C. As noted above, CLI classification in and of itself does not reflect the true potential for recreation in the study areas. However, it does serve as an indicator of recreation potential as compared to other areas of the Province, as well as a measure of the relative capabilities of land units within the study areas.

Area A

Canada Land Inventory recreation capability classifications in this area are low and moderate. Most of the area has been rated as 5 and 6 with little topographic variation or viewing opportunities. However, the classifications do indicate good hunting opportunity for one or two game species in a significant portion of this area, in addition to viewing wetland wildlife (waterfowl) along Hat Creek. A segment (approximately 590 hectares, 1458 acres) of land to the west of Hat Creek received the highest recreation capability rating (4) for this area for interesting rock formations and diversity of landforms.

Capability Class Rating		Square kms	Hectares	Acres	Percentage
4U RP		0.3	30	84	0.3
4U WEO		5.9	590	1,463	5.5
4U RQV		0.3	30	84	0.3
	Sub Total	6.5	650	1,631	6.1
5U VQE		5.1	510	1,253	4.8
5U WOM		1.7	170	420	1.6
5U QEV		1.0	100	247	0.9
5U EOM		4.1	410	1,013	3.9
5U EQR		53.2	5,320	13,146	50.00
	Sub Total	65.1	6,510	16,079	61.2
6U QE		34.8	3,480	8,599	32.7
	Sub Total	34.8	3,480	8,599	32.7
	TOTAL	106.4	10,640	26,309	100.00

(See Appendix C for definition of symbols)

A small area south of Highway 12 (approximately 30 hectares, 74 acres) also offers opportunities for viewing interesting topographic and vegetative patterns.

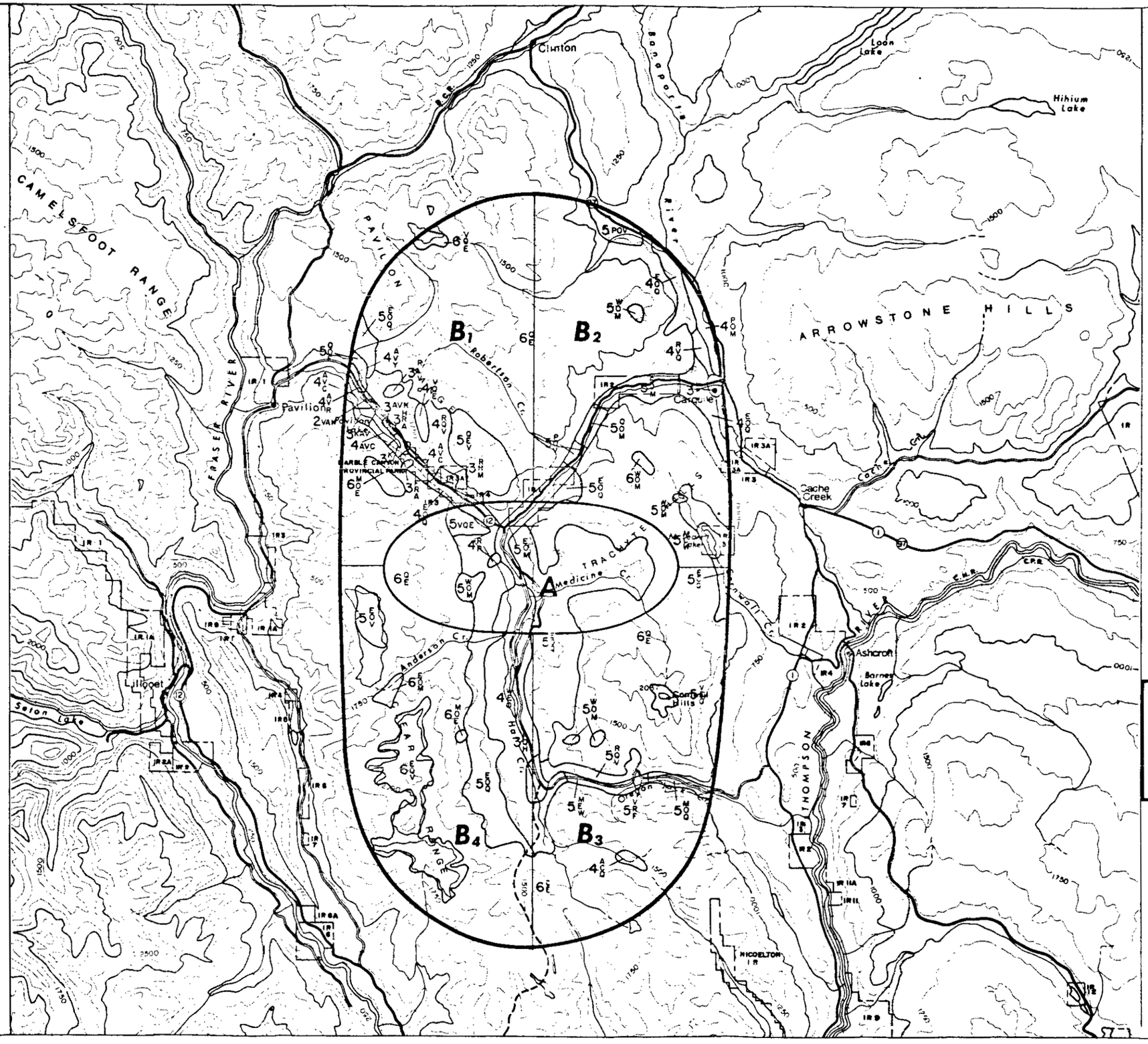
Despite these potentials for hunting and viewing, actual recreational activities within this area would be restricted by current agricultural use and private ownership of the land. Figure 4-11 portrays CLI recreational capability classes for that portion of Area A that will be subject to terrain modification by the major components of the Hat Creek project.

Area B

Recreation capability classifications in this area are shown on Figure 4-12 and rank primarily low and moderate. By far the largest portion of this zone is rated 6^{Q}_{E}, which is indicative of extensive areas of terrain with little topographic variation and low capability for recreational use. Highest capabilities (2 and 3) occur around water bodies (in this case the lakes in Marble Canyon) for activities including angling, viewing, and camping as well as two historic site locations within the canyon where pictographs are found.

Area B-1

Area B-1, which incorporates Marble Canyon and Turquoise, Crown and Pavilion Lakes, has the widest range of capabilities and the largest concentration of high capabilities within Zone B. These high classifications are for angling, boating, camping, and for viewing of interesting rock features, landforms, and an historic site. In this case too, the ratings are reflective of present use and good accessibility because most of the area of high recreation capability is within or near Marble Canyon Provincial Park. Viewing is also rated high (2 3, 4) along most of Highway 12 within this quadrant. There are also some isolated areas with capabilities for hunting one or two species of wildlife. However, the major portion of this quadrant is rated as having low



N

SCALE - 1:250,000

5 0 Kilometres 5 10 15

CONTOUR INTERVAL - 250 METRES

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
HAT CREEK PROJECT

DETAILED ENVIRONMENTAL STUDIES

RECREATION CAPABILITY AREAS A AND B

(SOURCE: CANADA LAND INVENTORY, 1967)

FIGURE 4-12

capability for recreation.

Area B-2

This area includes the Trachyte Hills and a portion of Highway 12. Most of this area has low recreational potential according to the CLI, although there are some portions which are rated as having good hunting for one or two game species and for waterfowl viewing. McLean Lake has been rated as having moderate canoeing capability. A segment of land to the southwest of the Bonaparte River is given a good rating (4) for viewing attractive vegetation and interesting terrain.

Area B-3

This area offers good viewing opportunities. The southern end of the Hat Creek Valley at Upper Hat Creek is rated as having the highest potential (3) for viewing and interpreting cultural and historic landscapes and topographic patterns. The valley floor also has a relatively high CLI rating (4) for wetland wildlife and interesting vegetative patterns. In addition, the Oregon Jack Creek Valley contains a site known as the Amphitheater, a box canyon with capabilities for viewing rock formations, interesting landforms and waterfalls. Langley Lake, a small artificial lake in a narrow scenic valley, has been designated by the CLI as having potential for viewing of vegetative zones, rock formations, and waterfowl. Cattle Valley, which is a scenic upland valley with potentially high viewing capabilities, has not been accorded more than a moderate rating (5) by the CLI. The Cornwall lookout area has been accorded a moderate rating based on interesting vegetative patterns and upland wildlife hunting capability.

According to the CLI map, good angling and canoeing capabilities (4) can be found at Blue Earth Lake, but the letter designations indicate that intensive use of the shoreland (such as for cottaging or camping) would be a problem because of unsuitable landforms and the small size of the lake.

Area B-4

Within this quadrant, the Hat Creek Valley floor has been given a CLI

rating of (4) for wetland wildlife and interesting vegetative patterns. There is also moderate hunting capability indicated at higher elevations to the west of this area. Although the upland areas to the west, particularly the Clear Range, offer opportunities for viewing because of logging road access to high elevations, these areas received a low CLI designation (6). According to the CLI map the mountain peaks in this range are the only areas within this quadrant that have any viewing potential. The remaining area has a low recreation potential.

(b) Constraints

(i) Agricultural Land Reserve

The agricultural land reserve classification covers a major portion of the Hat Creek Valley. The intent of the Agricultural Land Reserve classification is to retain certain lands in agricultural pursuits to the greatest extent possible (with exceptions that were described in section 4.1). Agricultural land reserves in the Hat Creek Valley are shown in Figure 4-6.

(ii) Forest Service Zones

The Forest Service has undertaken studies of two types of zones of significance to recreation: recreation zones and sight zones. Recreation zones (which are subdivided into primary and secondary) are found along the Thompson and Bonaparte Rivers, in Marble Canyon, at Barnes and Willard Lakes, and at other smaller lakes within the Hat Creek Valley. Sight zones, which are also subdivided into primary and secondary, are found predominantly along highways and rivers. These zones are indicative of sensitive viewing areas within which special forest cutting practices are in effect.

Forest Service zones are described as follows:

> Primary Recreation Zones: Areas of high recreation value but not covered by a formal map notation. These are areas which will be directly used by the public and if improperly logged could be very detrimental to the recreation values.

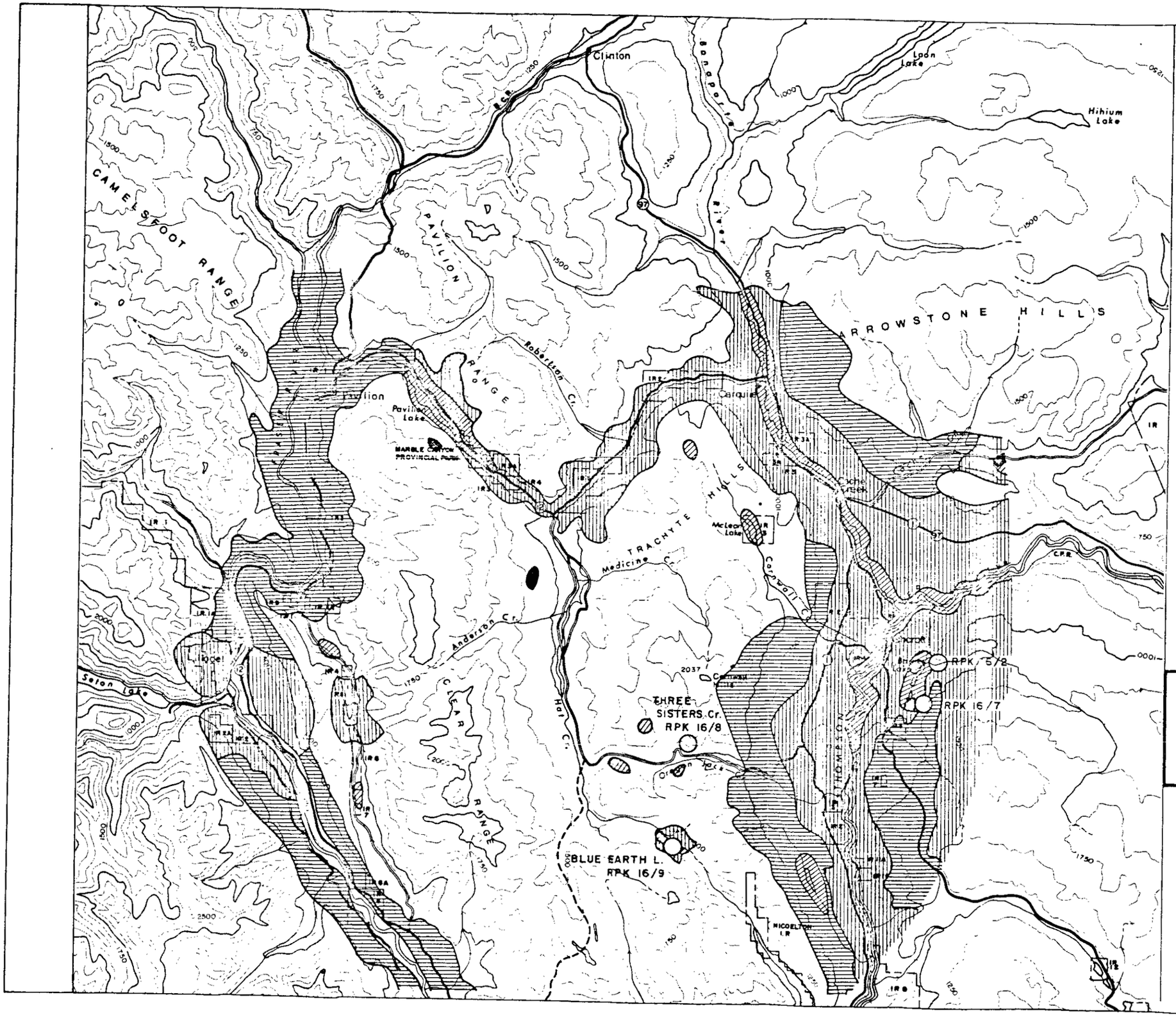
Secondary Recreation Zones: Areas of moderate recreation value or areas which will not be as severely affected by harvesting timber as the areas of primary recreation potential.

Primary Sight Zones: Areas of high visual impact from main roads, municipalities, or from areas of high recreation value. Visual aesthetics in these areas are very important.

Secondary Sight Zones: Areas requiring consideration of visual aesthetics but to a lesser degree than primary sight zones because the quantity or quality of viewing is not as high.(4-13)

The Forest Service also provides limited development at recreation sites known as Recreation Project (RPK) areas. Recreation project sites are found at Barnes and Willard Lakes in Area C and at Blue Earth Lake and Three Sisters Creek in Area B. Potential sites are indicated at Cornwall lookout and at a small lake southwest of Ashcroft.

The Forest Service has also designated areas known as Recreation Reserves. Timber harvesting would conflict with designated Recreation Reserve sites. Recreation Reserves are formal map notations of areas of high recreation value and are recognized by all Government departments. These areas may or may not be receiving public use at the present time but the recreation values are reserved for the use and enjoyment of the public and cannot be damaged by timber harvesting. Forest Service zones, sites and reserves are shown on Figure 4-13 for areas A, B and C.



LEGEND

- PRIMARY RECREATION ZONES
- SECONDARY RECREATION ZONES
- PRIMARY SIGHT ZONES
- SECONDARY SIGHT ZONES
- RECREATION RESERVES
- FOREST SERVICE RECREATION PROJECTS

N

SCALE - 1:250,000

0 Kilometres 5 10 15

CONTOUR INTERVAL - 250 METRES

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
HAT CREEK PROJECT

DETAILED ENVIRONMENTAL STUDIES

FOREST SERVICE ZONES AND SITES

(SOURCE: B.C. FOREST SERVICE, KAMLOOPS, 1978)

FIGURE 4-13

5.0 AREA C - THE BONAPARTE, THOMPSON AND FRASER RIVER VALLEYS

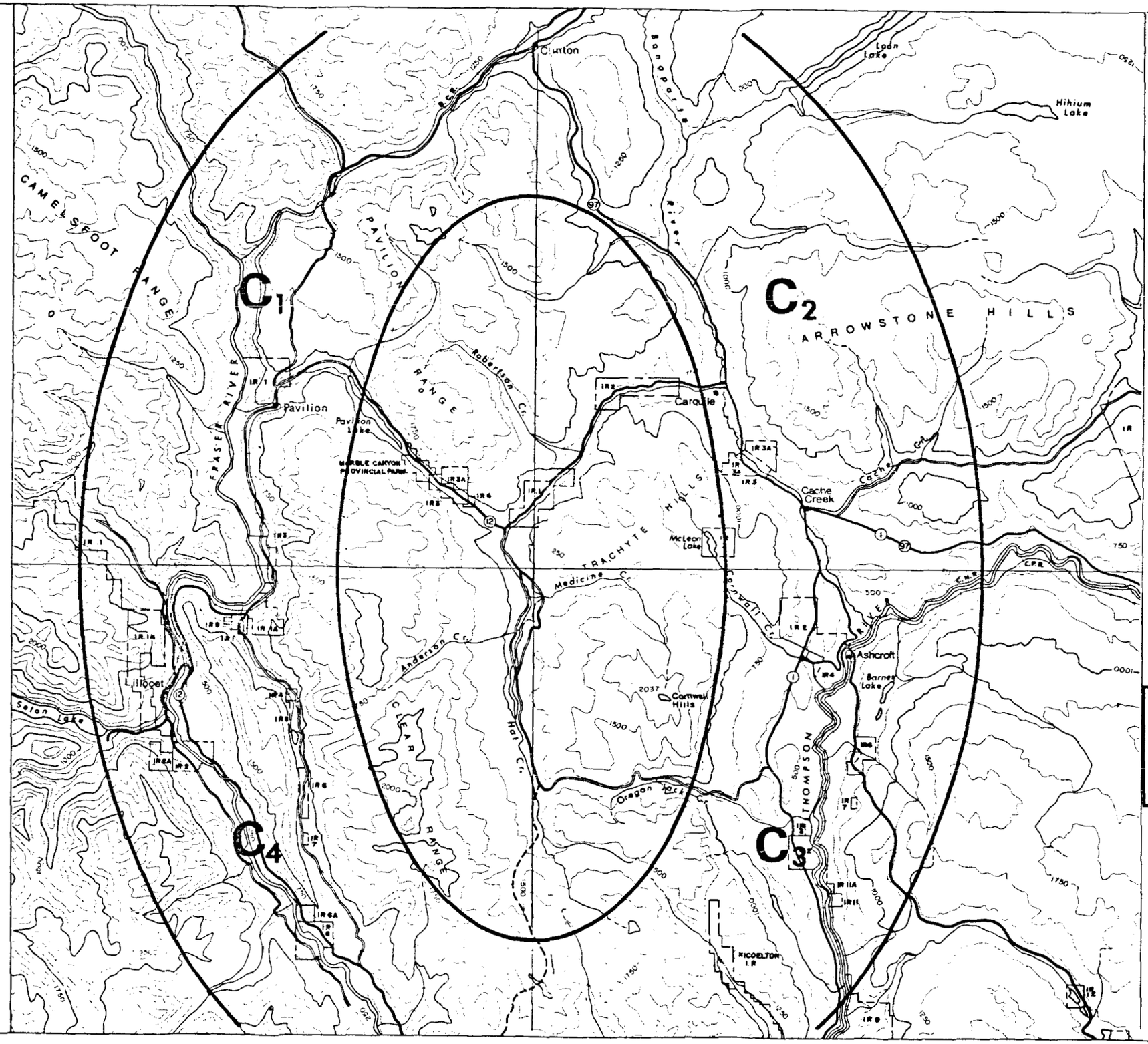
5.1 SETTING

The major river valleys which predominantly define Area C and surround the Hat Creek Valley are distinctly different from the quiet pastoral quality of the valley itself. To the east in Areas C-2 and C-3 are Highways 1 and 97, both major trunk highways connecting the Lower Mainland with the eastern and northern portions of the Province. Cache Creek, Ashcroft and Clinton, the closest major population centers to the project site are found on these routes with shopping and other community facilities available. Comparatively large concentrations of tourist accommodations and recreational opportunities are afforded by the Thompson and Bonaparte Rivers, their tributaries, and several nearby lakes which provide sites for fishing and other water oriented recreational pursuits.

To the west, the dramatic Fraser River canyon is a unique scenic resource distinctly different from the arid Thompson River valley. Backdropped on the west by the Camelsfoot and Pacific Coast Ranges, large irrigated farms lie on bench lands abutting the deeply incised river. Lillooet is the only community of importance, with access afforded by Highway 12 between Carquile and Lytton. Highway volumes and tourist accommodations are quite small in number compared to those in the Thompson River valley. General terrain in Area C is shown in Figure 5-1.

(a) LAND USE

Area C, covering approximately 2748 square kilometres (274,750 hectares), incorporates the settlements of Ashcroft, Cache Creek, Carquile , Clinton, Pavilion, Lillooet, and Spences' Bridge. These towns are located along transportation routes that have historically been major access corridors between the Interior and Lower Mainland of British Columbia. Highway 1 links the area



N

SCALE - 1:250,000

5 0 Kilometres 5 10 15

CONTOUR INTERVAL - 250 METRES

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
HAT CREEK PROJECT

DETAILED ENVIRONMENTAL STUDIES

GENERAL TERRAIN AREA C

FIGURE 5-1

with Vancouver to the west and other major settlements to the east including Kamloops, Revelstoke and Banff. Highway 97 links Highway 1 to settlements in the north of the Province while Highway 12 provides more localized access from Lytton to Highway 1 at Carquile, via Lillooet. There are three railroad lines passing through this area - the British Columbia Railroad to the north and west, and the Canadian National and Canadian Pacific Railroads to the south and east.

The Fraser River dominates Areas C-1 and C-2, and the Thompson River courses through Area C-3. Agricultural land uses, both grassland and improved pasture and cropland (irrigated land) are found primarily along these river systems. The land uses coincide with Agriculture Land Reserve designations for the area. The remaining land classifications are predominantly forested land and forest mixed with grassland. Approximately 25 Indian Reserves are also found within this area. Predominant land uses in Area C are shown in Figure 4-5 in a preceding section of the report.

5.2 RECREATIONAL ASSETS

For the active recreationist, the principal assets of Area C are its streams and lakes. For the passive recreationist, the scenic beauty of the Thompson and Fraser river canyons are important features. The Clear Range with attractions for hikers, Botanie Mountain for naturalists and viewers, the Camelsfoot Range for hunters and the Thompson for fishing, canoeing, rafting and viewing are all important assets. The contrast between the Thompson and the Fraser canyons is unique. The Thompson, arid with semi-desert vegetation contrasts with the richness of the Fraser's coniferous forested slopes. The Bonaparte, minor by comparsion, offers much less topographic relief but adds interest with a series of lakes scattered in the valley floor from Clinton south.

5.3 FACILITIES

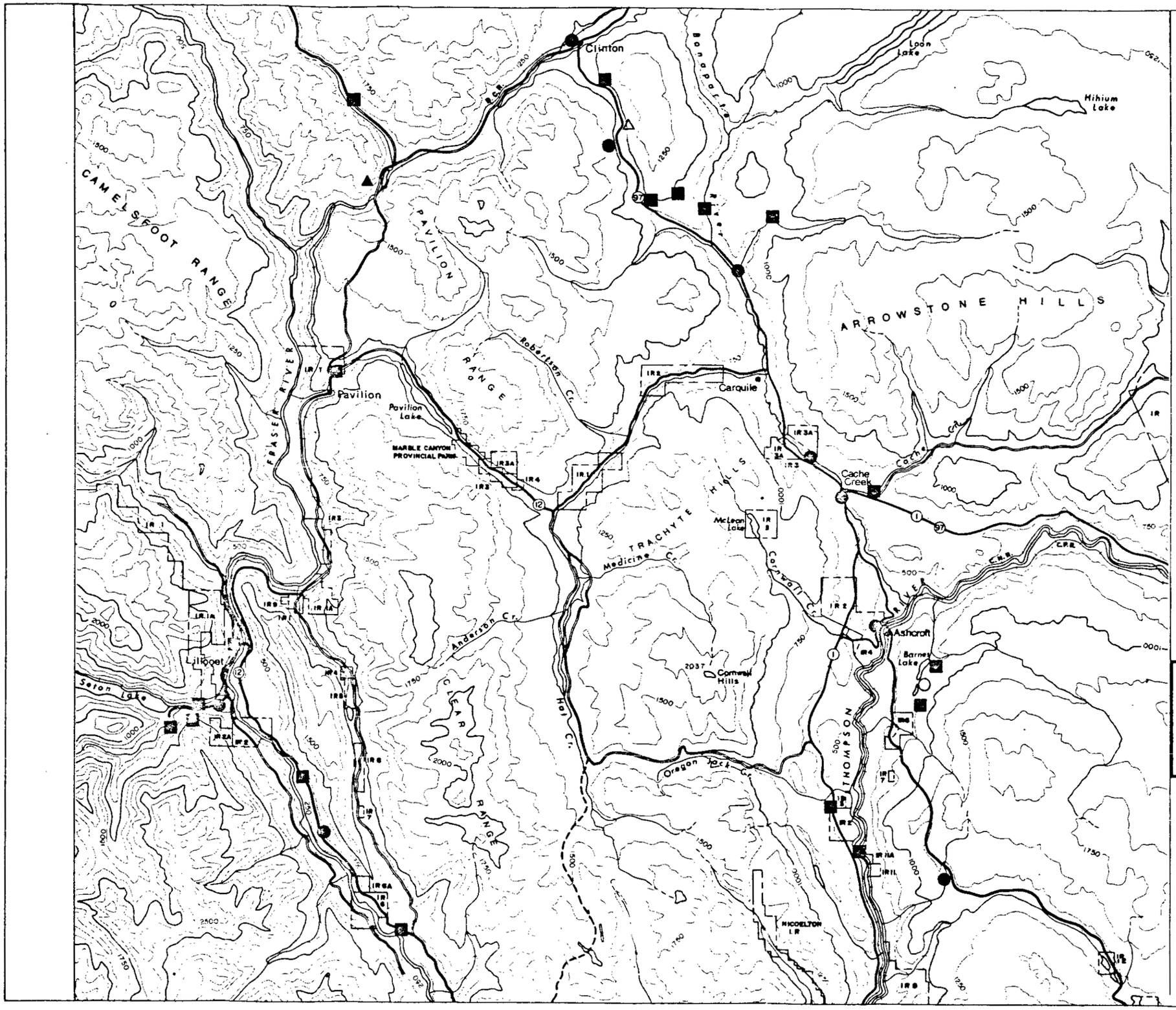
Compared with Areas A and B, Area C offers a large number of diverse

recreational facilities. Concentrations of motel-hotel and camping facilities are available in Cache Creek, Ashcroft, Clinton and Lillooet. For the vacationer in search of a resort and ranch experience, facilities can be found in the vicinity of Ashcroft, north of Cache Creek and south of Lillooet. Day use and overnight facilities exist at Parks Branch sites at Cayoosh, Kelly Lake and Kersey Lake Parks. The Forest Service has camp sites at Barnes and Willard Lakes Southeast of Ashcroft. A number of recreational reserves have been established at a variety of locations scattered throughout Area C. Recreation facilities in Area C are shown on Figure 5-2.

Table 5-1 summarizes the number of accommodation facilities by type in Area C. Parks Branch facilities are few, with only one campground with campsites and picnic tables located at Downing Park on Kelly Lake. Parks Branch sites also exist at Cayoosh in Lillooet and at Kersey Lake south of Clinton on Highway 97. Both these sites are listed as lacking picnic or other facilities but are undoubtedly quite well used based on field observations and the results of the User Pattern Survey (Appendix A).

There are an estimated 704 accommodation units in Area C, the bulk of which are concentrated in the Cache Creek area. Units in Ashcroft (Area C-3) added to those in C-2 account for two-thirds of all units in Area C. Over 75% of all units are hotel-motel units with the balance in trailer sites and campsites found distributed about equally in proportion in all four sectors of Area C. Two sites are listed as dude ranches; one in Area C-1, the other in C-3 south of Ashcroft.

Of decisive importance in Area C is the excellent access provided by Highways 1, 97 and 12. The Clinton-Pavilion Road, of much lower standard, completes the opportunity for circumferential travel around the entire area allowing the interested vistor to partake in a series of changing and dramatic scenic adventures.



PARKS BRANCH SITES

- △ DAY USE
- ▲ CAMPING
- ○ FOREST SERVICE SITE
- ● PRIVATE ACCOMMODATIONS
- ■ RECREATION RESERVE

N

SCALE - 1:250,000

5 0 Kilometres 5 10 15

CONTOUR INTERVAL - 250 METRES

BRITISH COLUMBIA
HYDRO AND POWER AUTHORITY
HAT CREEK PROJECT

DETAILED ENVIRONMENTAL STUDIES

RECREATION FACILITIES
AREA C

FIGURE 5 - 2

Private Accommodation Units:	C-1	C-2	C-3	C-4	Total
motel, hotel, court	92	282	65	97	536
campsites	14	72	9	24	119
trailer sites	14	29	6	-	49
	120	383	80	121	704
Parks Branch Sites:					
campsites	18	-	-	-	18
picnic tables	10	-	-	-	10

Sources: Tourist Accommodation Guide, Tourism B. C. 1977
B. C. Parks Branch

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EBASCO SERVICES OF CANADA LIMITED: Environmental Consultants

ACCOMMODATION UNITS IN AREA C, 1977

TABLE 5-1

THE HAT CREEK PROJECT - Detailed Environmental Studies

5.4 RECREATIONAL ACTIVITIES

Like Areas A and B, Area C lies in part in the Cariboo-Chilcotin Regional District. Information about recreation activities in this district was presented previously in the description of Areas A and B and is relevant as a general indication of activity patterns for Area C. Dominant activities in the area are dictated largely by the natural resources and facilities available. Angling is an important pursuit with major opportunities available on the Thompson, Bonaparte and Fraser Rivers as well as at Barnes, Kelly and other lakes. Sightseeing, either from highways or backroads, is another important activity.

(a) Local Resident Activity Days in Area C

As shown in Table 5-2, Area C accounts for almost 42,000 local community recreation activity days (excluding Lillooet) according to data provided in Appendix A. This represents 40.2% of all local resident activity days compared with 14.3% for Areas A and B combined. The most popular local resident recreational activity in Area C is angling, accounting for 35% of all activity followed by backroad travel which accounts for 32%. Hunting is the least important local resident activity in Area C, accounting for 1170 activity days or less than 3% of the total.

There are little data available on the proportion of local to non-local activity in Area C. Recreationists were interviewed at selected sites in the area during the survey described in Appendix A. These data, together with information from other sources is presented in Table 5-3. There are substantial differences in local to non-local use due to the variation in types of sites at which data was obtained. Day use facilities such as Kersey Lake show a dominant local use pattern whereas resorts cater to recreationists living some distance away. A comparison of total angler days and local resident angler effort at selected sites in Area C is presented in Table 5-4 using data from the user patterns survey and Fish and Wildlife estimates contained in the detailed fisheries report for the Hat Creek Project.

Area	Angling	Hunting	Lake & Shore	Back Rd.	Other	Total
C-1						
Kelly Lake	2009	102	-	-	196	2307
Pavilion Creek	127	-	762	-	-	889
Fraser River	-	-	-	-	-	-
Yalacom River	-	-	-	-	-	-
General Area	150°	-	-	3077°		3227°
Total	2286	102	762	3077	196	6423
C-2						
Kersey Lake/Clinton	1118	378	283	-	2867	4646
Scottie Creek	30	45	-	-	-	75
Bonaparte River	508	-	-	-	-	508
Bock Valley	318	-	1651	-	2786	4755
General Area	302°	122°	1031°	5603°	-	7058°
Total	2276	545	2965	5603	5653	17042
C-3						
Barnes Lake	2778	279	894	-	573	4524
Barnes Creek	1283	-	203	-	-	1486
Thompson River	5296	-	381	-	-	5677
General Area	1031°	244°	-	4579°	460°	6314°
Total	10388	523	1478	4579	1033	18001
C-4						
Cayoosh Park	254	-	-	-	-	254
Fraser River	-	-	-	-	-	-
General Area	12°	-	-	244°	-	256°
Total	266	-	-	244	-	510
TOTAL AREA C	15216	1170	5205	13503	6882	41976

Source: Appendix A, Existing Outdoor Recreational User Patterns, 1977.

°Estimated

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ESTIMATED LOCAL RESIDENT ACTIVITY DAYS IN AREA C FOR RESIDENTS OF HAT CREEK, CLINTON, ASHCROFT, CACHE CREEK

THE HAT CREEK PROJECT – Detailed Environmental Studies

TABLE 5-2

	Local	B.C.	Non-B.C. Canada	Non-B.C. Elsewhere	Visitor Days
Kelly Lake*	-	67	14	18	875
Kelly Lake°	58	(42)	-	-	-
Kersey Lake°	91	(9)	-	-	-
Barnes Lake°	52	(48)	-	-	-
Fountain Lake°	0	(100)	-	-	-
Bar Q Guest Ranch+	3	80	5	12	3911
Dumorets 3 Bar Ranch+	14	79	6	1	728

*Source: Parks Branch, 1976 data

°Source: Appendix A, Existing Outdoor Recreational User Patterns, 1977. Non-local attendance is shown in brackets and includes all those not resident in nearby communities.

+Source: Resort survey, 1976 (between 73 and 79% of all B. C. visitors are from the Lower Mainland)

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ORIGIN OF VISITORS AT RECREATION SITES IN AREA C

THE HAT CREEK PROJECT - Detailed Environmental Studies

TABLE 5-3

Site	Total Angler Days*	Local Angler Days°	Local %
Thompson River	14,330	5,296	37
Barnes Lake	6,000	2,778	46
Bonaparte River	2,000	508	25

*Source: Hat Creek Fisheries and Benthos Study, 1976.

°Source: Appendix A, Existing Outdoor Recreational User Patterns, 1977.

By far the most important local resident fishing sites in Area C are the Thompson River, Barnes Lake and Barnes Creek areas and the Kelly Lake and Creek area. The Bonaparte River - Kersey Lake - Clinton area are also important fishing locations but are much less significant than the others. Hunting is found at Kelly Lake, Clinton, Barnes Lake and at general locations throughout the area. "Lake and shore" activities are found at Pavilion Creek near the Fraser River; Back Valley near Cache Creek; at Barnes Lake; Barnes Creek and the Thompson River. Back-road travel is not site-specific. In all cases those interviewed responded that back road travel took place in the "general area" distributed predominantly in Areas C-1, C-2 and C-3 which lie generally in the vicinity of Highways 97 and 1 and the Clinton Pavilion Road.

(i) Rafting and Canoeing

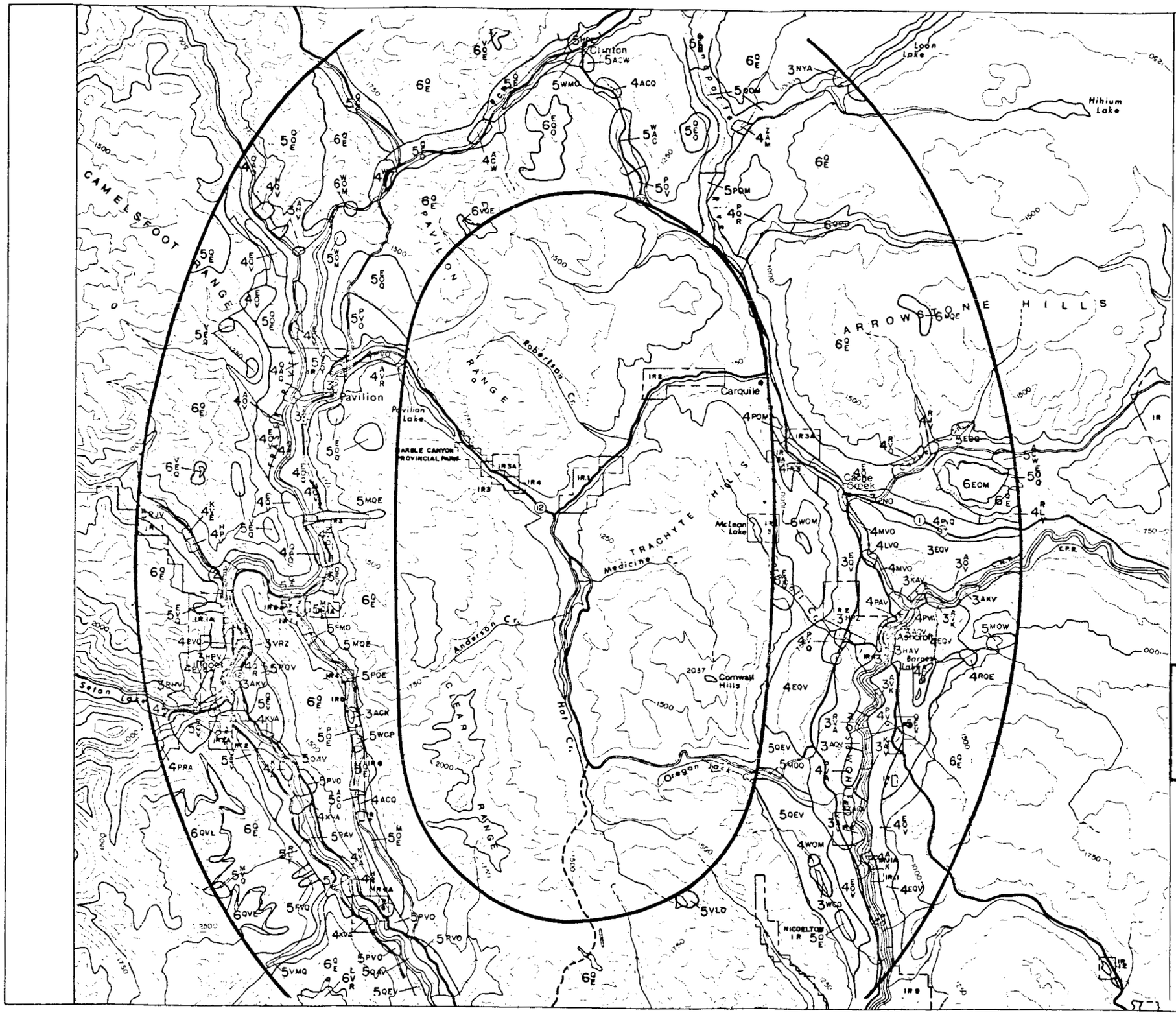
One recreational activity within Area C that is generally not found in Areas A and B is rafting and canoeing. The Thompson River from Savona to Lytton is one of the most popular rafting routes in British Columbia. There are three commercial rafting outfitters serving the river which combined had 820 guests in 1976, up from 310 in 1974. A two-fold increase was anticipated for 1977. In addition, there are numerous private and mobile rafters using the Thompson whose numbers are unknown.

Canoeing is also popular within the study area although the number of participants is unknown. Canoe routes include the Thompson River between Savona Provincial Park and Lytton, and the Fraser River between Lillooet and Lytton. Both routes offer locations for unorganized camping along the way.

5.5 CAPABILITY AND CONSTRAINTS

(a) Capability

Figure 5-3 shows that Area C has a wide range of topographic variation with an associated wide range of CLI recreation capability ratings



BRITISH COLUMBIA
HYDRO AND POWER AUTHORITY
HAT CREEK PROJECT

DETAILED ENVIRONMENTAL STUDIES

RECREATION CAPABILITY AREA C

(SOURCE: CANADA LAND INVENTORY, 1967)

FIGURE 5-3

and activities. This area includes portions of two major rivers, the Fraser and Thompson, the arid Thompson Plateau, and the Camelsfoot, Clear, and Marble Mountain Ranges. Recreational activities rated most highly (2 and 3) are angling, canoeing, and viewing of surrounding terrain and interesting landforms. Historic and archeological sites, also rated highly, occur along the Fraser River and adjacent tributaries as well as within major settlements. It is notable that the high capability ratings in this area do not reflect present levels of use. Except for the Forest Service developments at Barnes and Willard Lakes south and east of Ashcroft, and Cayoosh Provincial Park at Lillooet, there are no public recreation developments in class 2 and 3 lands. Public access to the shore of the Thompson River is also quite limited.

Class 4 and 5 lands, usually associated with hunting, waterfowl viewing, and scenic viewing in general, are distributed relatively evenly throughout Area C where they are located adjacent to lakes and water courses. The major portion of Area C is given a 6^{Q}_{E} rating, which is poor capability for recreation.

Area C-1

The highest numerical CLI recreation capability ratings in Area C-1 (3 and 4) occur along the Fraser River and Pavilion Creek. These capabilities are primarily associated with the activities of angling and viewing of interesting vegetative and cultural landforms. The Camelsfoot Range to the west of the Fraser River offers hunting opportunities for one or two species of upland wildlife.

Area C-2

The northern part of Area C-2 has received relatively high CLI ratings (4) for angling and canoeing activities because of numerous lakes and creeks. Among these are Three Mile Lake, Alkali Lake and Loon Creek. The CLI has also rated Loon Creek relatively high (4) for its fish hatchery. Hunting

for upland wildlife has received a similar capability rating along the Bonaparte River and Plateau. Highway 12 at the northeast edge of this area has a good rating (3) for viewing agricultural landscapes and vegetative patterns, and areas along Highway 1 and 97 are also rated as good for viewing. Several locations at Cache Creek, Clinton and Carquile offer opportunities for viewing and interpreting the area's history. For example, Hat Creek Post (Carquile House) at Carquile dates back to the mid 1850's when it became an important road house.

Area C-3

The Thompson River is the most dominant element in the landscape in this area, with CLI ratings of good capability for a number of recreational activities. Angling is rated very highly, along with good capabilities for viewing landscape patterns and rock formations, and for organized camping. There are also isolated areas of good hunting capability. Good angling and canoeing capability is also found at Barnes and Willard Lakes, about two kilometres southeast of Ashcroft. Venebles Lake has a high rating for canoeing, but no angling capability. Ashcroft Manor, at the junction of Highway 1 and the south road to Ashcroft, is rated as having good capability as a historic site.

Area C-4

The Fraser River in this area is rated by the CLI as having good angling capability, ranging from a classification of 2 near the northern edge to 5 for most of its remaining length within this area. All of the area along Highway 12, which generally follows the course of the Fraser, is rated as having good viewing capabilities. The River Canyon to the south of Pavilion has particularly colorful and dramatic rock outcroppings as seen from the highway. Several locations around Lillooet offer good capability for viewing historic features.

Fountain, Chilhil, and Cinquefoil Lakes are all rated as having both good angling and canoeing capabilities. Fountain Lake, which has the highest rating (3), also has good capability for organized camping. There is relatively good hunting capability along the Fraser Plateau.

(b) Constraints

Large areas of the Fraser, Bonaparte and Thompson River Valleys within Area C are included in the B. C. Agricultural Land Reserve. These locations are for the most part found where agriculture is pursued today. Although the intent of the ALR designation is to maintain agricultural activities, conditional use permits can be obtained for recreational developments.

B. C. Forest Service recreation zones, site zones, recreation reserves and recreation projects (RPK) are also found in Area C. The areas and sites are indicated on Figure 4-13 in the previous section and include the Hat Creek Valley Areas A and B, in addition to Area C. Primary recreation zones are found along the Thompson and Bonaparte Rivers but not along the Fraser. Primary and secondary sight zones are found along the valleys formed by all three rivers. Recreation project sites are found at Barnes and Willard Lakes in Area C.

(c) Ecological Reserves

Ecological Reserves, which are established by an Order-in-Council to protect a unique ecological feature from man-made development and other intrusions, are open to passive recreational use. Active recreation, such as camping and snowmobiling is not permitted but such pursuits as hiking, sightseeing and photography are allowed within a reserve.

There is one ecological reserve (ER 65) within Area C, located approximately 21 kilometres (13 miles) northeast of Clinton along the Cariboo highway. The Reserve comprises 188 hectares (465 acres) and its unique feature is a stand of northern Ponderosa pine.

6.0 AREA D - THE PERIPHERAL REGION

6.1 SETTING

The westerly half of Area D is distinctly different from the eastern portion. To the west of the Fraser River lie the massive Coastal mountains interspersed with rivers and lakes of outstanding scenic beauty. Access to the area is poor compared with Area C and the eastern part of Area D. Partly as a consequence, recreational use is comparatively low, attracting those desiring a more rugged experience. In Area D-1 the Camelsfoot and Shushwap mountain ranges dominate, with the Fraser and Yalakom the major river systems. In Area D-4 Anderson and Seton Lakes provide interesting scenic resources while the southern portion of the area contains the rugged Stein River, presently under study as a primitive wilderness area.

Quite different characteristics are found to the east in Areas D-2 and D-3. Both areas are literally peppered with small lakes, most of them stocked with fish, providing an immense angling resource. The area's hilly and rolling terrain is much different from the mountainous areas to the west. Areas D-2 and D-3 are drier, contain major highways and the city of Kamloops - the largest urban centre in the study region. Population levels are higher, access is easier, and recreation activity levels are greater in Areas D-2 and D-3 compared with D-1 and D-4. Figure 4-1 portrays the general terrain within Area D.

6.2 RECREATIONAL ASSETS

Due to its size and physiographic diversity, Area D offers a wealth of recreational opportunities. Active recreation is dominated by the numerous fishing lakes many of which such as Kamloops, Bonaparte, Green and Loon Lake on the east and Carpenter, Anderson and Seton on the west are of major size. The many smaller lakes scattered northwest and southwest of Kamloops are of equal fishing significance despite several which are inaccessible except by air. Hunting is of

importance throughout the area with the species sought related to terrain and topography. Birds provide much of the hunting experience in the easterly half of Area D while big game is more dominant in the westerly portion. Scenic values are more significant in Areas D-1, D-4 and the southern portion of D-3 with the dominant snow capped peaks of the Coastal range creating an exciting visual experience.

6.3 FACILITIES

Area D is the dominant source of recreational facilities within the study region. Kamloops is the most important single site for tourist accommodation with several hundred hotel and motel units within and nearby the city. Many of the lakes north and south of Kamloops contain hunting and fishing resorts catering to guests from a variety of places with B. C. and the Lower Mainland as the major source of visitors. Table 6-1 summarizes the number of public and private accommodation units found in Area D.

The importance of Area D-3 as a source of accommodation is indicated by Table 6-1. Kamloops provides the bulk of these facilities with the lakes and communities to the northwest and southwest providing most of the remainder. The Parks Branch maintains several major facilities in Area D including Loon Lake, Lac Le Jeune, Savona and Big Bar Lake Parks. Parks Branch facilities are more dispersed than public facilities, many being sited in less accessible areas. An exception is Savona Park which, because of its location on Highway 1, attracts many day use visitors.

6.4 RECREATION ACTIVITIES

Total activity day data for Area D are not available. However, limited information on local usage can be derived from one source. Data found in Appendix A indicate that about 45% of all local residents of Clinton, Cache Creek and Ashcroft use Area D for their recreational pursuits. A summary of activity days by recreation type for local area residents in Area D is contained in Table 6-2.

The dominant areas in Area D favored by local anglers include Loon, Green, Kelly and Big Bar Lakes. Local hunters use the Loon Lake area as well as sites near Machete and Bonaparte Lakes. Green Lake is

Area	D-1	D-2	D-3	D-4	Total
Private Accommodation Units	90	890	2504	6	3490
Parks Branch Facilities:					
Campsites	60	60	289	75	484
Picnic tables	25	46	63	30	164

Source: Tourism, B. C., Tourist Accommodation, 1977
B. C. Parks Branch

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY

EBASCO SERVICES OF CANADA LIMITED; Environmental Consultants

ESTIMATED ACCOMMODATION UNITS IN AREA D - 1977

THE HAT CREEK PROJECT – Detailed Environmental Studies

TABLE 6-1

	Angling	Hunting	Lake & Shore	Back Rd.	Other	Total
Activity Days	15273	2901	8891	12446	7922	47433
% of total activity days	45.6	36.5	57.9	39.9	48.4	45.4

Source: Appendix A, Existing Outdoor Recreational User Patterns

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ACTIVITY DAYS FOR RESIDENTS OF CLINTON, CACHE CREEK, HAT CREEK VALLEY AND ASHCROFT IN AREA D

THE HAT CREEK PROJECT – Detailed Environmental Studies

TABLE 6-2

a great favourite for "lake and shore" activities with over 5000 local activity days reported. Back road travel is scattered widely with the Clinton-Loon Lake, Fraser-Lillooet and Guichon-Highland Valley areas most favoured. "Other" activities are concentrated at Loon Lake, Deadman Creek and the North Thompson-Kamloops areas. Of the local recreation activities that take place in Area D, far more occur in Area D-2 than in D-3.

Activity data for non-local residents in Area D is generally lacking. However, some fragmentary information on fishing and hunting activity has been derived from the Fisheries Study and the Wildlife Report for the Hat Creek project.

A comparison of total and local fishing activity for some lakes in Area D is presented in Table 6-3. The data indicate that for most lakes, local activity forms a very low proportion of the total. Exceptions are Big Bar and Quiltanton Lakes where local angler days account for 46.4% and 25.4% of the totals, respectively. A further finding from the Fisheries Study is that many lakes in Area D are capable of supporting increases in angler pressure. Lakes being fished at capacity at present are in the minority. This finding is borne out for the lakes listed in Table 6-3 where capability data was provided.

Comparative hunting data is even more rudimentary than that available for fishing. The Wildlife Report for the Hat Creek Project provides hunter day information for big game only, thereby excluding a comparison with data in Appendix A which include total hunter days without any breakdown by species. An approximation of data comparable on a geographic basis was prepared for three sub-areas delineated with the Wildlife Report. These data presented in Table 6-4 inferentially support the finding made in comparing fishing activity that, except for the Hat Creek Valley and adjacent areas (Area 3-17), hunting by local community residents forms a small proportion of the total activity. Data for Areas 3-18 and 3-30, which overlay analysis Areas C-2, C-3 and D-2, support this conclusion.

Area	Lake	Angler Days			Capable of Supporting Increase*
		Total*	Local**	% Local	
D-1	Kelly	-	2,009	-	No
D-1	Big Bar	4,000	1,854	46.4	-
D-1	Beaverdam	4,000	233	5.8	-
D-2	Loon	40,000	4,650	11.6	Yes
D-2	Green	-	2,464	-	No
D-2	Hihium	5,000	302	6.0	-
D-3	Roche	25,000	89	0.4	-
D-3	Leighton	10,000	305	3.1	Yes
D-3	Quiltanton	1,000	254	25.4	Yes
D-3	Logan	-	51	-	-
D-4	Seton	500	-	-	Substantial

Source:

*Hat Creek Fisheries and Benthos Study.

**Appendix A, Existing Outdoor Recreational User Patterns.

Area**	Local* Hunter Days	All Hunters of**			Big Game** Hunter Days	Big Game** Days per Hunter
		Ducks	Upland Gamebirds	Big Game		
3-17	4,515	69	1,389	1,082	5,595	5.2
3-18	546	195	1,409	1,030	4,803	4.7
3-30	2,272	202	2,574	3,159	18,146	5.7

Source

*Estimated from data in Appendix A, Existing Outdoor Recreational User Patterns.

**Wildlife Report. (Does not report hunter days for ducks and upland birds).

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY

EBASCO SERVICES OF CANADA LIMITED; Environmental Consultants

COMPARISON OF ESTIMATED HUNTERS AND HUNTER DAYS
HAT CREEK-THOMPSON-BONAPARTE RIVER AND LAKE AREAS

THE HAT CREEK PROJECT - Detailed Environmental Studies

TABLE 6-4

7.0 FORECAST WITHOUT THE PROJECT

7.1 GENERAL TRENDS

Regardless of whether the Hat Creek Project proceeds or not there are several overriding issues that could impact recreation in B. C., the Hat Creek Valley and surrounding areas. First is the future growth in the Provincial population. There is no reason to anticipate any leveling or decline in the number of Provincial residents in future years, nor can income levels be expected to drop. Tourism will continue to be promoted and the number of visitors from other areas will, it is hoped, increase, futher bolstering the Provincial economy. Technology will continue to make mobility easier and the potential for more people to penetrate areas hitherto difficult of access will probably rise. All-terrain vehicles, trail bikes, snowmobiles and other recreational equipment together with extended leisure time will combine to increase pressures on outdoor recreational resources. In response, government will have little choice but to continue to limit fishing catches, set hunting bag limits, and reduce pressures on important habitat areas. None of these steps is new. They will likely become more important in future years if the natural resources of the Province are to remain productive. The consequences of these forces on recreation can be two-fold: the number of recreationists may rise but the recreation experience may decline - less fish per fisherman, fewer deer per hunter, more people per hectare of beach; or the types and patterns of recreation may change - new activities may substitute for current activities when the rewards become unsatisfactory for the effort expended. This may affect consumptive recreation activities most strongly. In contrast, those hunters or fishermen who are more intent on simply seeking an outdoor experience may find no diminution even if the number of wildlife taken is reduced. Others may range farther afield, penetrating into areas more remote from present activity locations.

(a) Travel Volumes

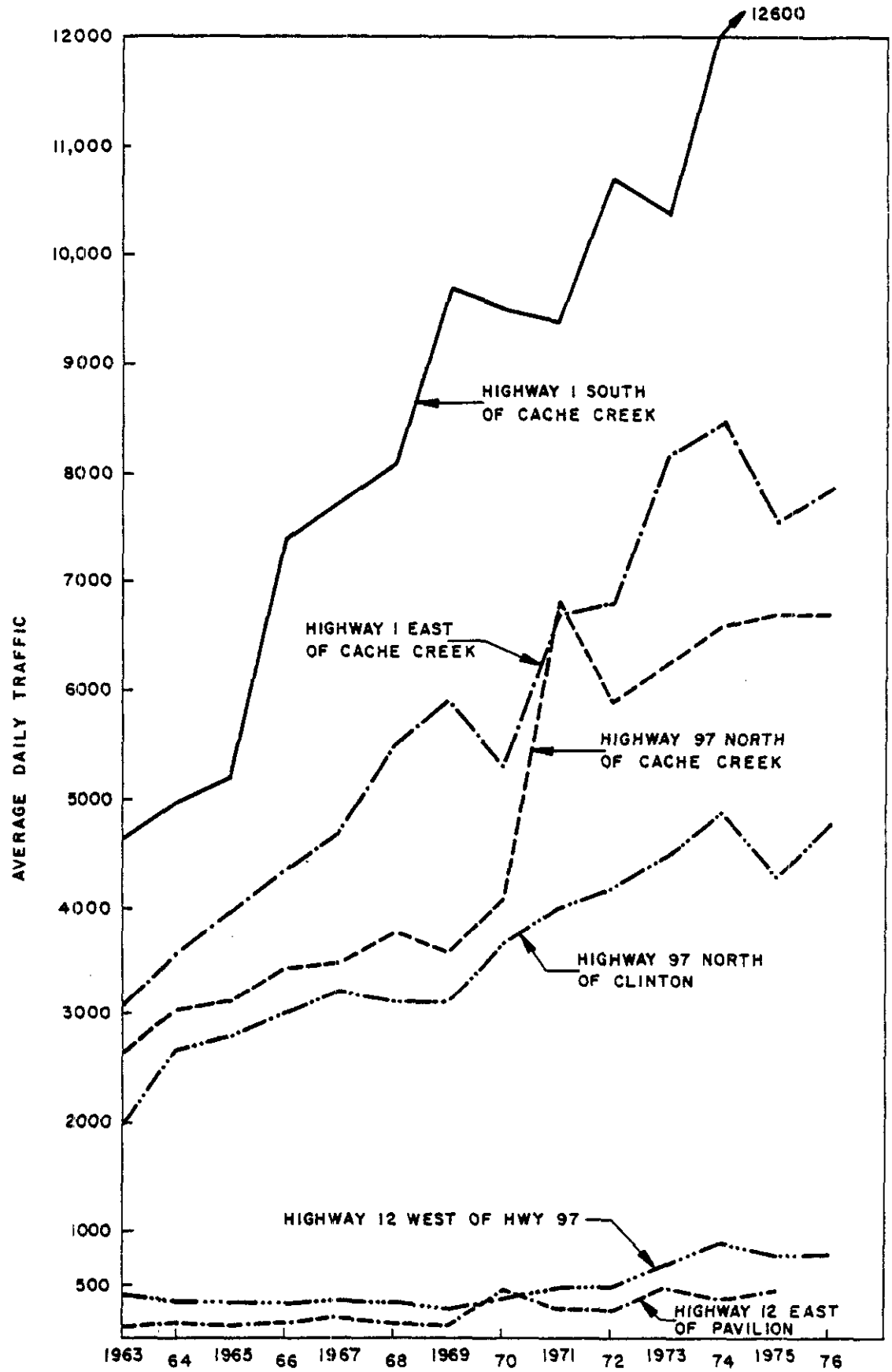
For the study area, and particularly for Areas A, B and C, several issues should be considered prior to forecasting growth with or without the project. Perhaps most important is access to and travel within the study area.

Although the Ministry of Highways and Public Works maintains records of traffic volumes at various stations throughout the study region there are little data available on trip purpose and origin-destination movements of travelers.

Average daily traffic volumes for July and August from 1963 to 1976 are graphed in Figure 7-1 for Highways 1, 97 and 12 in the general vicinity of the project area within analysis Areas B and C.

July and August are periods of high recreational travel. Ministry of Highways data shown in Table 7-1 indicate that in 1972 on Highways 1 and 97 in the project vicinity, 80 to 88% of all trips were social-recreational with the vast majority being multi-day trips. Autos with trailers and camper vehicles made up between 15% and 26% of vehicles, with the higher percentage found north of Clinton on Highway 97 leading towards the Cariboo. A comparison of trip purposes can be obtained from the B. C. Resident Tourism Survey of 1976 which indicated that 76% of visitors to the Cariboo-Chilcotin arrived by automobile with an additional 21% in recreation vehicles. About 80% of resident trips were for pleasure according to the 1976 survey with 38% of trips originating in the Lower Mainland. In the 1972 highway survey, of all trips originating in B. C. that traversed Highway 97 north of Clinton, 41% were from the greater Vancouver area. Comparative data on visitor origins are shown in Table 7-2.

A gross approximation of visitor origins on major thoroughfares within the vicinity of the Hat Creek Project indicates that between 57 and 62% of visitors are from B. C. (possibly higher on Highway 97 north of Clinton) with about 20% of the remainder from Canada and 20% from the U. S. Of B. C. visitors, about one-third are from the Lower Mainland.



Source: Ministry of Highways and Public Works

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AVERAGE DAILY TRAFFIC VOLUMES-HAT CREEK PROJECT VICINITY JULY-AUGUST 1973-1975

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FIGURE 7-1

	Hwy 1 North of Ashcroft	Hwy 97 at Lillooet-Bralorne Road	Hwy 1 East of Cache Creek
Average Daily Traffic	7000	4200	6600
Vehicles: (percent)			
passenger cars	68.1	59.3	66.4
passenger cars w/trailers	7.9	11.6	6.4
campers	11.3	14.7	8.5
panels/pick-ups	8.2	11.0	10.2
trucks	3.9	3.1	8.0
buses	0.6	0.3	0.5
Trip Purpose (%)			
work	4	4	3
shop, medical, etc.	8	11	17
social-rec. single day	2	10	4
social-rec. multi-day	86	75	76
Home Base of Vehicle (%)			
Vancouver Island	5	3	5
Greater Vancouver	27	32	18
Fraser Valley to Hope	7	5	5
Ashcroft-Kamloops	7	9	22
Okanagan-Kootenays-Shuswap	4	12	6
Cariboo and north	7	17	7
Sub total B.C.	(57)	(78)	(63)
Alberta	15	4	14
Rest of Canada	7	3	9
U.S.	21	15	14

Source: Ministry of Highways and Public Works

Visitor Origin	1977 Cariboo Chilcotin* Tourism Book	1976 Cache Creek** Tourist Booth	1972 Hwy 97+ No. of Cache Creek	1976 Marble+ Canyon Park	1976 Vic's++ Lakeshore	1972 Hwy 1+ So. of Ashcroft
Nearby Communities	15	2	17		8	7
Lower Mainland	21	20	32	62	58	27
Other B C	21	13	29		5	23
Canada	20	21	7	17	4	22
U S	23	44	15	21	25	21
Party Size (approx)	-	-	3.2	-	4	3.0

Source:

*Tourism, B C, Cariboo-Chilcotin Tourism Fact Book, 1977. Unpublished.

**Visit to Cache Creek Tourist Booth

+Ministry of Highways and Public Works

++Mr Vic Pearson, Owner, Personal Communication

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VISITOR ORIGINS AND PARTY SIZE AT SITES IN VICINITY OF HAT CREEK VALLEY

THE HAT CREEK PROJECT - Detailed Environmental Studies

TABLE 7-2

The trend in highway volumes has generally been upward over the years. Between 1966 and 1976 approximate increases in volumes on Highway 1 were between 70 and 81% in the area near Hat Creek. Highway 97 rose 94% just north of Cache Creek and 50% north of Clinton over the same period. Highway 12 rose over 200% just east of Pavilion and over 100% just west of Highway 97.

Without any decisive changes in travel patterns (which unpredictable events such as an oil shortage could bring about) the general trend could continue steadily upward in future years, limited only by highway capacity and changes in recreational destination preferences. A major change that could affect traffic volumes in the study area would be construction of the Coquihalla Highway between Hope and Merritt. This connection would shorten the distance between Kamloops and the Lower Mainland and likely divert east-west through traffic traveling on Highway 1 via Cache Creek. The effect on Highway 97 is unknown but it could be conjectured that traffic volumes would not be substantially influenced as travelers on Highway 97 are destined to and from the north. According to an official of the Ministry of Highways the Coquihalla route should be built and in operation within a decade (7-1).

Another development that could affect travel volumes in the area would be construction of a highway from Pemberton to Lillooet. If such a route were built there would likely be a strong impact on Route 12 between Lillooet and Highway 97 junction. The possibility of a Pemberton-Lillooet Highway is considered to be conjectural, however, and is not thought to be a prospect at this time.

(b) Attendance at Provincial Parks

Another indication of possible future recreational growth can be obtained from a study of attendance at local area Provincial parks over the past several years. Park attendance is highly dependent on the type of facilities available and their number. However, location is also of decisive significance, strongly affecting the ratio between day and overnight use. Some parks are very heavily used, if not actually overused. Others, depending on location, may operate well below capacity.

Data on party night campground use at selected Provincial park sites in the region are shown in Figure 7-2*. Goldpan Park, located on Highway 1, is more of a "transient" park than the others shown. The number of camper nights for Goldpan Park showed a general decline from 1966 to 1972 after which volumes returned to 1966 levels by 1975 and 1976. Campsite use at Golpan Park is not indicative of total use, however. Over the years, day use at Goldpan has been approximately five to ten times overnight use, attesting to the wayside character of the site. Skihist Park, located nearby on Highway 1, has a similar pattern with day use averaging two to three times overnight use. In 1976, 54% of campers at Goldpan Park were from B. C., as were 57% of campers at Skihist Park. Place of residence for the majority of B. C. visitors to the three Provincial parks in the study area for which data are available is shown in Table 7-3.

Marble Canyon, Loon Lake and Monck Park are increasingly remote from Highway 1. The location of these parks relative to the main travel corridor is in part reflected by the proportion of B. C. residents who use each of the parks. In 1976, 62% of overnight visitors at Marble Canyon campground were from B. C., 59% at Loon Lake and 84% at Monck.

In total overnight use, Marble Canyon and Loon Lake Parks exhibited an erratic but slightly upward trend between 1971 and 1976. Monck Park, like Goldpan, showed a decline in 1966 to 1972 followed by a general rise toward earlier levels. Over the past several years day use at Monck Park has approximately equaled overnight use. Day use information from the Parks Branch for Marble Canyon and Loon Lake Parks is unavailable.

(c) Accommodation Units

A further inferential guide to potential recreational growth is the record of increases in accommodation units in the study area. Detailed information on the types of accommodation units found in the entire study area is contained in Appendix B. Those accommodation

* It should be noted that all Parks Branch attendance data prior to 1973 has not been standardized and thus is not strictly comparable with data after that date.

Residence	Monck	Skihist	Goldpan
Capital	3.87	4.74	5.06
Central Fraser Valley	5.58	2.76	3.80
Cowichan Valley	+	1.01	1.34
Dewdney-Alouette	2.62	2.51	1.98
Fraser-Cheam	1.93	1.44	1.82
Fraser-Fort George	1.27	+	1.34
Greater Vancouver	50.94	25.42	30.20
Nanaimo	+	1.15	1.42
Okanagan-Similkameen	1.47	+	+
Thompson-Nicola	9.62	1.28	1.68
B.C. Attendance/Total(%)	84	57	54

Source: B.C. Parks Branch. Only regions with over 1% of total attendance at any of the three parks are shown.

+ less than 1%

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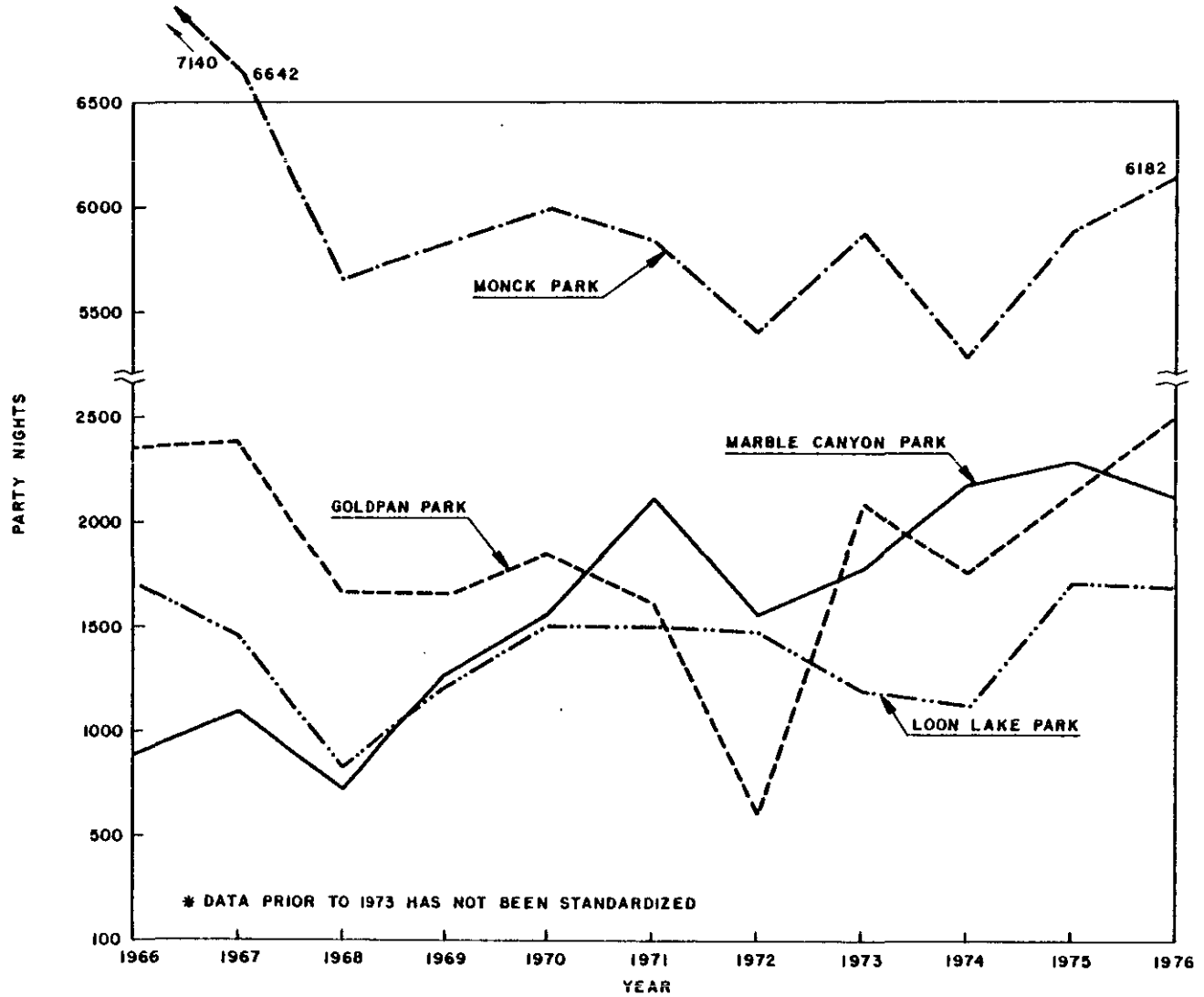
PLACE OF RESIDENCE OF MAJORITY OF B C VISITORS TO SELECTED PROVINCIAL PARKS, BY PERCENT, HAT CREEK STUDY REGION - 1975

THE HAT CREEK PROJECT - Detailed Environmental Studies

TABLE 7-3



SOURCE: PARKS BRANCH

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CAMPGROUND PARTY NIGHTS AT PROVINCIAL PARK CAMPGROUNDS IN THE HAT CREEK STUDY REGION 1966-76*

THE HAT CREEK PROJECT – Detailed Environmental Studies

FIGURE 7-2

units located closest to the project site are found at Marble Canyon Park and Pavilion Lake. As far as can be ascertained, the number of accommodation units at those sites has remained constant since the 1950's, following establishment of Marble Canyon Park in 1956. Facilities at Pavilion Lake predate the establishment of Marble Canyon Park but the number of units in previous years is unknown. Growth is thought to have been minimal, if any occurred at all.

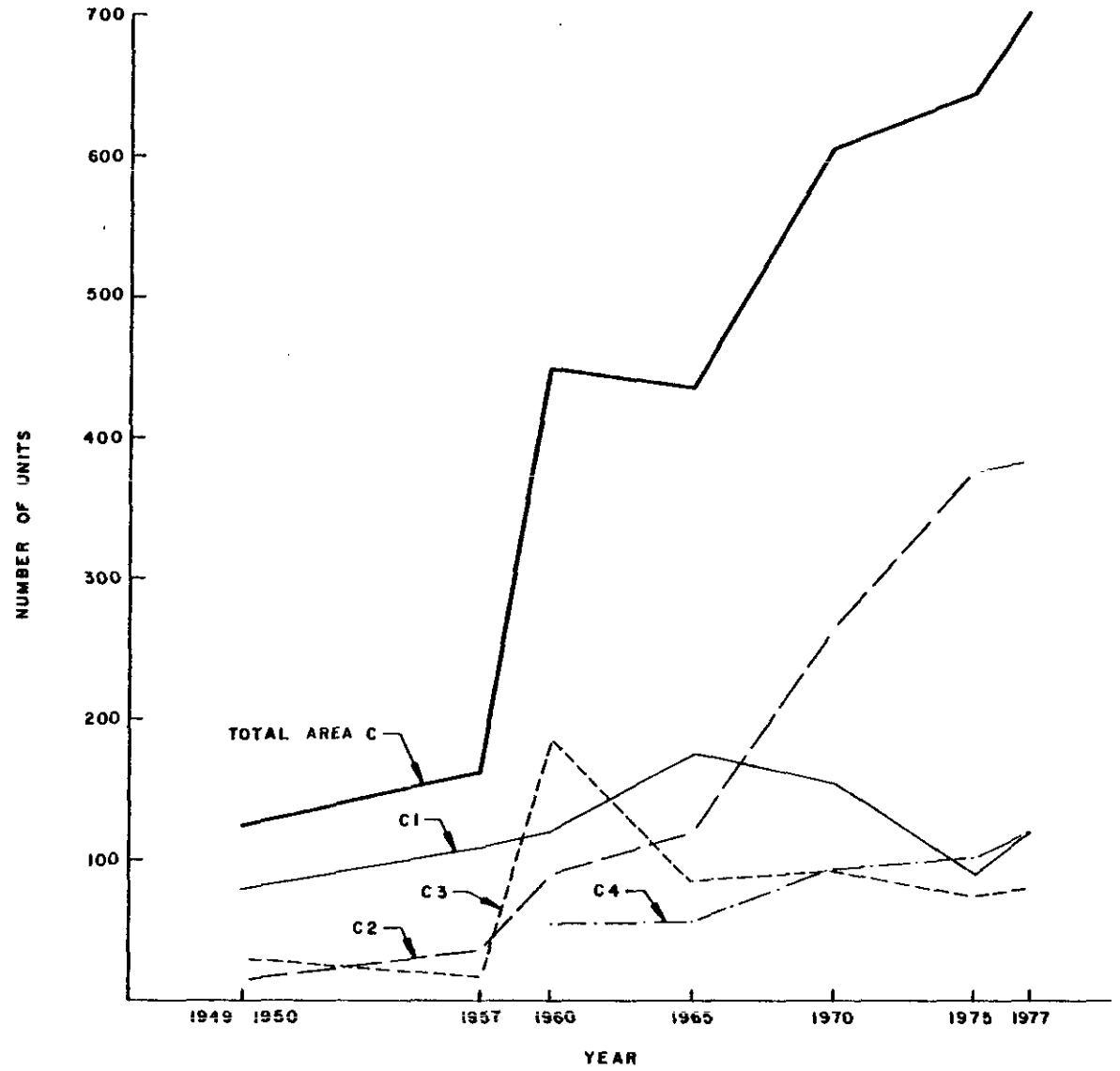
Area C, which circumscribes the Hat Creek Valley, has shown a rise in accommodation units in almost all years since 1949, according to data presented in Appendix B. Area C-2, in which Cache Creek is located, has shown the most dramatic rise of all three areas in Area C particularly over the fifteen years prior to 1975. Areas C-1 and C-3 in which Clinton and Ashcroft are located respectively, showed growth until 1960-63 after which both areas declined. Figure 7-3 presents data on all areas in Area C in graphic form.

(d) Hunting and Fishing

A less direct indication of recreational growth is increases in hunting and fishing licenses over the years. While not an exact measure of actual recreational activity as the number of angler days is not necessarily dependent on the number of licenses sold, there is an implicit assumption that fishing activity may be related, however imperfectly, to the number of licenses. Table 7-4 shows the number of licenses issued in the Province between 1966-67 and 1974-75. Total fishing licenses grew about 100,000 in number over the period while hunting licenses showed a more erratic pattern ranging between 414,000 and 443,000 in seven of the past nine years. On the average almost 430,000 hunting licenses were issued each year between 1966-67 and 1974-75.

(e) Recreational Developments

The Fish and Wildlife Branch have made recommendations concerning the development of recreational facilities at certain sites within the study region. The policy status of these recommendations is unknown but they do indicate the judgement of officials within an agency responsible for resource management within the Province.



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ACCOMMODATION UNITS IN AREA C 1947-75

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FIGURE 7-3

Year	Fishing Licenses			Total % Change	Hunting Licenses	% Change
	Totals	Resident	Non-Resident			
1966-67	289.5	216.1	73.4	-	417	-
67-68	315.8	237.9	77.9	+ 9.1	443	+ 5.9
68-69	328.7	246.7	82.2	+ 3.9	426	- 3.8
69-70	365.7	269.5	96.2	+10.1	432	+ 1.4
70-71	376.3	279.1	97.2	- 2.8	441	+ 2.1
71-72	357.4	264.6	92.8	- 5.0	423	- 4.1
72-73	368.9	280.5	88.4	+ 3.1	414	- 2.1
73-74	416.7	325.1	91.6	+12.9	487	+17.6
74-75	388.5	332.3	56.2	- 6.8	379	-22.2

Source: B. C. Department of Recreation and Travel Industry, B. C. Tourism Fact Book, 1978.

Within Area A and B it is recommended that no subdivisions for cottaging be considered at either Blue Earth, Crown, Turquoise or Pavilion Lakes. Public camping is noted as being needed at Pavilion, together with improved access and boat launching facilities.

Within Area C, improved public camping is indicated as being needed at Barnes Lake and on the Thompson River. The Thompson is also noted as needing improved access and boat launching.

Most recommendations apply in Area D. Of significance are recommendations that no subdivisions occur at Hihium or Loon Lake but that improved public camping be developed. Subdivisions are noted as being acceptable at Beaverdam, Big Bar, Bonaparte, Nicola and Kamloops Lakes, in addition to others. Fishing resorts would be acceptable at Nicola and Kamloops Lakes.

7.2 FORECASTS

(a) Population Growth

A more direct indication of potential recreation demand, particularly in Areas A, B and C, is forecast population growth in nearby communities. Population forecasts without the project for neaby communities are summarized in Table 7-5.

For the Hat Creek Valley itself, it is forecast that population would remain constant at 35 individuals (7-2).

Growth forecast for the entire area is comparatively modest, rising about 33% over the period from 1976 to 1990. Growth in unincorporated areas was determined to be zero due to annexation of new growth areas by local communities. The implicit assumption is that future growth will be concentrated in existing developed areas.

(b) Future Recreational Activity Growth

Recreational pressure on the Hat Creek Valley in the future - as it is today - will be brought about by two groups: those who live nearby and can visit the area and return home within a day; and those who are visitors, staying at nearby public or private facilities. While there are differences by type of activity, total recreation in the valley

Community	1976	1980	1986	1990	1976-90 % increase
Ashcroft	2030	2455	2685	3035	50
Cache Creek	1050	1205	1355	1595	52
Clinton	810	810	1155	1155	43
Lillooet	2220	2220	2785	2785	25
Unincorporated	1390	1390	1390	1390	0
Total	7500	8080	9370	9960	33

Source: "Socio-Economic Studies for the Hat Creek Project", 1977.

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FORECAST POPULATION GROWTH IN COMMUNITIES NEAR HAT CREEK, 1976-1990

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TABLE 7-5

is estimated at present to be approximately 49% non-local to 51% local. In future years these ratios may change, as could the total number of recreational activity days, depending on several factors including the growth in population of both participant groups, recreation activity participation rates, increased leisure and income, access and the availability of facilities.

Reviewing the available data for past years on highway volumes, private accommodation units, Parks Branch site numbers and use, growth in fishing licenses, and other inferential information, the conclusion drawn is that future growth in recreation pressure on the Hat Creek Valley will be more a result of growth in the population of the Lower Mainland and elsewhere than increases in the local area itself. The evidence points to very large numbers of non-local residents on the major highways, the majority of whom are on social-recreational trips (with increasing numbers bringing their accommodation with them). Growth in highway volumes in the past decade, even on major highways, has occurred at twice the rate forecast for local population growth. For local highways, including Highway 12, which provides access to the Hat Creek Valley, increases have been higher, ranging over 100%. In sheer numbers, while the local area may grow by 1000 persons over the same period, the Lower Mainland could grow 50 to 100 times as much. Local attendance records show that a majority of users of local recreational facilities are from the Lower Mainland, thus it is reasonable to assume that recreational growth will rise accordingly and that local pressures could form a diminishing proportion of the total.

The government has encouraged this growth and continues to do so. Tourism is important to the economy of British Columbia as it is to the communities of Cache Creek, Ashcroft, Clinton and Lillooet, all of which endeavor to attract visitors to their areas. Tourists or visitors are recreationists - either active or passive. Indeed, the concerns expressed by representatives of government agencies about overuse of natural resources (such as fish and game) are due not so much to local pressures but to those who visit the area for recreation activities, particularly residents from other parts of British Columbia.

(i) Future Activity Levels

The forecast for growth in recreational activities in the Hat Creek Valley without the Hat Creek project are based on several assumptions. First, and most decisive is persistence of the existing agricultural land use pattern. Agriculture is the dominant activity in the valley floor, much of the land is irrigated and the potential exists for expanding irrigation to further areas. Deeded, leased and permit lands are all used for hay growing and grazing and there is no reason to assume that this pattern will not persist. Further strengthening the case for continuation of the agricultural pattern is the designation of much of the area as agricultural land reserve indicating government policy to continue and strengthen the existing land use pattern.

Further supporting the assumption of no major change in land use pattern is the absence of any existing recreational facilities or proposals for new ones (except for proposals to install primitive facilities at Blue Earth Lake by the Forest Service). There are no major water bodies in the valley to attract development and access is comparatively poor. In addition, Canada Land Inventory interpretations, while pointing to several areas of comparatively low recreational potential, indicate the area has good potential for agriculture - for which it is already used. In addition, areas in the valley denoted as recreational reserves appear to have poor potential for development. These assumptions do not imply there will be no growth in recreational activity in the valley. There is no reason to believe, however, that existing patterns will change dramatically. It is assumed, therefore, that recreational activities will grow in some relation to increases in population (local and non-local) and general visitor and tourist activity.

For the non-project case it is assumed for the Hat Creek Valley itself that future activity day levels will rise at different rates for resident and non-resident recreationists. Growth in resident activity days is assumed to rise at the same rates as the forecast increase in local population in Cache Creek and Ashcroft (residents of these communities are the dominant source of local recreationists found in the valley) but with an increased participation rate of 5% per year. Non-local growth is assumed to

rise in proportion to highway volume increases on Highway 12 in the vicinity of Highway 97 which have approximated 100% per decade. Total activity days using these two assumptions are contained in Table 7-6.

Growth at Marble Canyon and at Pavilion Lakes are not assumed to increase at the same rate as the Hat Creek Valley. Marble Canyon campground is already overused and expansion of the site is diffidult if not impossible. A more probable answer to future growth is to create a public facility at Pavilion Lake which is large and capable of accommodating more fishing pressure. To create public access would require acquisition of private lands as recreation reserves along the lake have been evaluated and are impractical to use. If and when such an event would occur is unknown, dependent as it is on government policy. However, the opportunity to reduce pressure at Marble Canyon while at the same time enhancing recreation at Pavilion Lake would appear to be a reasonable course of action.

It is assumed therefore, that public access to Pavilion Lake will be improved and activity levels will rise in proportion to increases in highway volumes commencing within the next decade. Overnight use at Marble Canyon Park would remain constant, but day use is assumed to rise in proportion to increases in highway volumes. Estimated use at these facilities is shown in Table 7-6.

Without evidence to the contrary there is no reason to assume that the distribution of activities within the valley by type and location will vary from the distribution estimated at present. The dominant single activity will consist of back road travel followed by hunting and angling. Reduced consumptive success rates per hunter and fisherman can be assumed if no increase in the resource occurs. Whether this will result in a decrease in total activity days is unknown, however it may be reasonable to assume that sportsmen will be satisifed with lower yields per unit effort or will seek game elsewhere. As the bulk of hunters and fishermen are from British Columbia, pressure will likely increase equally with population Province-wide. Improved access to the north may lure hunters to new areas, however the degree to which this

Site	1976	1980	1986	1990
Hat Creek Valley:				
Local	11,425	13,065	15,525	17,175
Non-Local	10,975	15,365	21,950	26,340
Marble Canyon Park:				
Day Use	2,900	4,060	5,800	7,250
Overnight Use	6,350	6,350	6,350	6,350
Pavilion Lake	8,700	8,700	13,050	19,400

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ESTIMATED TOTAL RECREATIONAL ACTIVITY DAYS, HAT CREEK VALLEY AND ENVIRONS, 1976-1990

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TABLE 7-6

would affect local hunting pressure is unknown. Total estimated future activity days by type for the Hat Creek Valley and environs is shown in Table 7-7.

(c) Growth in Recreational Activity by Local Area Residents

The present estimated level of recreational activity for local community residents is contained in Appendix A. The activity day data refer to residents of Hat Creek, Clinton, Ashcroft and Cache Creek and show that an estimated 104,356 activity days occurred in 1976-77. Of these days, almost one-third was spent angling, almost 30% in back road travel, over 15% in "other" activities, slightly less than 15% in "lake and shore" activities and 7.6% in hunting. About 14% of all local recreation takes place in the Hat Creek Valley and at Pavilion Lake and Marble Canyon. Another major location is Clinton - Loon Lake area, accounting for about 22% of all activities, and the Ashcroft area which accounts for about 18%. It is indicated that in general, local recreationists show a strong proclivity to partake in activities at sites close to home. For both Clinton residents and Cache Creek-Ashcroft residents about one-half of all activity days take place within 20 to 30 kilometres (12 to 19 miles) of home. Current activity levels and participation rates are shown in Table 7-8.

There are little comparative data on participation in recreational activities. Table 7-9 presents data from three sources on recreational participation by percent of population for Canada, British Columbia, the Cariboo-Chilcotin and the study area. Pearse-Bowden (7-3) reported that on the population over age 20, 34% in the Kamloops region and 43% in the Cariboo-Coast region were licensed fishermen, however about 10% of those licensed did not fish. Thus, actual participation would be lower. Pearse-Bowden also indicated that Cariboo-Coast fishermen fished an average of 14.5 days during the season or 71,050 angler days in total. By comparison, Appendix A data show 33,506 angler days by local residents in 1976.

Activity	1976	1980	1987	1990
Angling	8,150	9,910	13,560	16,785
Hunting	10,450	12,710	17,390	21,520
Lake and Shore	3,390	4,120	5,640	6,980
Backroad	14,160	17,220	23,565	29,170
Other	4,200	5,105	6,985	8,645
Total	40,350	49,065	67,140	83,100

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ESTIMATED ACTIVITY DAYS IN THE HAT CREEK VALLEY AND ENVIRONS BY TYPE, 1976-1990

THE HAT CREEK PROJECT – Detailed Environmental Studies

TABLE 7-7

	Total Activity Days	%	Total Population % Participating	Participation Days/Capita	Participation Days per* person Over 15 years of Age
Angling	33,506	32.1	51.0	6.35	10.41
Hunting	7,942	7.6	26.0	1.50	2.47
Lake & Shore	15,348	14.7	56.0	2.91	4.77
Back Road	31,194	29.9	72.0	5.91	9.69
Other	16,366	15.7	-	3.10	5.08
Total	104,356	100.0	-	19.76	32.41

Source: Appendix A, Existing Outdoor Recreational User Patterns. Covering residents of Hat Creek, Cache Creek, Ashcroft and Clinton (excluding Lillooet).

* Population 15 years and younger is estimated at 39% of total population.

	Canada**	B.C.**	B.C.[o]	Cariboo-Chilcotin[o]	Study Area[oo]
Sightseeing	-	-	45	37	-
Fishing	-	-	-	-	51
Hunting	-		-	-	26
Fishing & Hunting	19.6	23.2	21	47	(38.5%)
Lake & Shore	-	-	-	-	56
Swimming	-	35.5	-	26	-
Boating, Canoeing	33.7	-	22	-	-
Backroad travel	-	-	-	-	72

** Statistics Canada, 1972 Survey of Selected Leisure Time Activities Survey 1973.

[o] Tourism B. C., British Columbia Resident Tourism Survey 1976.

[oo] Appendix A, Existing Outdoor Recreational User Patterns, for Hat Creek, Cache Creek, Ashcroft and Clinton.

(i) Future Local Recreation Activity Days

There are little or no direct data on increases in recreation participation rates over time for Canada or British Columbia and none at all for local area residents or for workers at mines and power plants. It is probable that rates will rise but how rapidly is difficult to determine.

Inferential evidence of possible future growth rates can be gleaned from data presented earlier. Fishing licenses for B. C. residents, for example, rose about 54% in the past nine years. Hunting licenses showed an erratic pattern with no pronounced upward trend in recent years. However growth in park facilities such as campsites and picinic tables in the region was substantial, with increases ranging close to 200% in the past decade.

Highway volume increases in the vicinity of the project area have risen between 70% and 200% in the past 10 years. Growth in accommodation units has also shown a mixed pattern but growth has been strongly upward, particularly from 1965 to 1975 in Area C-2, which lies close to the project site.

Using these increases to infer commensurate rises in recreation activity levels involves a degree of judgment. Although the evidence points to increases in recreation activity to which rises in traffic volumes, recreational facilities and licenses are responding, there is no direct tie between the factors. To ignore past increases as not being indicative of future recreation growth would, however, be unduly pessimistic. It is assumed, therefore, that increases in activity rates will rise between 50% and 100% per decade in future years based on growth in recreation related facilities and licenses. In applying the increase rates for local activities a conservative approach is followed by assuming a 5% annual rise in activity rates for the local study area population.

There is no clear-cut evidence to infer that the future distribution of recreation days will differ markedly from those occurring at present. Local recreation patterns are strongly oriented to sites

well within the 100 Kilometre study boundary with Areas C-2, C-3, D-2 and D-3 strongly favored. Only 2.9% of total activity days take place beyond Kamloops, north of 100 Mile House or south of Lytton and Merritt.

Assuming the previously described changes in recreation particpation rates by the local population, estimated future activity days for local area residents would be as shown in Table 7-10. Table 7-11 provides estimates of the distribution of future local recreation activities.

	1976	1980	1986	1990
Estimated Population	5280	5860	6585	7175
Estimated Recreation Days				
Angling	33,506	40,200	50,200	56,900
Hunting	7,942	9,500	11,900	13,500
Lake & Shore	15,384	18,400	23,000	26,100
Backroad	31,194	27,900	46,800	53,000
Other	16,366	19,700	24,600	27,900
Total	104,356	125,200	156,500	177,400

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ESTIMATED RECREATION DAYS FOR POPULATION 15 YEARS AND OLDER FOR HAT CREEK, CACHE CREEK, CLINTON AND ASHCROFT, 1976-1990

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TABLE 7-10

	1976	1980	1986	1990
Lower Hat Creek Valley	7,975	9,855	13,020	14,990
Upper Hat Creek Valley	3,450	4,270	5,635	6,475
Marble Canyon-Pavilion Lake	3,550	4,220	6,935	10,200
Area C:				
C-1	6,425	7,760	9,705	11,000
C-2	17,040	20,410	25,510	28,915
C-3	18,000	21,535	26,920	30,515
C-4	510	625	785	885
Area D	47,410	56,530	67,985	74,420
Total	104,360	125,200	156,500	177,400

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY

EBASCO SERVICES OF CANADA LIMITED; Environmental Consultants

DISTRIBUTION OF ESTIMATED RECREATION ACTIVITY DAYS FOR RESIDENTS OF HAT CREEK, CACHE CREEK, CLINTON AND ASHCROFT 15 YEARS AND OLDER, 1976-1990

THE HAT CREEK PROJECT - Detailed Environmental Studies

TABLE 7-11

8.0 FORECAST WITH THE PROJECT

8.1 GENERAL EFFECTS ON RECREATION

(a) Primary Effects

The Hat Creek Project can be expected to have two primary recreational effects:

- a loss in recreational opportunities caused by changes in land use from existing agricultural-forestry use to electric power production and mining.

- an induced recreational demand impact caused by increases in population directly related to site activities as well as by people attracted to the site to observe the operation.

Secondary recreational impacts could occur if natural resources beyond the immediate site are impacted by the project. For example, the presence of the project itself will to some degree impair the natural aspect of the landscape and thus reduce the enjoyment of those concerned with sightseeing in a natural or rural setting. Air contaminants could affect vegetation which in turn could impair habitat and reduce hunting success rates. Water quality changes could conceivably impair fisheries thus decreasing catch rates and the general recreational experience associated with angling.

Impacts can occur at four different stages of the project: pre-construction, construction, operation and decommissioning. Each of these is related to a different future time period and the project impact assessment has therefore been organized to coincide with these periods. Impacts include those occurring to the natural environment

through physical change or disturbance brought about by project activities, and direct recreational demand impacts brought about by the increased population levels associated with or induced by the project.

8.2 PRE-CONSTRUCTION IMPACTS

For all practical purposes the recreational impacts associated with the pre-construction stage have already occurred. Physical impacts consist of excavation of the coal sample test trenches, creation of facilities for a small on-site work force and a program of test borings to examine the physical properties of coal in the valley. Physical impacts associated with these activities that could affect recreation are thought to be minor. Removal of coal at the two test excavation sites occurred at relatively small sites. Trench A, the larger of the two, is located west of the Hat Creek Road in a scrub grazing area. It is possible that game animals may have been displaced by these activities but the extent is unknown. It is also conceivable that back road travel may have been slightly affected although no direct evidence is available. Removal of coal did not affect the quality of water in Hat Creek and the fishery was thus undisturbed. All physical impacts occurred within Area A.

The more important impacts were probably caused by the population associated with the resident work force and by visitors attracted to the site. Pamphlets and informational literature were distributed at the Cache Creek visitor booth during 1977 and visitors also checked in at the Hydro information trailer located at the junction of Highway 12 and Hat Creek Road. It is estimated that 140 visitors signed in at the trailer between May 1 and November 30, 1977, representing approximately 280 persons[8-1]. It is probable that local residents also visited the site without signing in and total visitation could thus be higher.

The resident work force consisted of 30 engaged in excavating and trucking during the bulk sample program which extended into

August, and 70 to 80 men engaged in the core sample drilling program covering the period through the winter of 1977-78. Core drilling workers worked 10-hour shifts six days per week. In addition to the project workers, a small group of archeologists were encamped in the area exploring for archeologic artifacts.

Recreational activity at the site by workers and visitors is unknown, but it is probable that workers fished Hat Creek. It is also assumed that back road travel occurred but the extent is unknown. Assumptions on recreational activity induced during the pre-construction stage are outlined in Table 8-1. All activities are assumed to take place in Area A.

8.3 CONSTRUCTION AND OPERATION IMPACTS

(a) Construction Impacts

Impacts described in the foregoing subsection deal with both project construction and operation, however, the predominant concerns are with long-term operational impacts.

Construction impacts of concern to recreation are those which create physical disturbance of the land surface. For the most part these impacts are caused by land clearance for construction of facilities. Dust, noise and other impacts are less significant being temporary in character.

Construction impacts occur predominantly in three analysis areas: Areas A, B-3 and C-3. The mine, plant and some offsite facilities are located in Areas A and B, and the balance of the offsite facilities are found predominantly in Area C-3.

The second major recreational impact of concern is the induced recreation demand created by the construction labor force. It is anticipated that workers will take advantage of the recreation resources

	Angling*	Backroad Travel°	Sightseeing
Bulk Sample	90	90	-
Drilling	-	210	-
Visitors	-	-	280
TOTAL	90	210	280

*assumes bulk sample workers fished one day per month during the summer season.

°assumes bulk sample workers engaged in backroad travel one day per month and drilling crews one day bi-monthly.

and facilities within the valley and nearby creating much greater recreation pressure than exists at present.

(i) Physical Disturbance

From the recreational perspective, construction and operation impacts will overlap during the period between 1978 and 1987 at the end of which time it is assumed all four Hat Creek units will be built and functioning. From the standpoint of land disturbance it can be assumed that areas covered by the ash dumps and the full open pit coal mine will grow to reach their ultimate size over many years, but at the time operation begins excavation and filling will have affected relatively small areas. Top soil and cover vegetation will have been removed to facilitate operations. At the end of the construction stage, the area occupied by all project components will amount to about 684 hectares (1690 acres) in Area A and B-3 with an additional 254 hectares (628 acres) in Area C-3.

There are no recreational facilities affected by project construction; thus the physical impact to recreation will occur by dispersing activities which presently occur in the disturbed site areas to other locations. These activities consist of hunting, fishing, backroad travel and sightseeing. In addition, gem hunting along Medicine Creek (which is included in the backroad travel category) will be substantially reduced or eliminated.

The amount and type of game animals affected by the disturbed area is unknown. Information on this subject will be found in the Wildlife Report for the Hat Creek Project. It is assumed that a net loss in habitat will occur even though existing game may disperse to other areas as a result of the project activities. According to the Wildlife Report, disturbed land at the minesite consists of 49% sagebrush, 25% Ponderosa Pine/Douglas fir/Bunchgrass and 12% mixed elevation grassland. Predominant vegetation affected by the plant

is 36% Aspen, 34% Englemann Spruce/Lodgepole pine and 19% mixed elevation grassland. Offsites construction affects 23% low elevation grassland, 28% big sage, 17% Douglas fir/Pinegrass and 8% Ponderosa pine/Douglas fir/Bunchgrass. No vegetative type was cited as scarce or rare.

Impacts on hunting are expected to extend well beyond the immediate areas affected as it is anticipated that game animals will not venture near the actual site of operations. Impacts on hunting therefore are assumed to occur throughout most of Area A.

The fishery in Hat Creek will be disturbed over the 700 metre (2297 feet) section in which it is to be relocated. Relocation could result in the entire loss of fish in this section and may have downstream consequences. These impacts are evaluated in the Hat Creek Fisheries and Benthos Study. From the recreational perspective, angling that takes place in this section will be eliminated during construction. It is possible, however, that once project operations commence, angling could be restored depending on project characteristics and operational practices.

Backroad travel probably occurs in the area to be disturbed by the project, particularly in the Trachyte Hills which are somewhat more open than other sections of Area A. Sightseeing of the natural environment in the project area will also be affected. The Aesthetic Considerations Report prepared for the Hat Creek Project indicates that components of the project will be most visible in the Medicine Creeek Valley and Upper Hat Creek Valley, with some project elements visible from Marble Canyon, Cattle Valley and Highway 12, portions of which lie in Areas B-1 and B-2. For the most part visual impacts are indicated by the report to occur during the operation phase, the construction phase being too dynamic to quantify.

Sightseeing is not expected to be adversely affected by the project. During the project construction phase, it can be reasonably expected that both local residents and tourists will make special trips to view the activities taking place. For travelers on Highway 12, it will be virtually impossible to avoid seeing the project during construction and thus substantial increases in sightseeing can be expected. Visitor numbers however, have not been estimated. The estimated number of recreational activity days displaced by the project is contained in Table 8-2.

The impacts indicated in Table 8-2 are not correlated by project component. Because the activities affected are dispersed in location, there is no precise means for directly allocating impacts significantly to one particular aspect of the project. The only exception is angling, where the direct agent is the open pit mine which necessitates the diversion of Hat Creek. A general discussion of project alternatives is contained in Appendix D.

(b) Operational Impacts

(i) Physical Effects

Once the plant, mine and offsite facilities are completed and fully operational, project impacts affecting recreational activities will be of three separate kinds: gradual filling of the ash and mine waste disposal area; potential impacts to the surrounding vegetation caused by air quality changes; and visible dust, stack emissions and cooling tower plumes affecting scenic values beyond the physical presence of the project itself.

Gradual filling of ash disposal areas will predominantly affect backroad travel as most game of interest to hunters will likely be dispersed due to the presence of machines and human activity. It is assumed that backroad travel could continue in the

Activity Affected	Amount	Quality	Impact Significance
Hunting	840	Undetermined	-
Fishing	1490	Undetermined	High
Backroad Travel	150	Fair	Moderate
Other	50	Undetermined	-
Sightseeing[o]	NA	Good	-

[o]Sightseeing is expected to increase because of the project.

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY

EBASCO SERVICES OF CANADA LIMITED; Environmental Consultants

ESTIMATED ANNUAL RECREATION ACTIVITY DAYS DISPLACED DURING CONSTRUCTION PHASE FOR AREAS A AND B, 1978-1987

THE HAT CREEK PROJECT - Detailed Environmental Studies

TABLE 8-2

unfilled portions of project disposal areas. No further fishing impacts are assumed to occur in the operational phase beyond those preempted by construction. It is possible that fishing could improve during the operational phase but the extent remains unknown. "Other" activities which include nature study, plant collecting and walking are assumed to affect 100 activity days annually through preemption of land during the operation phase.

Project facilities could affect natural scenic values. Nevertheless, the physical presence of the project is expected to attract sightseers. Thus, the net impact of the project on sightseeing will be to increase activity (as will be described later).

The impact of stack gas emissions on recreation are difficult to demonstrate or quantify. There is, however, a low, but not impossible, chance for vegetation to be affected by stack emissions. If such chance occurrences were to take place in summer, vegetation such as Englemann Spruce could be affected at high points including Cornwall lookout. The extent to which this would offset visitation is unknown but is considered to be small as the occurrences (if any) are expected to be infrequent. Operational practices are in fact intended to avoid occurrences of this kind. Effects on humans are thought to be negligible or nil as the pollutant concentrations expected - should a chance occurrence take place - are below detectable levels. It is assumed, therefore, that stack discharges will not directly affect visitation or other activities in the upper reaches of the hills and mountains surrounding the valley. Annual estimates of activity day impacts associated with project operation are contained in Table 8-3.

(c) Induced Recreational Activity Impacts

The recreational impacts caused by project activities described in the preceding section will probably create shifts in the location of activities rather than decreases in the amount of activity. All activities affected by the project are dispersed, thus locations at which the activity takes place can be shifted by

ACTIVITY AFFECTED	AMOUNT	QUALITY	IMPACT SIGNIFICANCE
Hunting	100	Undetermined	Low
Fishing	-	Undetermined	-
Backroad Travel	250	Fair	Low
Other	100	-	-

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY

EBASCO SERVICES OF CANADA LIMITED: Environmental Consultants

ESTIMATED ANNUAL RECREATION ACTIVITY DAYS DISPLACED IN AREA A DURING OPERATION PHASE, POST 1987

THE HAT CREEK PROJECT - Detailed Environmental Studies

TABLE 8-3

participants. There are many areas where backroad travel, angling, hunting and sightseeing can take place that are relatively close to the project site. In the preceding section, recreational assets available in Areas B, C and D were described, all of which are capable of absorbing the loss of recreational resources within Area A.

The most important recreational impact of the project will not be the loss of recreational resources within Area A, but the introduction of new population in the Hat Creek Valley and adjoining towns. These population increases can be expected to create significant increases in recreational activity levels throughout all areas near the project site and environs.

Increases in population created by the project are of two kinds: those associated with the construction work force and those who will operate the facility. Both of these will tend to overlap to some degree as the project will be built in stages with generating units going into operation while others are still building. Estimates of population increases have been prepared for the "with the project" case by year[8-2]. These are reproduced in Table 8-4. Recreation activity levels associated with these increases in population will be incremental to those already forecast for the "without the project" case and reflect a 5% annual increase in participation rates overall. It is assumed, however, that participation rates between the construction and operational work force will be different. It is anticipated that workers in the Hat Creek Valley camps will be either single without a permanent residence or married and absent from a home located some distance away. It is quite possible that recreation levels for camp construction workers will be higher than those for residents of nearby communities. Recreational pressure on the Hat Creek Valley from construction workers will be much higher because the labor force is physically located within the Valley. It is expected that construction workers will use the valley for recreation after hours and on weekends except those who

	Hat Creek Valley Camps	Ashcroft/ Cache Creek	Clinton	Other Rural Areas	TOTAL
1978	165	60	10	-	70
1979	470	240	30	15	285
1980	675	920	110	55	1,085
1981	1,660	1,490	175	90	1,755
1982	2,290	2,500	295	145	2,940
1983	2,315	2,930	345	170	3,445
1984	1,655	3,145	370	185	3,700
1985	1,065	2,920	345	170	3,435
1986	485	2,955	345	170	3,470
1987	300	3,260	385	190	3,835
1988	30	3,215	380	190	3,785
1989	30	3,265	385	190	3,840
1990	30	3,295	385	190	3,870
2000	-	3,410	400	200	4,010
2010	-	3,300	390	195	3,885
2020	-	3,280	385	195	3,860

Source: "Socioeconomic Studies for the Hat Creek Project", 1977.

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY

EBASCO SERVICES OF CANADA LIMITED; Environmental Consultants

DISTRIBUTION OF INCREMENTAL POPULATION ASSOCIATED WITH HAT CREEK PROJECT (1978-2020)

THE HAT CREEK PROJECT - Detailed Environmental Studies

TABLE 8-4

may travel home on days off. A further assumption is that the resident farming population of 35 persons will be reduced as their lands are preempted by B. C. Hydro for use in the project. Where agriculture continues it is quite possible that the recreational pressure induced by a large resident work force could conflict with agricultural and grazing areas as off-duty workers seek the fish and game available.

In a survey of Bethlehem-Lornex miners residing in Ashcroft, described in Appendix A, no major significant differences were found in recreation patterns for miners in comparison to the entire population. It is assumed, therefore, that the Hat Creek work force resident in Ashcroft, Cache Creek, Clinton and rural areas will not differ in participation from the existing and forecast population. The work force resident in the Hat Creek Valley camps are assumed to have higher participation levels however, primarily due to the life-style available to a largely male group semi-isolated from nearby communities. While it is possible to estimate local work force participation rates and recreation days for various activities, the consequences to local resources (including fish and game, for example) are unknown. Hopeful anglers may fish Hat Creek and surrounding lakes even if the prospects of a catch are remote, or perhaps more likely, as catch rates diminish sportsmen will range farther afield or turn to other pursuits. In sheer numbers, the potential for extreme pressure on wildlife in the valley and environs will likely be high. Should natural resources become significantly affected as a result, restrictions may be in order.

(i) Hunting and Fishing

Earlier, it was noted that in total, 51% of local community residents fished and 26% hunted. The average for the two activities combined is estimated at 38.5%. These rates are higher than other nearby areas such as the Cariboo-Chilcotin.

Hat Creek Valley camp workers are assumed to have even higher participation rates estimated to range up to 75%, which is slightly more than the "backroad" recreation category for local community residents.

The average number of days spent hunting by hunters is considerably below the number of days spent by fishermen pursuing their sport. Undoubtedly these differences are due to the very restricted season for hunting in comparison with fishing. Pearse-Bowden indicated in "The Value of Fresh Water Sport Fishing in British Columbia" that, in 1969-70, in the Kamloops and in the Cariboo-Chilcotin areas, respectively, licensed fishermen over the age of 20 spent 16.9 and 14.5 days fishing during the season.

Estimated fishing and hunting recreation days for the incremental population of the Hat Creek Valley and residents of nearby communities with the project are shown in Tables 8-5 and 8-6.

(ii) Backroad Travel

Backroad travel is a very popular activity with local area residents and is expected to continue in the future at the same level as at present. Approximately 72% of the local population engage in backroad travel at a rate of about 5.9 days per capita. The resident camp labour force is estimated to engage in backroad travel at the same rate as the resident population, both groups having somewhat equivalent access to areas wherein the activity can take place. Estimated backroad travel activity days are presented in Table 8-7.

(iii) Other Recreation Activities

A variety of recreation activities are encompassed under the heading of "other" activities, including picnicking, swimming, boating, camping, skating, canoeing, nature study and several additional minor pursuits. In total these account for 30.4% of all local recreational activity days or about 6 days per capita annually.

Origin	1980	1982	1984	1986	1988	1990
Hat Creek Camps*	9,900	36,400	28,320	8,900	590	630
Ashcroft/Cache Creek°	7,000	20,640	27,960	28,140	32,660	34,150
Clinton°	830	2,430	3,290	3,290	3,860	4,150
Other Areas°	420	1,200	1,640	1,620	1,940	2,060
Totals	18,150	60,670	61,210	41,950	39,050	40,990

* Assumes 75% of residents fish 16.3 days

° Assumes that new residents participate at same rate as existing population.

Origin	1980	1982	1984	1986	1988	1990
Hat Creek Camps*	2,500	9,150	7,130	2,240	140	150
Ashcroft/Cache Creek°	1,660	4,880	6,610	6,650	7,680	8,400
Clinton°	200	570	780	780	910	990
Other Areas°	100	290	390	390	460	490
Totals	4,460	14,890	14,910	10,060	9,190	10,030

* Assumes that 75% of residents hunt 4.1 days.

° Assumes that new residents participate at same rate as existing population.

Origin	1980	1982	1984	1986	1988	1990
Hat Creek Camps	4,790	17,560	13,660	4,290	290	310
Ashcroft/Cache Creek	6,520	19,180	25,970	26,150	30,350	33,050
Clinton	780	2,260	3,050	3,060	3,580	3,880
Other Areas	380	1,120	1,540	1,500	1,810	1,920
Total	12,470	40,120	44,220	35,000	36,030	39,160

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY

EBASCO SERVICES OF CANADA LIMITED; Environmental Consultants

ESTIMATED BACK ROAD TRAVEL ACTIVITY DAYS - INCREMENTAL POPULATION ASSOCIATED WITH HAT CREEK PROJECT

THE HAT CREEK PROJECT – Detailed Environmental Studies

TABLE 8-7

For forecast purposes these rates are assumed to remain the same for the resident population with the same rates applicable to the Hat Creek camp workers. A forecast of activity days for "other" activities is set forth in Table 8-8.

(iv) Total Incremental Recreation Activity Days

Table 8-9 portrays the types of phenomena expected with the introduction of a major industrial installation in a semi-remote area. Population, and as a consequence forecast recreation activity, shows strong increases during the early years, peaking when construction is at a plateau and operations are beginning. As the construction work force declines and the permanent staff takes up residence, recreation activity totals decline and then stabilize.

The forecast in Table 8-9 reflects three forces at work: first is the absolute increase in population directly attributable to the project as forecast in the Socioeconomic Studies (this population is incremental to the normal growth expected in the study area without the project shown in Table 7-5); second, differences in participation rates assumed in some activities for construction campsite workers; and third, an assumed growth of 5% per annum in recreation activity participation rates overall.

A comparison of activity days forecast for area residents and for project workers is provided in Table 8-10. These data indicated that in 1984 and 1986, project-induced recreation activity levels exceed those forecast for local population without the project. Total activity days with the project would be the sum of both, as it is assumed that local population recreation increases would occur whether the project proceeds or not.

(v) Distribution of Incremental Recreation Activity Days

The locations where future recreational activity will take place is difficult to ascertain. A forecast of distribution of activi-

Origin	1980	1982	1984	1986	1988	1990
Hat Creek Camps	4,870	17,890	13,930	4,370	300	310
Ashcroft/Cache Creek	6,640	19,540	26,460	26,640	30,910	33,660
Clinton	790	2,300	3,110	3,110	3,650	3,930
Other Areas	400	1,130	1,550	1,530	1,820	1,940
Totals	12,700	40,860	45,050	35,650	36,680	39,840

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY

EBASCO SERVICES OF CANADA LIMITED; Environmental Consultants

ESTIMATED OTHER ACTIVITY DAYS - INCREMENTAL POPULATION ASSOCIATED WITH HAT CREEK PROJECT

THE HAT CREEK PROJECT - Detailed Environmental Studies

TABLE 8-8

Origin	1980	1982	1984	1986	1988	1990
Hat Creek Camps	22,060	81,000	63,040	19,800	1,320	1,400
Ashcroft/Cache Creek	21,820	64,240	87,000	87,580	101,600	109,260
Clinton	2,600	7,560	10,230	10,240	12,000	12,950
Other Areas	1,300	3,740	5,120	5,040	6,030	6,410
Total	47,780	156,540	165,390	122,660	120,950	130,020

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY

EBASCO SERVICES OF CANADA LIMITED; Environmental Consultants

TOTAL ESTIMATED ACTIVITY DAYS - INCREMENTAL POPULATION ASSOCIATED WITH THE HAT CREEK PROJECT

THE HAT CREEK PROJECT - Detailed Environmental Studies

TABLE 8-9

Activity Source	1976	1980	1982	1984	1986	1988	1990
Local Population (non-project)	104,356	125,200	135,630	146,060	156,500	166,950	177,400
Project Population	-	47,780	156,540	165,390	122,660	120,950	130,020
Total	104,356	172,980	292,170	311,450	279,160	287,900	307,420

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY

EBASCO SERVICES OF CANADA LIMITED; Environmental Consultants

FORECAST LOCAL NON-PROJECT AND PROJECT-INDUCED RECREATIONAL ACTIVITY DAYS 1976-1990

THE HAT CREEK PROJECT - Detailed Environmental Studies

TABLE 8-10

ties for recreational growth "without the project" was presented in the preceding section and it could be assumed that the future distribution of activities for the "with the project" case would be similar. There are three problems associated with this assumption however. First is the introduction of a large resident work force within the valley, coupled with major physical disturbances in the lower reaches; second is the capability of the valley's lands and water to absorb the increases forecast; and third is possible changes in the locations of recreation activity by non-local recreationists who may choose to partake in activities elsewhere as a result of the project.

It was indicated earlier that introduction of the large construction work force into the valley will induce great pressure on the available natural resources. CLI data indicate that while the valley is not highly rated for recreational capability, it does possess attributes suitable for low density recreation such as sightseeing, hunting and backroad travel - for which the area is already used. What is lacking however are measures of carrying capacity as well as management programs to ensure that recreation-carrying capacity levels are not exceeded. With the exception of fish stocking in local lakes, the predominant thrust of provincial management policies in the valley is toward agriculture (including irrigated agriculture), grazing and forestry. Recreation is not a dominant theme in the valley as it is at Marble Canyon and Pavilion Lake to the northwest along Highway 12.

Lacking distinctive and explicit recreational policies for the valley, two scenarios have been prepared outlining what could occur under differing management assumptions. For both scenarios it should be borne in mind that substitution is an important factor related to all activities presently occurring in the Hat Creek Valley. There are a large number of areas nearby, many (such as lake fishing sites) operating at below capacity, to which

recreationists can turn if the recreation experience in the Hat Creek Valley proves unsatisfactory. This substitution opportunity could possibly affect non-local recreationists who have traveled some distance from home and thus have more flexibility in destination than local day-use recreationists who are comprised predominantly of the project camp construction workers and residents of nearby communites.

(i) Scenario One - Predominantly Unrestricted Activity

Assuming no restrictions on angling or hunting are imposed other than those existing at present, it is quite conceivable that local fishing in Hat Creek and adjacent valley lakes could be eliminated for all practical purposes. Pavilion Lake would be an exception and assuming public access is not improved, pressure will increase through greater use of the private boat launching ramp. Pavilion Lake does have the capacity to accept greater fishing pressure and is generously stocked on an annual basis. It is doubtful however that Pavilion Lake will be capable of accepting a major increase without affecting the resource. The Thompson River and major fishing resources available in Area D will most likely absorb much of the increased pressure brought about by project workers - as they do for local community residents now.

Assuming no basic change in hunting regulations it is conceivable that the resident camp labor force could exert extreme pressure on existing game resources, perhaps to the point of permanent depletion. Forecast total project work force hunter days will exceed present hunter days in the valley in the early 1980's. If the majority of this activity takes place in the valley, and assuming no change in present and projected valley hunting activity, hunting levels could double. The extent to which wildlife population in the valley could tolerate this potential increase in pressure is unknown as data on sustainable yields by species is lacking.

Backroad travel in the valley would likely increase to very high levels particularly as some farming would be discontinued with grazing and pasture lands turned over to project-related activities. The extent to which plant-related emissions would affect domestic grazing or wildlife forage is unknown. Impacts are anticipated to be low, but chance occurrences are possible. In essence, it is conceivable that all terrain or four-wheel-drive vehicles could penetrate most areas of the valley excepting actively farmed areas within the Upper Hat Creek area. Similar impacts could occur in winter with probable active use of snowmobiles (some snowmobile enthusiasts have been known to drive game to the point of exhaustion, thus affecting wildlife).

All "other" activities would also grow, likely resulting in severe congestion at Marble Canyon Park with the possible spread of picnicking and other activities to undesignated areas throughout the valley and along roadsides.

(ii) Scenario Two - Restricted Activity

A more stringent - and perhaps likely - approach, depending on the experience gained as construction begins and work force numbers grow, would be to limit recreation activities that are found to exert heavy pressure on resources.

Fishing activity could be banned or catches limited at local lakes; the length of open season could be limited by the Fish and Wildlife Branch for hunting of threatened game species; valley areas could be posted to restrict off-road vehicles where agricultural conflicts occur, game is harassed or vegetative and soil damage occurs (this may be particularly important in arid areas). Coincidental with the imposition of restrictions would be the introduction of substitute indoor and outdoor organized activities for construction camp workers, perhaps under the direction of a recreation supervisor.

Indoor and outdoor sports and games including non-destructive activities such as cross country skiing, target shooting, ice skating, auto racing and other similar pursuits could divert pressure from local natural resource-based recreation activities. Providing facilities and equipment for these activities would enhance participation. Local community parks could be established offering opportunities for baseball, football, hockey and similar activities to help relieve outdoor recreation demands caused by population increases in local communities. An additional step would be to direct construction camp outdoor recreationists to sites and faciliites in Area D capable of accepting increased pressure.

(d) Project Operation Impacts 1986-2020

Once the Hat Creek project is completed and in operation, no further increase in recreational activity demands will be caused by the project itself as the permanent resident work force is expected to be constant in number. Growth in population in local nearby communities will likely continue, but the forces causing growth will not be due to the project as the most significant effects of the project-related population on total local population will already have been felt. As a result, increases in project-induced recreation activity levels will grow in concert with local activity at a projected rate of 5% annually. Growth in total activity beyond the assumed annual increase in participation rate will occur through increases in local population unrelated to the project.

(i) Mine Site Visitation

A representative of the Bethlehem Mining Company which operates a mine southeast of Ashcroft provided information on the tour program their company sponsors for visitors (8-3). Over an approximate five month period between April and September each year, the Company sponsors an average of five tours per week for casual visitors with an average party size of five persons. In

addition, approximately six busloads of school children, containing about 30 to 40 children per bus, tour the site each year during the school period. Technical tours are also held with an estimated attendance of 10 to 30 persons per tour, with six tours held each year. In total, based on the preceding data, visitors at the Bethlehem mine would range between 720 and 810 persons per year.

Assuming B. C. Hydro follows a similar program visits to the site would at a minimum equal those at the Bethlehem site. The Hat Creek project is somewhat closer to main travel arteries and its unique size and type of activity could attract larger numbers of visitors, particularly as it is situated near Highway 12 leading from Carquile through Marble Canyon to Pavilion Lake, and Lillooet. Access will also be available on the new access road from Highway 1 near Ashcroft to the project site. It is assumed that visits to the site would range between 1000 and 2000 persons per year.

(e) Non-local Recreational Growth

Data are lacking which can be used to forecast recreational growth in Areas C and D caused by non-local residents. As was pointed out earlier, indirect evidence points to non-local recreationists, particularly B. C. residents from the Lower Mainland, as being a dominant factor in overall recreation patterns. The extent to which growth in B. C. as a whole will affect recreation patterns in Areas C and D is unknown.

8.4 POST-OPERATIONAL IMPACTS

Quantifying recreational activity days in the project area for the post-operational stage is not deemed feasible because of the extremely long time horizons involved.

Post-operational impacts are related to the physical conditions that could prevail beyond 2020. The major changes at the time could be the removal of the physical facilities including the plant, conveyor, transmission structures and other features directly related to the function of electric power generation and coal handling. Major infrastructure items such as access roads and water line will, or could, remain. The landscape will have been changed by the creation of ash dumps (which it is assumed will have been covered and revegetated) and the open pit mine. Assuming the mine can be filled with water by natural drainage over a few years, and further assuming the water is of adequate quality to support aquatic life, a recreational asset will have been created. It is quite conceivable, assuming steadily increasing recreational demands, that people would be attracted to what could be known as "Hat Lake" and either a public camping site or a private resort development could conceivably be developed. The adjacent ash dumps and plant site would have been covered, seeded and allowed to regrow to as natural a condition as feasible, thus attracting game species and allowing for increased levels of hunting, backroad travel and other outdoor pursuits that may be popular at the time. Angling will increase and boating would be possible due to the presence of the water-filled mine. In addition, angling would continue on Hat Creek itself. In summary, from the perspective of outdoor recreation opportunities, positive advantages could accrue in the post-operational phase.

9.0 MITIGATION AND COMPENSATION

Information presented in previous sections of the report point to the Hat Creek Valley and adjacent areas as relatively insignificant recreations areas. The valley lacks facilities, is somewhat difficult of access and attracts recreationists predominantly interested in dispersed, low density activities. Existing agricultural land use constrains any major change in recreation patterns. Residents in nearby communities (who could be expected to be major users of the valley if it were, in fact, an important recreation area) expend only 15% of their activity days in the valley. In total, recreational activity days in the valley are estimated to be split approximately equally between local and non-local recreationists. Forecast growth of recreation in the valley points to steady but unspectacular increase. Lacking major recreation assets, this pattern seems the most probable for the future without the project.

Project impacts are of two kinds: direct, which result in displacement of land through the location of project components or by their operation (site alteration and ash disposal are the principal causal agents); and indirect, which result from project construction and operation (induced recreational demands by the project work force are the dominant factors). Land alteration results in a direct reduction of recreational opportunity wherever recreational activities occur at present. Estimated 1976 activity days lost through land alteration are presented in Table 9-1. These estimates are thought to be somewhat conservative as they include some areas which are currently used for agricultural pursuits.

Because the recreation activities affected are both low density and dispersed, the precise location of the activities affected cannot be exactly defined. Impacts in recreation caused by plant-related emissions are thought to be minor as operational policy will be toward a "no discharge" facility. It is the intention to treat water discharges to ensure maintenance of a satisfactory standard, and air emissions are to be

ACTIVITY	AMOUNT	QUALITY	IMPACT SIGNIFICANCE
Hunting	940	Undetermined	-
Fishing	1,490	Undetermined	High
Backroad Travel	400	Fair	Moderate
Other	150	Undetermined	-

*Estimates based on 1976 activity levels.

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY

EBASCO SERVICES OF CANADA LIMITED: Environmental Consultants

TOTAL ANNUAL DAYS DISPLACED BY PROJECT CONSTRUCTION AND OPERATION FOR AREAS A & B*

THE HAT CREEK PROJECT - Detailed Environmental Studies

TABLE 9-1

managed so as to minimize or avoid impacts to vegetation. No further impacts associated with project location and operation are assumed to occur beyond those set forth in Table 9-1. Impacts associated with the project work force are treated separately under topic of "Compensation".

While project impact on recreation are subject to possible mitigation and compensation actions, those which cannot be mitigated without major locational, operational and related economic cost should be considered for compensation.

9.1 MITIGATION

In general, mitigation of recreational impacts can be accomplished either by shifting the location of the project or by modifying operational modes. Shifting the location of the project to a site outside the valley is not a viable option; however changing the location of project components could possibly reduce impacts. Changes in operational mode could also affect recreation by possibly decreasing impacts on natural resources.

9.2 COMPENSATION

Recreational impacts to be considered for compensation include those set forth in Table 9-1. However, the more significant recreation impacts attributable to the project will be caused by the population associated with the construction and operation work force. Estimates of recreation days generated by the project-related population were presented in Section 8. On the one hand, recreation demands created by the project work force will cause possible strain and excessive pressure on natural resources and nearby recreation facilities. On the other hand, the activity days produced by the resident work force can be considered to be a benefit in that expenditures will be made within the immediate area to secure the equipment and licenses necessary to partake in recreation activities. In addition, expenditures will be made by the project work force to get to recreation sites, pay for accommodations, food and the like.

(a) Compensation Options

The Hat Creek project lies within a region with significant opportunities for substitution of activities lost by project actions with others of an equivalant or better quality. Limited evidence points to several lakes (including Pavilion) with the capacity to sustain increased fishing pressure. Hunting activities are widespread within 100 kilometres (62 miles) of the project site with the Hat Creek Valley itself comparatively low in activity levels. One compensatory action therefore would be through the appropriate Government department, to enhance opportunities at alternate recreation sites outside the Hat Creek Valley itself. Options that have been derived from a review of government agency documents include the following:

- provide improved opportunities for picnicking and fishing at Langley and Blue Earth Lakes;
- provide better public access to Pavilion Lake for boat launching, fishing, camping and picnicking by acquiring private lands at strategic locations on the lake;
- improve access to the Thompson River for fishermen;
- improve public camping facilities at Barnes Lake;
- improve public access, camping and boat launching on the Thompson River;
- provide assistance to improve habitat conditions within the Hat Creek Valley, adjacent areas and nearby hunting regions.

A second compensatory action would be to provide assistance to the appropriate government departments to control recreation activities within the Hat Creek Valley and adjacent hills and mountains so that natural resources and the recreational experience are not unduly diminished. This could be accomplished by posting lands, instructing members of the project work force, and by controlling access by recreationists in those locations where B.C. Hydro has land rights to ensure that activities take place at the most appropriate sites. CLI and biophysical land analyses could be used in assessing capability and use limits for sites within the valley.

A third type of action to compensate for both recreation resources losses and project increased recreation demands would be to create and direct recreation activities of an organized type. Construction camp recreation buildings and play fields would be quite useful in this regard with a paid recreation director and assistants. Competitive team sports could be fostered, and hiking, hunting, fishing and other dispersed outdoor activities could be organized and channeled to areas capable of absorbing the impact. To aid communities such as Cache Creek, Ashcroft and Clinton in absorbing project induced population increases, assistance could be provided in establishing recreation parks with appropriate indoor and outdoor facilities for adults and children.

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12.0 AGENCIES & CONTACTS

The following is an alphabetical list of Agencies and associated individuals contacted during this study through a personal visit or by telephone conversation. The individuals listed either provided information used in the preparation of this report or were sources of referrals to other individuals or agencies for information.

B. C. Research, Vancouver
- Mr. Tunner

Ecological Reserves Committee, Lands Branch B. C. Department of Environment, Victoria
- Dr. B. Foster

B. C. Fish and Wildlife Dept., Burnaby
- Mr. Ted Richardson

Forest Service, Victoria
- Mr. Harry Marshall

Ministry of Highways & Public Works, Traffic Engineering Branch
- Mr. D. Neil Vickers
- Mr. J. H. Harding, Director

B. C. Hydro
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Lands Branch, Kamloops
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- Mr. Dougald MacDonald

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- Ms. Edna Joyce
- Ms. Joan Mcilvride
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- Mr. Bob Broadland - Heritage Conservation Director

Squamish - Lillooet Regional District, Pemberton
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- Ms. Janice Ife

Thompson - Nicola Regional District, Kamloops
- Mr. Herb Verdi
- Ms. Alyson Bagleish

Tourism, B.C., Ministry of Provincial Secretary and Travel Industry
- Mr. Dave Hall

Vic's Lakeshore Camping, Cache Creek
- Mr. Vic Pearson

APPENDIX A

EXISTING OUTDOOR RECREATIONAL USER PATTERNS

Prepared By: Strong-Hall and Associates Limited
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1. INTRODUCTION

1.1 Background

Estimates of existing outdoor recreational user patterns for the Hat Creek study region were derived in order to provide a quantitative basis for the evaluation of project-induced changes in the recreational resource.

Prior to this work, little user information was available on the many sites perceived as recreational areas but not regulated or monitored by public (or, for that matter, private) agencies.

A review of available documents by the staff of Strong Hall and Associates Ltd. yielded little recreational use data for the study region that was sufficiently specific or comprehensive to evaluate those changes in recreational resource values which various sites may experience due to the proposed thermal generation project.

The acquisition of information unavailable through published sources is critical to the subsequent recreation resource evaluation to be conducted in the Detailed Environmental Studies program. Such information includes: the level and characteristics of recreational use at the many unregulated (that is, non-government or commercially administered) sites in the region; the origin of the users, i.e. local, non-local British Columbians, or non-British Columbians (these distinctions have considerable implications for the impact evaluation process); and other information specific to the purpose of this study.

In light of this information deficiency, it was considered necessary to conduct user surveys which would provide information on the distribution and level of use by both local area residents and other British Columbia residents. Two surveys were undertaken: a

household survey conducted within the study region, and a survey of nine sites which were anticipated to be impacted by the project.

1.2 Household Survey

A household survey, based on a 7% random sample of households, was conducted in the communities of Ashcroft, Cache Creek, Clinton, Lillooet, Hat Creek Valley, and rural residential areas of the primary study region. The survey, conducted in March 1977, by Cornerstone Planning Group Limited, involved 145 households, chosen from British Columbia Hydro and Power Authority computerized customer lists, and 309 persons 15 years of age and over were interviewed. This sample constituted 4% of the primary region's 7,500 population.

The respondents in the household survey were asked questions about their recreational activities during the previous 12 months for the four principal sites they visited during that period. The questions related to activities in which the respondent engaged, the number of days (visits) to each site, and changes in the quality of the site's environment. The recreational components of the household survey are presented in Section 3.1. Details of the survey methodology are presented in Appendix H of the Hat Creek Socio-Economic Report.

1.3 Site Survey

An obvious limitation of the household survey as a means of determining recreational use in the region is that it does not provide information as to the use of the region's recreational resources by British Columbians who live beyond the study region boundary. In order to provide information on non-local use, through which estimates could be derived for total recreational use patterns, a site survey was undertaken during the summer of 1977.

Nine sites were selected, based on an a priori assessment that they were the most likely to experience changes in recreation quality due to thermal plant air and water borne emissions and/or crowding due

to the incoming mining and plant work force and their dependents. The selection was made on the basis of the best information available at the time of survey (for example, plume path isopleths and current and anticipated use patterns), and was the result of discussions between consultants representing various disciplines.

Given that time and budget constraints would not allow for sustained interviewing over long periods of time at each of the nine sites, a rotational survey pattern was established to minimize any bias resulting from varying use levels within the survey time frame. Hence, interviewing was allocated among the nine sites for the full five-week survey period.

To ensure that varying use patterns were appropriately accounted for at each site, the survey activity was conducted in four-hour blocks. This schedule allowed four survey periods at each site, including one morning and one afternoon on different week days, and one morning and one afternoon on different weekend days.

To maintain consistency with the March 1977 Household Survey, the site survey enumerator interviewed all persons 15 years of age and older at each site.

Survey data, presented in Section 3, contain "population data". These figures have been multiplied by a factor which in the case of the household survey, is the ratio of the sample of households/individuals in each of the communities surveyed to the population of households/individuals of each respective community. The method used to translate the site survey data into population data is described in detail in a footnote to Table 5.

2. RESOURCE INVENTORY

2.1 Regional Recreation Activity

Table 1, which documents the regional outdoor recreation activity of local recreationists,* shows that they spend more time engaged in angling (33,506 recreation days) and backroad travel (31,194 recreation days) than in either hunting (7,942 recreation days) or lake and shore activities (15,348 recreation days). Angling thus represents 31.2% of local residents' outdoor recreation time; backroad travel 29.9%; lake and shore activities 14.7%; and hunting 7.6%.**

Table 2 compares particpation rates in outdoor recreation activities of local residents (inluding Lillooet) to those of all B. C. residents and to all Canadian residents. Over 72% of the respondents in the household survey of local residents stated that they particpated in some form of backroad travel, a non-site specific activity.

Backroad travel was viewed in some cases as a recreation activity in itself, whereas, in other cases, it was viewed as one recreation activity pursued in connection with others. Local angling/hunting and lake/shore particpation rates (38.5% and 56%, respectively) appear to be significantly higher than either the B. C. (23.2% and 35.5%) or Canadian (19.6% and 28.5%) rates. Hunting and fishing, especially, are viewed as essential ingredients of the hinterland lifestyle in British Columbia and Canada generally, reflecting the proximity and abundance of opportunities for these pursuits and,

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* Local recreationists are defined as residents of Ashcroft, Cache Creek, Clinton and adjacent rural areas. Lillooet residents are excluded unless otherise stated.

** A recreation day is defined as any part of a day spent by a person 15 years of age or older engaged in an outdoor recreation activity. Specificity is added by referring to an angler-day, lake and shore day, etc.

TABLE 1

REGIONAL OUTDOOR RECREATION ACTIVITY
OF PRIMARY AREA RESIDENTS *

Activity	Recreation **** Days	Percent Distribution Of Recreation Days
Angling	33,506	32.1%
Hunting	7,942	7.6%
Lake and Shore **	15,348	14.7%
Back Road Travel ***	31,194	29.9%
Other	16,366	15.7%
TOTAL	104,356	100.0%

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* Primary area residents include Hat Creek Valley, Ashcroft, Clinton and Cache Creek.

** Lake and Shore activities include:
- Picnicking
- Swimming
- Boating
- Water Skiing
- Camping

*** Back Road Travel activities include:
- Driving for Pleasure
- Back Road Travel
- Trail Biking
- Hiking
- Horseback Riding
- Gem and Rock Collecting

**** Based on Household Survey.

SOURCE: Strong Hall & Associates Ltd.

TABLE 2

PARTICIPATION RATES

Activity	Primary Area* Survey No. 1 Respondents		B.C.** Residents	Canada** Residents
Angling	51.0%)			
	)	38.5%	23.2%	19.6%
Hunting	26.0%)			
Lake and Shore	56.0%		35.5%	28.5%
Back Road Travel	72.0%		N/A	N/A

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* Figures include Lillooet, Cache Creek, Hat Creek, Clinton and Ashcroft, taken from Household Survey 1977, Strong Hall & Associates Ltd.

** SOURCE: 1972 Survey of Selected Leisure Time Activities, Statistics Canada, January 1973.

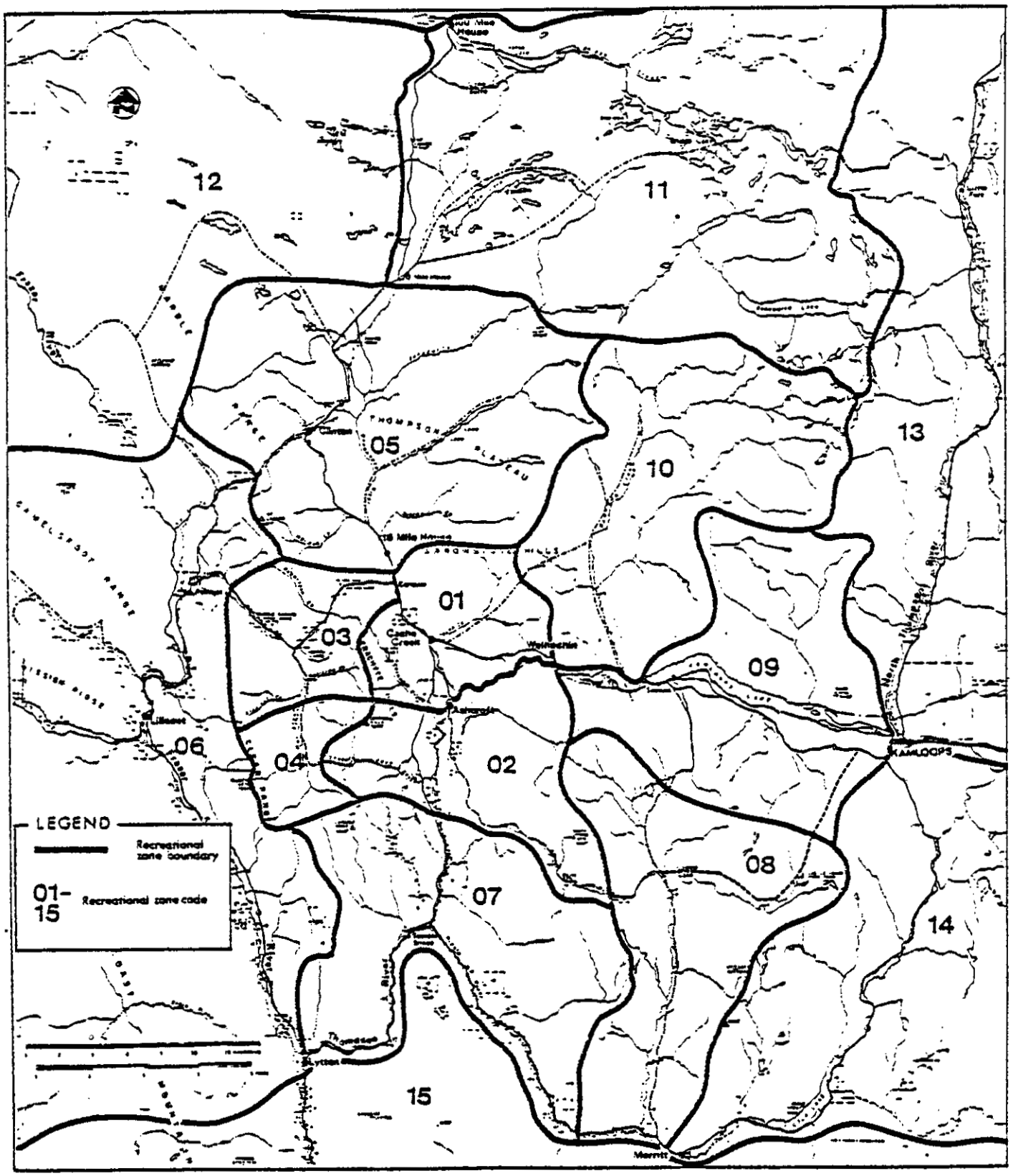
perhaps, the absence of alternative leisure opportunities. Since urban dwellers would figure more prominently in the B. C. and national statistics, it is probably not surprising that residents of the study region, which is part of the rural/small town hinterland, appear to participate more heavily in the outdoor recreation activities in question.

2.2 Distribution of Primary Area Residential Recreation Activity by Zone

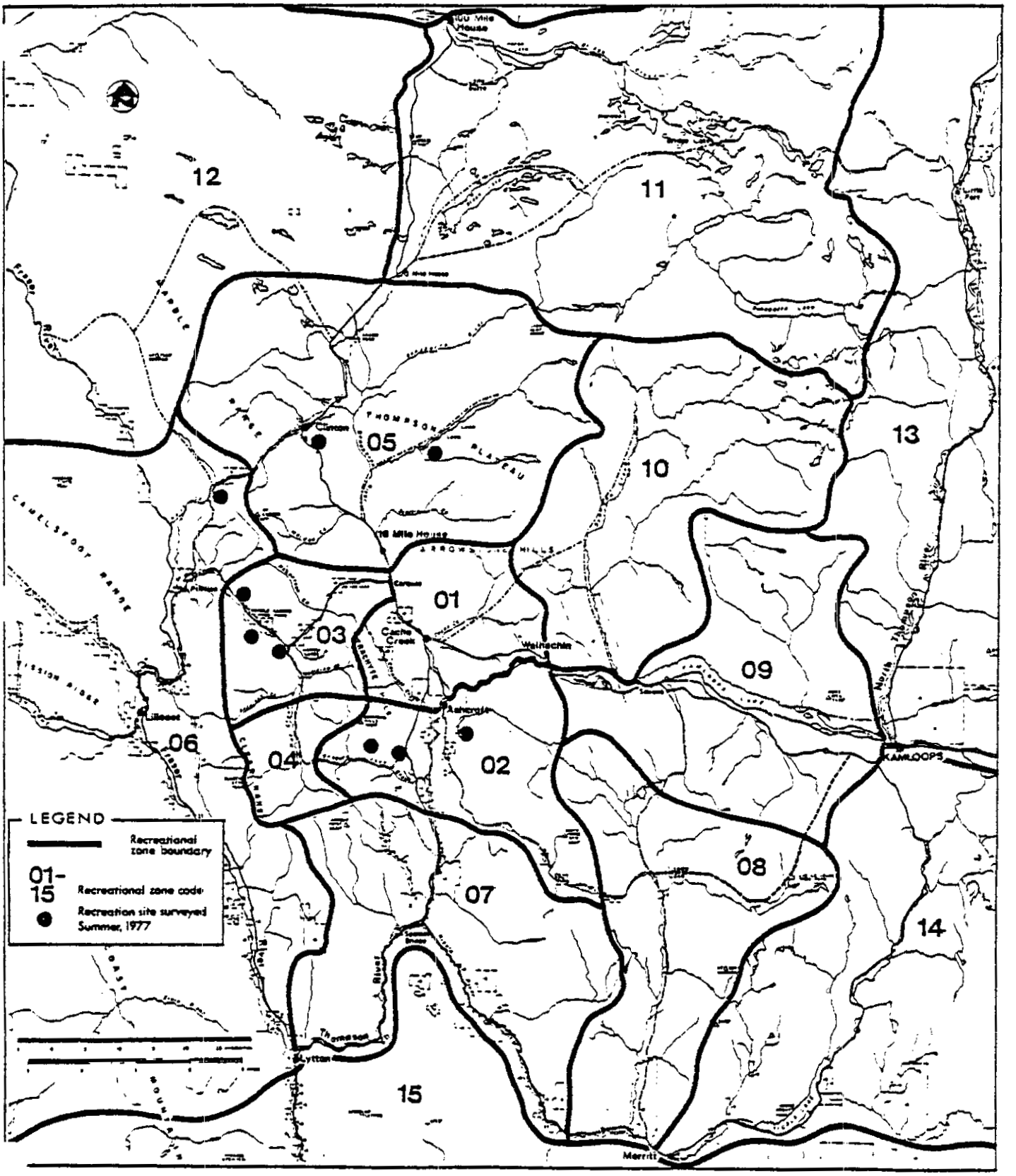
Map 1 shows the region divided into 14 recreational destination zones. The division is based on the observation that people tend to identify a place of outdoor recreational activity by certain physiographic features (e.g., watersheds, mountain ranges, and valleys). Specific sites are shown on Map 2. Each zone and each specific site within a zone is identified by a numerical identification developed for the purpose of this study. Of the four digit numbering system, the first two digits (01 to 14) identify fourteen physiographic zones, the remaining two digits identify known recreational sites within each zone. Hence, 0206 identifies site 06 (Barnes Lake) within zone 02 (Ashcroft-Oregon Jack Area).

The number of recreation days spent by local residents in each of these zones is shown in Table 3 and Map 3. The most popular zone in the region is the Clinton-Loon Lake area (05) where an estimated 23,342 recreation days are spent. The intensive use of this recreational zone can be attributed to its proximity to Clinton (population 810) and the presence of Loon Lake, an accessible, well developed and highly reputed fishing spot.

The second most popular zone among locals is the Ashcroft-Oregon Jack area (02), with 19,214 recreation days. The area is close to Ashcroft (population 2,030) and Cache Creek (population 1,050), and contains Barnes Lake, a good year-round fishing Lake.



Map 1 Physiographic Recreational Zones



Map 2 RECREATION SITES

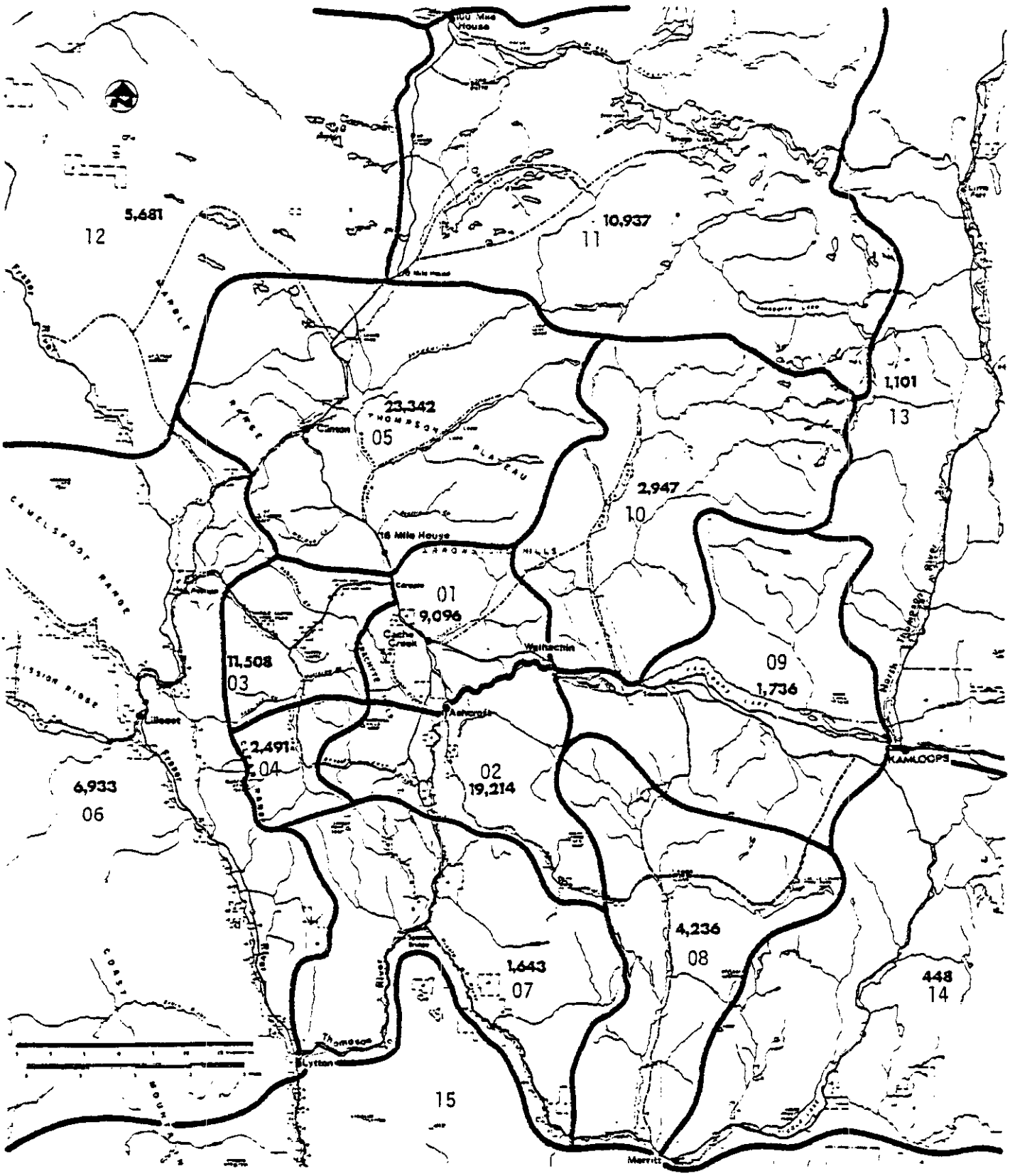
TABLE 3

DISTRIBUTION OF PRIMARY AREA RESIDENTIAL*
OUTDOOR RECREATION ACTIVITY BY PHYSIOGRAPHIC ZONE **

Physiographic Recreation Zone	Code	No. of Recreation Days
Cache Creek	01	9,096
Ashcroft-Oregon Jack	02	19,214
Hat Creek Valley-Pavillion Lake	03	11,508
Upper Hat Creek Valley	04	2,491
Clinton-Loon Lake	05	23,342
Fraser-Lillooet	06	6,933
Spences Bridge	07	I,643
Guichon Highland Valley	08	4,236
Kamloops Lake	09	1,736
Deadman Creek	10	2,947
South Cariboo Lakes	11	10,937
Big Bar-Chilcotin	12	5,681
North Thompson-Kamloops	13	1,101
Nicola-Stump Lake	14	448
SUB-TOTAL		101,313
Area Outside Region	15	3,043
TOTAL		104,356

* Primary area residents include Hat Creek, Cache Creek, Ashcroft and Clinton.

** Based on Household Survey, Strong Hall & Associates Ltd, 1977.



Map 3

Distribution of Local Resident Outdoor Recreation Days by Recreational Zone.

Table 3 also indicates that during the 12-month period preceding the household survey, an estimated 11,508 local recreation days were spent in the Hat Creek Valley-Pavilion Lake zone. Roads lead into this zone from Clinton, the Cache Creek/Ashcroft area, Hat Creek valley, and Lillooet.

The South Cariboo Lakes zone accounts for 10,937 recreation days spent by local residents, with most of the activity occurring at Green Lake.

2.3 Distribution of Primary Area Residential Recreation by Site

The tables in Section 3 provide a breakdown of the number and type of local recreation days spent by site during the 12-month period preceding the household survey. Loon Lake (0506) is the most popular site, accounting for an estimated 9,312 local recreation days. This 11.2 kilometre (7-mile) long lake, located 17.6 kilometres (11 miles) off Highway 97, is secluded but accessible. It caters to fishing activity, having seven fishing resorts, one campsite, boat rentals, and boat launching facilties.

Green Lake (1111) ranks second in recreational use, with 7,730 days, the majority of which are accounted for by lake/shore activity.

The Thompson River (0208), which has excellent steelhead runs and canoeing opportunities, provides local residents with an estimated 5,296 angling days and 381 lake/shore days each year. The area classified as Back Valley (0107), which comprises Cache Creek Watershed, Pass Valley and the Back Valley, accounts for about 4,755 local recreation days per annum. This relatively dry plateau area is well suited to hiking, riding, hunting, skiing, snowmobiling, and snowshoeing. Also, its small lakes have high capabilities for fishing and canoeing.

An estimated 4,646 local recreation days are spent at Kersey Lake/Clinton vicinity (0507).* Its proximity to Clinton accounts in largest part for its intensive use. Barnes Lake (0207), a fishing spot located within easy reach of Ashcroft, attracts 4,524 local recreation days.

Pavilion Lake (0303) has a commercial campground with four cabins, 18 campsites, a boat launching ramp, boat rentals, and is surrounded by private residences and summer cottages. It attracts about 2,854 local angling, hunting and lake/shore days each year. Approximately 2,307 local recreation days are spent at Kelly Lake (0604), which is used primarily for angling.

In the Hat Creek Valley and environs (excluding the Pavilion Lake and Marble Canyon area), local activity focuses primarily on hunting (2,240 days) and backroad travel (3,714 days).** There is some angling in Hat Creek (almost 1,500 days at Site 0307).*** Other sites in the valley are little used by local residents. These are: Harry Lake (0309) 175 days; the south end of Hat Creek (0403) 775 days; the headwater (0404) 4 days; Blue Earth Lake (0405) 242 days; Oregon Jack Creek (0203) 201 days; and Cornwall Lookout (0205) 406 days.

2.4 Distribution of Primary Area Residential Recreation Activity by Community of Origin by Site

Tables in Section 3 show local use of recreation sites and the place of residence of local users. As expected, residents of each

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* For the purposes of the household survey only, Kersey Lake is the area in the southern vicinity of Clinton, containing the three small lakes that are visible from Highway 97.

** Backroad travel, which includes all driving for pleasure, may include multiple-purpose trips (e.g., visiting friends and sightseeing) and may inadvertently involve double-counting in the case of hunting and driving for pleasure.

*** This estimate from the resident survey is somewhat higher than a Fish and Wildlife Branch estimate of 250 to 1,000 angler-days.

community spend the major part of their recreation time in those recreational areas that are closest to home.

Maps 4 and 5 illustrate that the Clinton population allocates 53% of its recreation time to the Clinton-Loon Lake zone (05), and only half of one percent to the Cache Creek and Ashcroft-Oregon Jack zones (01 and 02), while residents of Ashcroft and Cache Creek spend 7.4% of their outdoor recreation time in the Clinton-Loon Lake zone (05) and 41.5% in the Cache Creek and Ashcroft-Oregon Jack zones (01 and 02).* Clinton residents show a preference, measured by recreation time spent, for the following zones: Clinton-Loon Lake (05) 53%; Fraser-Lillooet (06) 11.5%; Big Bar-Chilcotin (12) 11.4%; and South Cariboo Lakes (11) 9%. Cache Creek/Ashcroft residents favour the Cache Creek and Ashcroft-Oregon Jack zones (01 and 02) 41.5% of their recreation time; Hat Creek-Pavilion Lake (03) 14.4%; South Cariboo Lakes (11) 11.6%; Clinton-Loon Lake (05) 7.4%; Guichon-Highland Valley (08) 4.9%; Deadman Creek (10) 3.6%; and Upper Hat Creek Valley (04) 3.1%.

In each case, the sum of these figures represents approximately 85% of residents' outdoor recreation time. Hat Creek residents spend 94.3% of their recreation time in the Hat Creek-Pavilion Lake and Upper Hat Creek Valley zones and 5% in the Ashcroft-Oregon Jack zone, of which 4.7% is at Cornwall Lookout. Thus, they spend 99% of their recreation time in the Hat Creek Valley.

The recreation patterns of open-pit miners resident in Ashcroft were also studied, in order to determine the effects of an incoming mine working force for the proposed Hat Creek project on existing recreational areas. This comparative analysis is discussed in Section 3.3.

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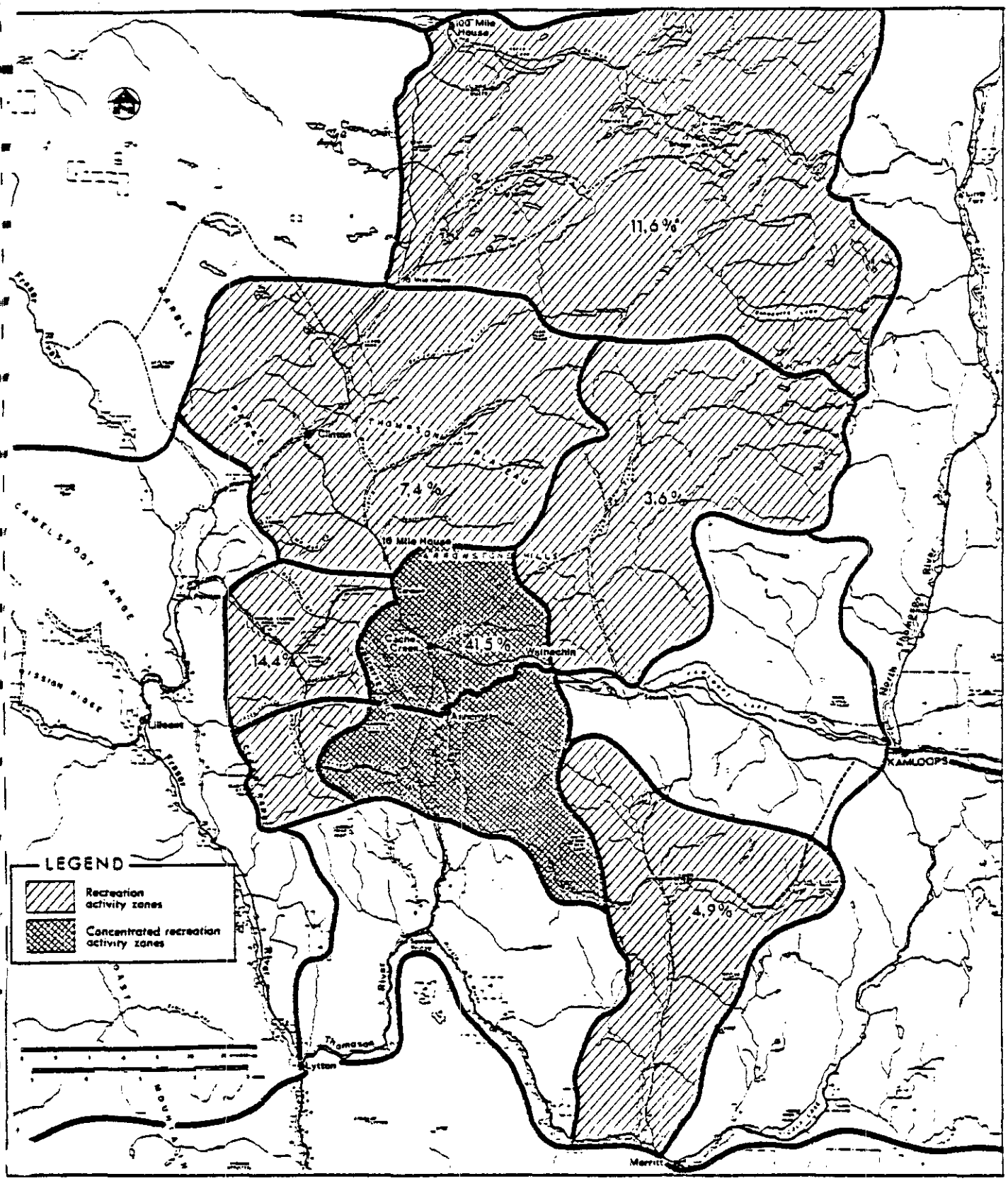
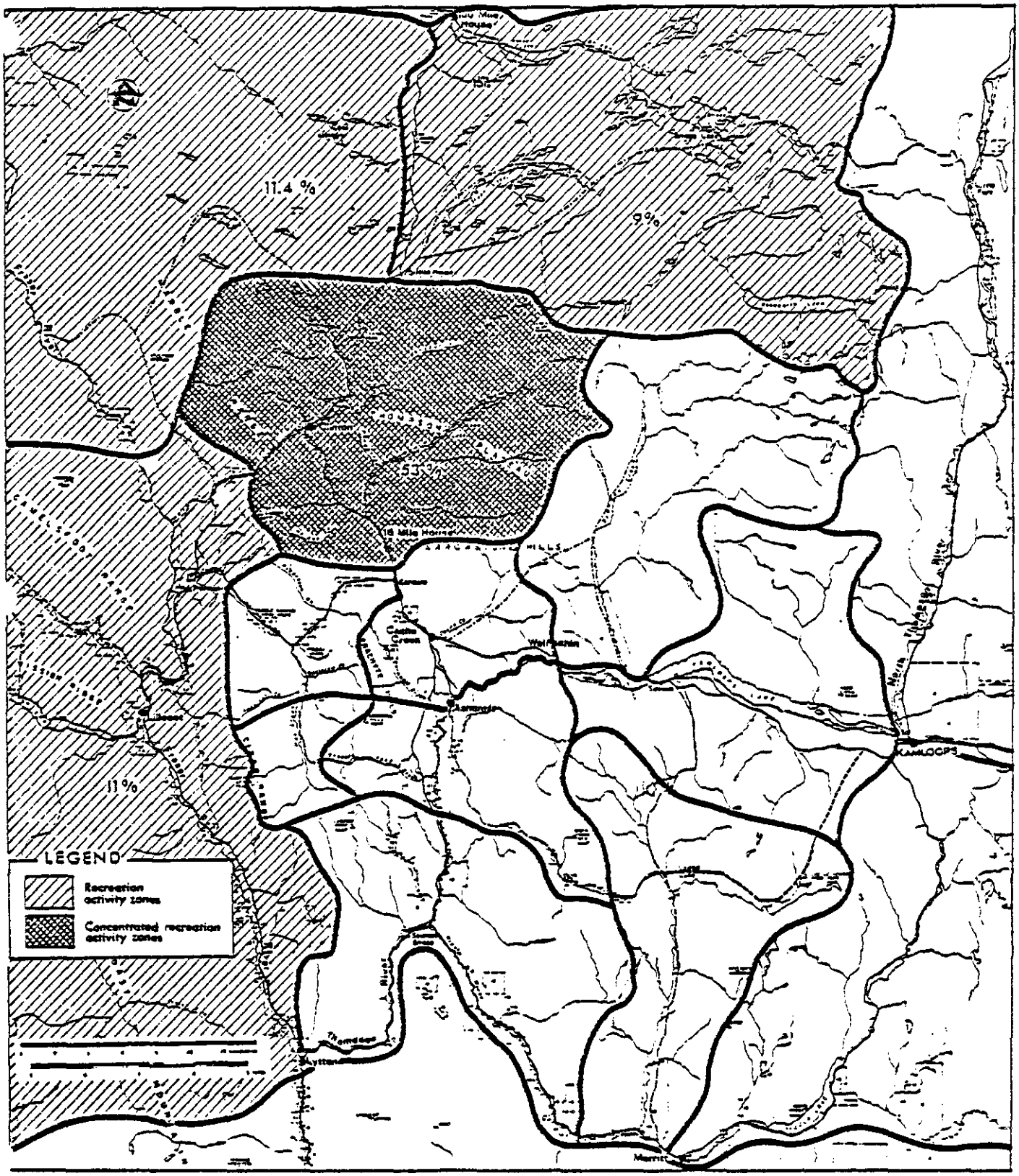
* The sampling design was constructed in such a way that the multiplier used to translate household survey data into population estimates had to be combined for the communities of Ashcroft and Cache Creek.



Map 4

Distribution of Ashcroft / Cache Creek Residents' Outdoor Recreation Activity by Recreational Zone



Map

Distribution of Clinton Residents' Recreation Activity by Recreational Zone

2.5 Distribution of Total Summer Recreational Activity by Site

One of the primary purposes of the site survey was to establish the proportion of days during the summer spent by local residents as opposed to non-local residents, in order to estimate total recreational use at 12 selected sites.

The information given in Table 4 indicates a strong preference by non-local residents for certain provincial campsites such as Crown Lake/Marble Canyon and Loon Lake Provincial Parks, while areas such as Kersey Lake* are used overwhelmingly by local residents, primarily for swimming, sunbathing and picnicking. Barnes Lake and Kelly Lake are used almost equally by local and non-local residents. Due to lack of publicity about the recreation potential of, and access to, the south end of the Hat Creek Valley, including Oregon Jack Creek, this area receives substantially more local than non-local use.

The surprisingly high non-local figures for the entire Hat Creek Valley and the north end of the Hat Creek Valley are probably attributable to television and press coverage of B. C. Hydro's proposed Hat Creek development during the early summer of 1977.** The Cache Creek visitor center also promoted tourism in these areas by offering brochures on the Hat Creek site.

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* For purposes of the site survey, Kersey Lake refers to the one small lake located 8 kilometres (5 miles) south of Clinton on the right side of Highway 97, approaching the village.

** The Hat Creek coal mine site itself, as a recreation/public interest area, attracted seven and 19 recreation days for local and non-local residents, respectively, for a summer recreation day split of 27% local and 73% non-local.

TABLE 4

LOCAL - NON-LOCAL* SPLIT OF RECREATION DAYS BY SITE**
SAMPLE SIZE = 608 PEOPLE 15 YEARS AND OLDER

Site	Origin	No. of Recreation Days***	Summer Recreation Day % Split
Hat Creek Valley South and Oregon Jack excluding Cornwall Lookout	Local	55	89
	Non-Local	7	11
Cornwall Lookout	Local	14	45
	Non-Local	17	55
Hat Creek Valley North	Local	22	44
	Non-Local	28	56
Entire Hat Creek Valley****	Local	12	23
	Non-Local	41	77
Barnes Lake	Local	197	52
	Non-Local	183	48
Pavilion Lake	Local	32	33
	Non-Local	69	67
Crown Lake/Marble Canyon	Local	176	24
	Non-Local	566	76
Loon Lake	Local	6	2
	Non-Local	313	98
Kersey Lake	Local	863	91
	Non-Local	90	9
Kelly Lake	Local	417	58
	Non-Local	303	42
Fountain Lake	Local	-	0
	Non-Local	325	100
TOTAL	Local	1,801	48%
	Non-Local	1,961	52%

* Local does not include Lillooet residents.

** Based on Site Survey data, Strong Hall & Associates Ltd., 1977.

*** No. of recreation days of those interviewed over the summer period.

**** Travel through Valley from one access to the other.

Table 5 presents various estimates of local, non-local and total summer use at selected sites in the primary study area.* The usage figures calculated for Barnes Lake are: 4,784 recreation days, according to the household survey; and 1,768 recreation days, according to the site survey. The discrepancy between these two estimates can possibly be ascribed to the fact that Barnes Lake is popular for ice fishing and, thus, the average percentage figure for recreation time spent in the summer (55%) may be too high.

The difference between the Pavilion Lake estimates of 4,757 recreation days from the household survey and 871 recreation days from the site survey is due to the fact that all site survey respondents were found in the very limited public access area, whereas household survey respondents did not differentiate between

---

* The methodology employed to calculate the estimates of use based on the residential survey is as follows: The figure for total local use at any given site is extracted from Section 3 tables and then multiplied by 55% in order to yield local summer use. 55% was the average figure for the proportion of outdoor recreation time that is spent in the summer. The local summer use figure is divided by the proportion of local summer recreation days to total summer recreation days at that site (determined from Table 4). The accuracy of these estimates is dependent upon the accuracy of the total local use information obtained from the household survey.

Estimates of use from the site survey extrapolate the number of visitors at a site on a Saturday, Sunday and weekday morning or afternoon over a 13-week period. In all cases, the morning or afternoon value is not doubled to give the day figure, for the majority of users spend the entire day at a single site, that is, it is assumed that there would be no turnover at the site during the day. In one or two instances, this assumption may not be approriate (e.g., Kersey Lake), but the same method is applied throughout for consistency. Where both a morning and afternoon figure are available, the larger number is used.

Total recreation use estimates are calculated by applying the local/non-local percent split for summer recreation days, found in Section 3 tables.

TABLE

ESTIMATED SUMMER RECREATIONAL USE BY SELECTED SITES

Site	Residential Survey* Local	Non-Local	Total	Site Survey** Local	Non-Local	Total	Other
Barnes Lake	2,488	2,336	4,784	919	849	1,768	
Pavilion Lake	1,570	3,187	4,757	287	584	871	
Crown Lake/Marble Canyon	382	1,210	1,592	880	2,780	3,666	3,947 + day use***
Loon Lake Provincial Campsite	Not Available			37	1,809	1,846	2,883 + day use***
Kersey Lake	2,555	252	2,807	4,282	424	4,706	
Kelly Lake	1,269	918	2,187	1,267	917	2,184	1,426 + day use***
Cornwall Lookout	622	760	1,382	234	286	520	750 days in fire season****
Hat Creek North	Not Available			Not Available			
Hat Creek South	1,481	183	1,664	382	47	429	

* Based on household survey data, adjusted to estimate total recreation days of primary area residents 15 years+ for the summer period plus non-local use (15 years+) for summer period. Lillooet is not included.

$$\frac{\text{Residential sample days} \times \text{sample multiplier} \times \text{proportion of summer to annual use}}{\text{Proportion of primary local recreation days to all recreation days}}$$

** Based on site survey data adjusted to estimate total recreation days of primary area residents 15 years+ and non-local users (15 years+) for summer period. Lillooet is not included.

*** Based on B. C. Parks Branch data adjusted to estimate all users 15 years+ for the June through September period.

**** Adjusted Cornwall Lookout guest book figures.

SOURCE: Strong Hall & Associates Ltd.

days spent at private cottages, at the commercial campsite, or at the public access area.*

Days spent at Crown Lake/Marble Canyon are estimated at 1,592, based on the household survey, and 3,666 according to the site survey. The latter calculation is probably more accurate since adjusted B. C. Parks Branch data indicate that 3,947 nights were recorded at the campsite in the 1976 summer period.**

The site survey estimate of 1,846 user-days for the Loon Lake Provincial Campsite is of the same order of magnitude as the Parks Branch figure of 2,883 user-nights. Again, the latter figure does not include "days only" use since the site does not lend itself to "day only" activities.

The adjusted household survey figure of 2,807 days (summer recreational use) for Kersey Lake is probably incorrect since the respondents did not pinpoint the exact site in question. As the site survey considered only those people who were actually at the Kersey Lake site, the estimate of 4,706 gives a more accurate picture of activity there.***

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* To apply the local/non-local summer recreation day split to the local summer residential survey use figure at Pavilion Lake, one must assume that the percentage split found in the public access areas is the same in the cottages and commercial site.

** People visiting the site during the day, but not camping overnight, were not represented in the Parks Branch figure.

*** Even this figure may be an underestimate, as the activity at the lake involves short stops throughout the day and the calculation takes into account only the activity that occurred during the survey period. As mentioned in Footnote * on the preceding page, it was decided that, because Kersey Lake was one of the few sites where double counting would occur if the number survey was doubled to give the day use figure, it would be preferable to sacrifice accuracy in this particular instance for the sake of consistency throughout.

The estimates of summer recreational use at Kelly Lake by both methods are virtually identical - 2,187 versus 2,184 days. These figures are consistent with the Parks Branch figure of 1,426 user-nights, to which must be added an unspecified amount of "day only" use.

Estimates of use for Cornwall Lookout range from the site survey figure of 520 days* to the residential survey figure of 1,382 days. The adjusted Cornwall guest book figure of 750 days during the fire season fell between these two estimates.

Use in the south Hat Creek Valley amounted to an estimated 1,664 days based on the household survey, and 429 days according to the site survey. This apparently large discrepancy is probably due to the fact that the area is primarily used for angling and hunting, but neither activity was able to take place during the site survey (the former due to the unusually low level of water in the streams experienced in the summer of 1977). Therefore, the average summer to annual recreational use ratio of 55% may be too high.

2.6 Angler-Day Estimates

Both lake and steam fisheries are estimated in terms of local and non-local use in Table 6.

As might be expected, sites further from the local study area are comparatively little used by local residents (e.g., Clinton-Loon Lake, Guichon-Highland Valley, and Nicola-Stump Lake). Similarly, the sites which are largely commercially developed with fishing camps (e.g., Loon Lake), or have publicly provided camping

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* Probably an underestimate since respondents to the household survey failed to locate site precisely.

TABLE 6

ESTIMATED ANGLER-DAYS AT
SELECTED SITES IN STUDY REGION

Area	Local Use*	Non-Local Use**	Total Use***
CACHE CREEK AREA 01			
Bonaparte River	510	1,490	2,000
Back Valley (including Pass Lake)	320	680	1,000
ASHCROFT-OREGON JACK AREA 02			
Barnes Lake	2,780	3,220	6,000
Barnes Creek	1,280	n/a	n/a
South Thompson River	5,300	6,720	12,020
HAT CREEK-PAVILION LAKE AREA 03			
Pavilion Lake	1,070	8,930	10,000
Crown Lake	100	5,900	6,000
Hat Creek	1,490	0	250 - 1,000****
UPPER HAT CREEK VALLEY AREA 04			
Blue Earth Lake	110	1,090	1,200
CLINTON-LOON LAKE AREA 05			
Beaverdam	230	3,770	4,000
Loon Lake	4,650	35,350	40,000
Hihium Lake	300	4,700	5,000
FRASER-LILLOOET AREA 06			
Kelly Lake	2,000	n/a	n/a
Carpenter Lake	0	1,000	1,000
Seaton Lake	0	500	500
SPENCES BRIDGE AREA 07			
Quiltanton Lake	250	750	1,000
GUICHON-HIGHLAND VALLEY AREA 08			
Leighton Lake	300	9,700	10,000
Logan Lake*****	50	0	0
Lac Le Jeune	0	30,000	30,000
KAMLOOPS AREA 09			
Kamloops Lake	0	1,000	1,000
DEADMAN CREEK AREA 10			
Deadman Creek and Lake	130	30	160
SOUTH CARIBOO LAKES AREA 11			
Green Lake	2,460	n/a	n/a
BIG BAR-CHILCOTIN AREA 12			
Big Bar Lake	1,850	2,150	4,000
NICOLA-STUMP LAKE AREA 14			
Roche Lake	90	910	1,000

* Strong Hall & Associates Ltd., Resident Survey, 1977 (from Table 4, rounded to nearest 10).

** Calculated - difference between total use and local use estimates.

*** Fish and Wildlife Branch, 1976.

**** S. J. McDonald, personal communication with Beak Consultants Ltd.

***** Although the Resident Survey recorded 50 angler-days at Logan Lake, the Fish and Wildlife Branch show no activity at the site, therefore total use does not reflect sum of local and non-local use.

facilities, receive relatively low levels of fishing activity by loca local residents. For example, Hat Creek is probably fished exclusively by local residents. In contrast, Pavilion Lake, with limited public access, a commercial resort catering to tourists, and lakeshore cottages predominantly owned by non-local residents, receives a considerably higher level of fishing activity by non-local than by local residents.

2.7 Cottaging and Commercial Use

Pavilion Lake and Loon Lake differ from the other seven sites identified in Table 4 in that the majority of activity occurring at these lakes results from cottaging and commercial use. Data collected by Don Poole & Associates[A-1] indicate that there are approximately 190 properties with over 400 owners/leaseholders at Loon Lake, about 180 of whom are year-round residents. In addition, there are seven fishing camps at this popular lake which recorded 27,216 adult user-days in 1976.*

The breakdown of these users by origin was as follows:

Study Area	831
Lower Mainland	18,856
Elsewhere in B. C.	1,092
Outside the Province	6,407
TOTAL	27,186

* This figure agrees with the adusted estimates of angling effort determined in Fisheries Technical Circular No. 24. Taking into account all cottages, all fishing resorts and the Provincial Campsite at Loon Lake, this document indicated that between 19,153 and 23,451 angler-days were spent at Loon Lake from May 1973 through September 1973.

From May through September 1976, Vic's Lakeshore Camping, the only resort on Pavilion Lake, accommodated 3,447 adult user-days. These users were drawn from the following areas:

Study Area	288
Lower Mainland	1,991
Elsewhere in B. C.	184
Outside the Province	984
TOTAL	3,447

The local component of cottaging activity in the region as determined from the household survey is shown in Table 7. This cottaging activity is concentrated at three sites in the region: Green Lake, Loon Lake, and Pavilion Lake.

TABLE 7

RECREATION SURVEY
VALUE & LOCATION OF RECREATION COTTAGES
OWNED BY RESIDENTS IN PRIMARY AREA COMMUNITIES *
SAMPLE SIZE = 145 HOUSEHOLDS **
MULTIPLIER = 15

Value	Pavilion Lake 0303	Loon Lake 0506	Green Lake 1111	Area Outside Region 1599	TOTAL
Value not stated	-	-	-	15	15
$ 0 - $ 4,000	-	-	-	15	15
$ 5,000 - $ 9,000	-	-	-	15	15
$10,000 - $14,000	-	-	30	15	45
$15,000 - $19,000	-	-	-	-	-
$20,000 - $24,000	-	15	-	-	15
$25,000 - $29,000	15	-	15	-	30
$30,000 - $59,000	-	-	-	-	-
$60,000+	15	15	-	-	30
TOTAL	30	30	45	60	165

* Primary area includes Lillooet, Cache Creek, Ashcroft, Clinton and Hat Creek Valley.

** Population of Primary Area = 7,500
Average Household Size = 3.5
No. of Households = 2,143

SOURCE: Strong Hall & Associates Ltd.

RECREATION SURVEY

EXTRACTED FROM RESIDENT SURVEY

This map shows recreational sites in this region (I: show Map Card 5). I'd like to know which, if any, of these sites you visited within the last year to take part in these activities. You can select up to four sites. (I: complete Q.20 for three or four sites, if possible, then pursue Q.21 through Q.25 for each site mentioned.)

20.	Where did you go to take part in these activities? I: record from Map Card 5.	20a.	20b.	20c.	20d.
21.	It would be really helpful if you would estimate how many days or part day visits you made during the past year to _____ (I: name site 20A. then ask Q.22 - Q.25 for site a. Repeat for sites b. and c. Record response.	21a.	21b.	21c.	21d.
22.	What were your main activities at _____? (I: record from Card 8)	22a.	22b.	22c.	22d.
23.	Would your enjoyment of a visit to _____ be reduced if there were perhaps 50% more people there as you experienced last year? (I: record 1. yes 2. no 3. uncertain 4. don't know 5. no response)	23a.	23b.	23c.	23d.
24.	Would you continue to visit _____ under such circumstances? I: record and proceed after 20d. 1. no ⟶ Q.25 2. yes ⟶ Q.26 3. uncertain ⟶ Q.26 4. don't know ⟶ Q.26	24a.	24b.	24c.	24d.
25.	Which area would you visit as an alternative should you not desire to visit _____ because of the increase in population? I: record from Map Card 5, plus uncertain or don't know	25a.	25b.	25c.	25d.

26. Did you visit the Hat Creek Valley for any type of recreation during the past year? I: check response, proceed.
yes _____ Q.26a., no _____ ⟶ Q.29

26a. How many times did you visit the valley for recreational purposes during the past year? I: record response. _____ times

26b. To which area(s) of the Hat Creek Valley did you go during these visits? I: record response.

_____

Of the visits you made to the Hat Creek Valley last year, how many days or part-days would you have engaged in (I: record for each).

26c. fishing _____

26d. hunting _____

26e. other _____

27. If you were not able to visit the Hat Creek Valley, where would you go for a similar type of recreational experience? I: show Map Card 5, record response.

_____

28. Keeping in mind the other recreational opportunities available to you, please place what you consider to be a fair dollar value on your day's recreational experience in the Hat Creek Valley. This question is not designed for use in setting any charges. I: record response

_____

I: if the Hat Creek Valley <u>has been</u> recorded as one of the sites above⟶ Q.26b.

3. RECREATION COMPONENTS OF THE HOUSEHOLD SURVEY

3.1 Household Survey of Recreational Use - Excerpt

19. I: "Now I'd like to ask you a few questions about outdoor recreation in the area."

Here is a list of outdoor activities (I: show Card 8). About how many days or part-days did you take part in these activities in this area during the past year? I: record response for each.

19a. fishing _____

19b. hunting _____

19c. lakeshore activities _____

19d. backroad travel, etc. _____

19e. other _____

I: if R did not participate in any outdoor activity Q.26

use space for Q.18

This map shows recreational sites in this region (I: show Map Card 5). I'd like to know which, if any, of these sites you visited within the last year to take part in these activities. You can select up to four sites. (I: complete Q.20 for three or four sites, if possible, then pursue Q.21 through Q.25 for each site mentioned).

20.	Where did you go to take part in these activities? I: record from Map Card 5.	20a.	20b.	20c.	20d.
21.	It would be really helpful if you would estimate how many days or part-day visits you made during the past year to _____. (I: name site 20A. then ask Q.22 - Q.25 for site a. Repeat for sites b. and c. Record response.	21a.	21b.	21c.	21d.

22. What were your main activities at _____? (I: record from Card 8). 22a. 22b. 22c. 22d.

23. Would your enjoyment of a visit to _____ be reduced if there were perhaps 50% more people there as you experienced last year? 23a. 23b. 23c. 23d.
(I: record 1. yes 2. no
3. uncertain 4. don't know
5. no response

24. Would you continue to visit _____ under such circumstances? 24a. 24b. 24c. 24d.
I: record and proceed after 20d.
1. no Q.25
2. yes Q.26
3. uncertain Q.26
4. no response Q.26

25. Which area would you visit as an alternate should you not desire to visit _____ because of the increase in population? 25a. 25b. 25c. 24d.
I: record from Map Card 5, plus uncertain, or don't know.

I: If the Hat Creek Valley has been recorded as one of the sites above Q.26b

26. Did you visit the Hat Creek Valley for any type of recreation during the past year? I: check response, proceed.
yes _____ Q.26a, no _____ Q.29

26a. How many times did you visit the valley for recreational purposes during the past year?
I: record response _____ times.

26b. To which area(s) of the Hat Creek Valley did you go during these visits?
I: show Map Card 9. Record response.

Of the visits you made to the Hat Creek Valley last year, how many days or part days would you have engaged in:
I: record for each.

26c. fishing _____

26d. hunting _____

26e. other _____

27. If you were not able to visit the Hat Creek Valley, where would you go for a similar type of recreational experience?
I: show Map Card 5. Record response.

_____

28 Keeping in mind the other recreational opportunities available to you, please place what you consider to be a fair dollar value on your day's recreational experience in the Hat Creek Valley. This question is not designed for use in setting any charges.
I: record response.

_____

3.3 Population Data

RESIDENTS OF HAT CREEK, CLINTON, ASHCROFT, CACHE CREEK (COMPILED FROM OTHER TABLES)

Area		Angling	Hunting	Lake & Shore	Back Road	Other	TOTAL
CACHE CREEK AREA 01							9,096
Bonaparte River	0104	508	-	-	-	-	508
Back Valley	0107	318	-	1,651	-	2,786	4,755
General Area	0199	-	38	749	3,046	-	3,833
ASHCROFT-OREGON JACK AREA 02							19,214
Oregon Jack Creek	0203	-	102	-	-	99	201
Cornwall Lookout	0205	-	356	-	-	50	406
Barnes Lake	0206	2,778	279	894	-	573	4,524
Barnes Creek	0207	1,283	-	203	-	-	1,486
Thompson River	0208	5,296	-	381	-	-	5,677
General Area	0299	1,130	267	-	5,019	504	6,920
HAT CREEK-PAVILLION LAKE AREA 03							11,508
Pavillion Lake	0303	1,070	318	1,060	-	406	2,854
Crown Lake/Marble Canyon	0305	101	389	192	-	13	695
Anderson Creek	0306	-	-	-	-	-	-
Hat Creek	0307	1,493	533	-	-	-	2,026
Harry Lake	0309	-	76	-	-	99	175
McLean Lake	0310	-	381	-	-	-	381
General Area	0399	51	1,250	-	3,714	362	5,377
UPPER HAT CREEK VALLEY AREA 04							2,491
Hat Creek	0403	-	318	-	-	457	775
Headwaters	0404	-	4	-	-	-	4
Blue Earth Lake	0405	114	127	-	-	1	242
General Area	0499	132	4	-	1,284	50	1,470
CLINTON-LOON LAKE AREA 05							23,342
Beaverdam	0503	233	-	-	-	-	233
Chasm Park	0504	-	64	-	-	-	64
Bonaparte River	0505	-	-	-	-	-	-
Loon Lake	0506	4,650	1,049	400	-	3,213	9,312
Kersey Lake/Clinton vicinity *	0507	1,118	378	283	-	2,867	4,646
Scottie Creek	0509	30	45	-	-	-	75
Hihium Lake	0510	302	-	-	-	-	302
General Area	0599	815	225	762	6,902	-	8,710
FRASER-LILLOOET AREA 06							6,933
Kelly Lake and Creek	0604	2,009	102	-	-	196	2,307
Pavillion Creek	0605	127	-	762	-	-	889
Fraser River	0606	-	-	-	-	-	-
Cayoosh Provincial Park	0607	254	-	-	-	-	254
Yalacom River	0608	-	-	-	-	-	-
Carpenter Lake	0610	-	-	-	-	-	-
Seaton Lake	0611	-	-	-	-	-	-
Fraser River	0613	-	-	-	-	-	-
General Area	0699	162	-	-	3,321	-	3,483
SPENCES BRIDGE AREA 07							1,643
Skihist Provincial Park	0703	30	-	-	-	-	30
Pimainus Lake and Creek	0708	-	-	-	-	-	-
Quiltanton Lake	0710	254	-	-	-	-	254
Thompson River	0711	584	-	-	-	-	584
General Area	0799	635	-	-	140	-	775
GUICHON-HIGHLAND VALLEY AREA 08							4,236
Leighton Lake	0803	305	64	-	-	-	369
Logan Lake	0805	51	-	-	-	43	94
Lac Le Jeune	0808	-	-	-	-	-	-
General Area	0899	1,012	165	-	2,293	303	3,773
KAMLOOPS LAKE AREA 09							1,736
Kamloops Lake	0905	-	-	572	-	220	792
Dairy Lake	0910	-	-	76	-	-	76
General Area	0999	38	127	89	360	254	868
DEADMAN CREEK AREA 10							2,947
Cultus Lake	1004	-	-	-	-	-	-
Criss Creek	1005	-	-	-	-	-	-
Deadman Creek	1006	127	-	-	-	889	1,016
General Area	1099	-	-	-	1,931	-	1,931
SOUTH CARIBOO LAKES AREA 11							10,937
Canim Lake	1103	-	-	-	-	-	-
Horse Lake	1104	-	-	-	-	-	-
Sheridan Lake	1106	13	-	-	-	-	13
Bridge Lake	1107	-	-	-	-	30	30
Green Lake	1111	2,464	242	5,024	-	-	7,730
Machete Lake	1114	-	381	-	-	-	381
Bonaparte Lake	1116	-	-	178	-	-	178
Bonaparte River	1117	76	-	378	-	-	454
Young Lake	1118	-	-	127	-	-	127
Dare Lake	1120	-	-	76	-	-	76
General Area	1199	-	91	-	1,857	-	1,948
BIG BAR-CHILCOTIN AREA 12							5,681
Big Bar Lake	1203	1,854	178	921	-	755	3,708
Fraser River	1204	-	-	-	-	-	-
General Area	1299	-	131	211	725	906	1,973
NORTH THOMPSON-KAMLOOPS AREA 13							1,101
General Area	1399	-	-	-	64	1,037	1,101
NICOLA-STUMP LAKE AREA 14							448
Jacko Lake	1403	-	-	127	-	-	127
Roche Lake	1406	89	-	-	-	-	89
Douglas Lake	1415	-	-	-	-	-	-
General Area	1499	-	-	181	-	51	232
OTHER AREAS OUTSIDE REGION 15							3,043
General Area	1599	2,000	257	51	533	202	3,043
TOTAL		33,506	7,942	15,348	31,194	16,366	104,356

*Kersey Lake and other ill-defined recreation sites in the vicinity of Clinton were not clearly separated by respondents.

SPATIAL DISTRIBUTION OF RECREATION DAYS BY ACTIVITY
ASHCROFT AND CACHE CREEK AREA RESIDENTS
SAMPLE SIZE = 189 MULTIPLIER = 12.7

Area		Angling	Hunting	Lake & Shore	Back Road	Other	TOTAL	% TOTAL
CACHE CREEK AREA 01							9,066	13.4%
Bonaparte River	0104	508	-	-	-	-	508	
Back Valley	0107	318	-	1,651	-	2,756	4,725	
General Area	0199	-	38	749	3,046	-	3,833	
ASHCROFT-OREGON JACK AREA 02							19,011	28.1%
Oregon Jack Creek	0203	-	102	-	-	99	201	
Cornwall Lookout	0205	-	356	-	-	-	356	
Barnes Lake	0206	2,718	279	864	-	572	4,433	
Barnes Creek	0207	1,283	-	203	-	-	1,486	
Thompson River	0208	5,296	-	381	-	-	5,677	
General Area	0299	1,130	267	-	5,017	444	6,858	
HAT CREEK-PAVILLION LAKE AREA 03							9,727	14.4%
Pavillion Lake	0303	813	318	978	-	406	2,515	
Crown Lake/Marble Canyon	0305	101	102	177	-	13	393	
Anderson Creek	0306	-	-	-	-	-	-	
Hat Creek	0307	1,448	533	-	-	-	1,981	
Harry Lake	0309	-	76	-	-	-	76	
McLean Lake	0310	-	381	-	-	-	381	
General Area	0399	51	1,245	-	2,958	127	4,381	
UPPER HAT CREEK VALLEY AREA 04							2,070	3.1%
Hat Creek	0403	-	318	-	-	457	775	
Headwaters	0404	-	-	-	-	-	-	
Blue Earth Lake	0405	114	127	-	-	-	241	
General Area	0499	127	-	-	927	-	1,054	
CLINTON-LOON LAKE AREA 05							4,972	7.4%
Beaverdam	0503	127	-	-	-	-	127	
Chasm Park	0504	-	64	-	-	-	64	
Bonaparte River	0505	-	-	-	-	-	-	
Loon Lake	0506	800	203	249	-	419	1,671	
Kersey Lake	0507	-	-	102	-	13	115	
Scottie Creek	0509	-	-	-	-	-	-	
Hihium Lake	0510	-	-	-	-	-	-	
General Area	0599	-	-	762	2,233	-	2,995	
FRASER-LILLOOET AREA 06							1,893	2.8%
Kelly Lake and Creek	0604	152	102	-	-	-	254	
Pavillion Creek	0605	127	-	762		-	889	
Fraser River	0606	-	-	-	-	-	-	
Cayoosh Provincial Park	0607	254	-	-	-	-	254	
Yalacom River	0608	-	-	-	-	-	-	
Carpenter Lake	0610	-	-	-	-	-	-	
Seaton Lake	0611	-	-	-	-	-	-	
Fraser River	0613	-	-	-	-	-	-	
General Area	0699	102	-	-	394	-	496	
SPENCES BRIDGE AREA 07							1,613	2.4%
Skihist Provincial Park	0703	-	-	-	-	-	-	
Pimainus Lake and Creek	0708	-	-	-	-	-	-	
Quiltanton Lake	0710	254	-	-	-	-	254	
Thompson River	0711	584	-	-	-	-	584	
General Area	0799	635	-	-	140	-	775	
QUILCHON-HIGHLAND VALLEY AREA 08							3,314	4.9%
Leighton Lake	0803	305	64	-	-	-	369	
Logan Lake	0805	51	-	-	-	13	64	
Lac Le Jeune	0808	-	-	-	-	-	-	
General Area	0899	952	165	-	1,764	-	2,881	
KAMLOOPS LAKE AREA 09							1,676	2.5%
Kamloops Lake	0905	-	-	572	-	190	762	
Dairy Lake	0910	-	-	76	-	-	76	
General Area	0999	38	127	89	330	254	838	
DEADMAN CREEK AREA 10							2,464	3.6%
Cultus Lake	1004	-	-	-	-	-	-	
Criss Creek	1005	-	-	-	-	-	-	
Deadman Creek	1006	127	-	-	-	889	1,016	
General Area	1099	-	-	-	1,448	-	1,448	
SOUTH CARIBOO LAKES AREA 11							7,810	11.6%
Canim Lake	1103	-	-	-	-	-	-	
Horse Lake	1104	-	-	-	-	-	-	
Sheridan Lake	1106	13	-	-	-	-	13	
Bridge Lake	1107	-	-	-	-	-	-	
Green Lake	1111	2,464	-	3,378	-	-	5,842	
Machete Lake	1114	-	381	-	-	-	381	
Bonnaparte Lake	1116	-	-	178	-	-	178	
Bonnaparte River	1117	76	-	-	-	-	76	
Young Lake	1118	-	-	127	-	-	127	
Bare Lake	1120	-	-	-	-	-	-	
General Area	1199	-	-	-	1,193	-	1,193	
BIG BAR-CHILCOTIN AREA 12							1,739	2.6%
Big Bar Lake	1203	1,295	178	-	-	-	1,473	
Fraser River	1204	-	-	-	-	-	-	
General Area	1299	-	25	-	241	-	266	
NORTH THOMPSON-KAMLOOPS AREA 13							978	1.4%
General Area	1399	-	-	-	64	914	978	
NICOLA-STUMP LAKE AREA 14							445	.7%
Jacko Lake	1403	-	-	127	-	-	127	
Roche Lake	1406	89	-	-	-	-	89	
Douglas Lake	1415	-	-	-	-	-	-	
General Area	1499	-	-	178	-	51	229	
OTHER AREAS OUTSIDE REGION 15							838	1.1%
General Area	1599	203	-	51	533	51	838	
TOTAL		22,555	5,451	11,654	20,288	7,668	67,616	100.0%

SPATIAL DISTRIBUTION OF RECREATION DAYS BY ACTIVITY
CLINTON AREA RESIDENTS
SAMPLE SIZE = 64 MULTIPLIER = 15.1

Area		Angling	Hunting	Lake & Shore	Back Road	Other	TOTAL	% TOTAL
CACHE CREEK AREA 01							30	.1%
Bonaparte River	0104	-	-	-	-	-	-	
Back Valley	0107	-	-	-	-	-	30	
General Area	0199	-	-	-	-	-	-	
ASHCROFT-OREGON JACK AREA 02							150	.4%
Oregon Jack Creek	0203	-	-	-	-	-	-	
Cornwall Lookout	0205	-	-	-	-	-	-	
Barnes Lake	0206	60	-	30	-	-	90	
Barnes Creek	0207	-	-	-	-	-	-	
Thompson River	0208	-	-	-	-	-	-	
General Area	0299	-	-	-	-	60	60	
HAT CREEK-PAVILLION LAKE AREA 03							1,207	3.5%
Pavillion Lake	0303	257	-	30	-	-	287	
Crown Lake/Marble Canyon	0305	-	287	-	-	-	287	
Anderson Creek	0306	-	-	-	-	-	-	
Hat Creek	0307	45	-	-	-	-	45	
Harry Lake	0309	-	-	-	-	-	-	
McLean Lake	0310	-	-	-	-	-	-	
General Area	0399	-	-	-	407	181	588	
UPPER HAT CREEK VALLEY AREA 04							-	
Hat Creek	0403	-	-	-	-	-	-	
Headwaters	0404	-	-	-	-	-	-	
Blue Earth Lake	0405	-	-	-	-	-	-	
General Area	0499	-	-	-	-	-	-	
CLINTON-LOON LAKE AREA 05							18,369	53.0%
Beaverdam	0503	106	-	-	-	-	106	
Chasm Park	0504	-	-	-	-	-	-	
Bonaparte River	0505	-	-	-	-	-	-	
Loon Lake	0506	3,850	846	151	-	2,794	7,641	
Kersey Lake	0507	1,117	378	181	-	2,854	4,530	
Scottie Creek	0509	30	45	-	-	-	75	
Hihium Lake	0510	302	-	-	-	-	302	
General Area	0599	815	226	-	4,674	-	5,715	
FRASER-LILLOOET AREA 06							4,000	11.5%
Kelly Lake and Creek	0604	1,857	-	-		196	2,053	
Pavillion Creek	0605	-	-	-	-	-	-	
Fraser River	0606	-	-	-	-	-	-	
Cayoosh Provincial Park	0607	-	-	-	-	-	-	
Yalacom River	0608	-	-	-	-	-	-	
Carpenter Lake	0610	-	-	-	-	-	-	
Seaton Lake	0611	-	-	-	-	-	-	
Fraser River	0613	-	-	-	-	-	-	
General Area	0699	60	-	-	1,887	-	1,947	
SPENCES BRIDGE AREA 07							30	.1%
Skihist Provincial Park	0703	30	-	-	-	-	30	
Pimainus Lake and Creek	0708	-	-	-	-	-	-	
Quiltanton Lake	0710	-	-	-	-	-	-	
Thompson River	0711	-	-	-	-	-	-	
General Area	0799	-	-	-	-	-	-	
GUICHON-HIGHLAND VALLEY AREA 08							921	2.7%
Leighton Lake	0803	-	-	-	-	-	-	
Logan Lake	0805	-	-	-	-	30	30	
Lac Le Jeune	0808	-	-	-	-	-	-	
General Area	0899	60	-	-	529	302	891	
KAMLOOPS LAKE AREA 09							60	.2%
Kamloops Lake	0905	-	-	-	-	30	30	
Dairy Lake	0910	-	-	-	-	-	-	
General Area	0999	-	-	-	30	-	30	
DEADMAN CREEK AREA 10							483	1.4%
Cultus Lake	1004	-	-	-	-	-	-	
Criss Creek	1005	-	-	-	-	-	-	
Deadman Creek	1006	-	-	-	-	-	-	
General Area	1099	-	-	-	483	-	483	
SOUTH CARIBOO LAKES AREA 11							3,127	9.0%
Canim Lake	1103	-	-	-	-	-	-	
Horse Lake	1104	-	-	-	-	-	-	
Sheridan Lake	1106	-	-	-	-	-	-	
Bridge Lake	1107	-	-	-	-	30	30	
Green Lake	1111	-	242	1,646	-	-	1,888	
Machete Lake	1114	-	-	-	-	-	-	
Bonaparte Lake	1116	-	-	-	-	-	-	
Bonaparte River	1117	-	-	378	-	-	378	
Young Lake	1118	-	-	-	-	-	-	
Bare Lake	1120	-	-	76	-	-	76	
General Area	1199	-	91	-	664	-	755	
BIG BAR-CHILCOTIN AREA 12							3,942	11.4%
Big Bar Lake	1203	559	-	921	-	755	2,235	
Fraser River	1204	-	-	-	-	-	-	
General Area	1299	-	106	211	484	906	1,707	
NORTH THOMPSON-KAMLOOPS AREA 13							121	.4%
General Area	1399	-	-	-	-	121	121	
NICOLA-STUMP LAKE AREA 14							-	
Jacko Lake	1403	-	-	-	-	-	-	
Roche Lake	1406	-	-	-	-	-	-	
Douglas Lake	1415	-	-	-	-	-	-	
General Area	1499	-	-	-	-	-	-	
OTHER AREAS OUTSIDE REGION 15							2,205	6.3%
General Area	1599	1,797	257	-	-	151	2,205	
TOTAL		10,945	2,478	3,624	9,158	8,440	34,645	100.0%

SPATIAL DISTRIBUTION OF RECREATION DAYS BY ACTIVITY
HAT CREEK AREA RESIDENTS
SAMPLE SIZE = 19 = 100 PERCENT

Area		Angling	Hunting	Lake & Shore	Back Road	Other	TOTAL	% TOTAL
ACHE CREEK AREA 01							-	
Bonaparte River	0104	-	-	-	-	-	-	
Back Valley	0107	-	-	-	-	-	-	
General Area	0199	-	-	-	-	-	-	
ASHCROFT-OREGON JACK AREA 02							53	5.0%
Oregon Jack Creek	0203	-	-	-	-	-	-	
Cornwall Lookout	0205	-	-	-	-	50	50	
Barnes Lake	0206	-	-	-	-	1	1	
Barnes Creek	0207	-	-	-	-	-	-	
Thompson River	0208	-	-	-	-	-	-	
General Area	0299	-	-	-	1	-	1	
HAT CREEK-PAVILLION LAKE AREA 03							574	54.4%
Pavillion Lake	0303	-	-	52	-	-	52	
Crown Lake/Marble Canyon	0305	-	-	15	-	-	15	
Anderson Creek	0306	-	-	-	-	-	-	
Hat Creek	0307	-	-	-	-	-	-	
Harry Lake	0309	-	-	-	-	99	99	
McLean Lake	0310	-	-	-	-	-	-	
General Area	0399	-	5	-	349	54	408	
UPPER HAT CREEK VALLEY AREA 04							421	39.9%
Hat Creek	0403	-	-	-	-	-	-	
Headwaters	0404	-	4	-	-	-	4	
Blue Earth Lake	0405	-	-	-	-	1	1	
General Area	0499	5	4	-	357	50	416	
CLINTON-LOON LAKE AREA 05							1	.1%
Beaverdam	0503	-	-	-	-	-	-	
Chasm Park	0504	-	-	-	-	-	-	
Bonaparte River	0505	-	-	-	-	-	-	
Loon Lake	0506	-	-	-	-	-	-	
Kersey Lake	0507	1	-	-	-	-	1	
Scottie Creek	0509	-	-	-	-	-	-	
Hihium Lake	0510	-	-	-	-	-	-	
General Area	0599	-	-	-	-	-	-	
FRASER-LILLOOET AREA 06							-	
Kelly Lake and Creek	0604	-	-	-	-	-	-	
Pavillion Creek	0605	-	-	-	-	-	-	
Fraser River	0606	-	-	-	-	-	-	
Cayoosh Provincial Park	0607	-	-	-	-	-	-	
Yalacom River	0608	-	-	-	-	-	-	
Carpenter Lake	0610	-	-	-	-	-	-	
Seaton Lake	0611	-	-	-	-	-	-	
Fraser River	0613	-	-	-	-	-	-	
General Area	0699	-	-	-	-	-	-	-
SPENCES BRIDGE AREA 07							-	
Skihist Provincial Park	0703	-	-	-	-	-	-	
Pimainus Lake and Creek	0708	-	-	-	-	-	-	
Quiltanton Lake	0710	-	-	-	-	-	-	
Thompson River	0711	-	-	-	-	-	-	
General Area	0799	-	-	-	-	-	-	
QUILCHOH-HIGHLAND VALLEY AREA 08							1	.1%
Leighton Lake	0803	-	-	-	-	-	-	
Logan Lake	0805	-	-	-	-	-	-	
Lac La Jeune	0808	-	-	-	-	-	-	
General Area	0899	-	-	-	-	1	1	
KAMLOOPS LAKE AREA 09							-	
Kamloops Lake	0905	-	-	-	-	-	-	
Dairy Lake	0910	-	-	-	-	-	-	
General Area	0999	-	-	-	-	-	-	
DEADMAN CREEK AREA 10							-	
Cultus Lake	1004	-	-	-	-	-	-	
Criss Creek	1005	-	-	-	-	-	-	
Deadman Creek	1006	-	-	-	-	-	-	
General Area	1099	-	-	-	-	-	-	
SOUTH CARIBOO LAKES AREA 11							-	
Canim Lake	1103	-	-	-	-	-	-	
Horse Lake	1104	-	-	-	-	-	-	
Sheridan Lake	1106	-	-	-	-	-	-	
Bridge Lake	1107	-	-	-	-	-	-	
Green Lake	1111	-	-	-	-	-	-	
Machete Lake	1114	-	-	-	-	-	-	
Bonaparte Lake	1116	-	-	-	-	-	-	
Bonaparte River	1117	-	-	-	-	-	-	
Young Lake	1118	-	-	-	-	-	-	
Bare Lake	1120	-	-	-	-	-	-	
General Area	1199	-	-	-	-	-	-	
BIG BAR-CHILCOTIN AREA 12							-	
Big Bar Lake	1203	-	-	-	-	-	-	
Fraser River	1204	-	-	-	-	-	-	
General Area	1299	-	-	-	-	-	-	
NORTH THOMPSON-KAMLOOPS AREA 13							2	.2%
General Area	1399	-	-	-	-	2	2	
NICOLA-STUMP LAKE AREA 14							3	.3%
Jacko Lake	1403	-	-	-	-	-	-	
Roche Lake	1406	-	-	-	-	-	-	
Douglas Lake	1415	-	-	-	-	-	-	
General Area	1499	-	-	3	-	-	3	
OTHER AREAS OUTSIDE REGION 15							-	
General Area	1599	-	-	-	-	-	-	
		--	--	--	708	258	1,055	100.0%

SPATIAL DISTRIBUTION OF RECREATION DAYS BY ACTIVITY
LILLOOET AREA RESIDENTS
SAMPLE SIZE = 37 MULTIPLIER = 40

Area		Angling	Hunting	Lake & Shore	Back Road	Other	TOTAL
CACHE CREEK AREA 01							-
Bonaparte River	0104	-	-	-	-	-	-
Back Valley	0107	-	-	-	-	-	-
General Area	0199	-	-	-	-	-	-
ASHCROFT-OREGON JACK AREA 02							-
Oregon Jack Creek	0203	-	-	-	-	-	-
Cornwall Lookout	0205	-	-	-	-	-	-
Barnes Lake	0206	-	-	-	-	-	-
Barnes Creek	0207	-	-	-	-	-	-
Thompson River	0208	-	-	-	-	-	-
General Area	0299	-	-	-	-	-	-
HAT CREEK-PAVILLION LAKE AREA 03							8,200
Pavillion Lake	0303	2,680	-	-	-	40	2,720
Crown Lake/Marble Canyon	0305	-	-	-	-	-	-
Anderson Creek	0306	-	-	-	-	-	-
Hat Creek	0307	-	-	-	-	-	-
Harry Lake	0309	-	-	-	-	-	-
McLean Lake	0310	-	-	-	-	-	-
General Area	0399	-	-	-	680	-	680
UPPER HAT CREEK VALLEY AREA 04							-
Hat Creek	0403	-	-	-	-	-	-
Headwaters	0404	-	-	-	-	-	-
Blue Earth Lake	0405	-	-	-	-	-	-
General Area	0499	-	-	-	-	-	-
CLINTON-LOON LAKE AREA 05							80
Beaverdam	0503	-	-	-	-	-	-
Chasm Park	0504	-	-	-	-	-	-
Bonaparte River	0505	-	-	-	-	-	-
Loon Lake	0506	-	-	-	-	-	-
Kersey Lake	0507	-	-	-	-	-	-
Scottie Creek	0509	-	-	-	-	-	-
Hihium Lake	0510	-	-	-	-	-	-
General Area	0599	-	-	-	80	-	80
FRASER-LILLOOET AREA 06							37,678
Kelly Lake and Creek	0604	80	-	-	-	-	80
Pavillion Creek	0605	-	-	-	-	160	160
Fraser River	0606	80	-	-	-	-	80
Cayoosh Provincial Park	0607	2,640	-	960	-	-	3,600
Yalacom River	0608	339	440	-	-	400	1,179
Carpenter Lake	0610	1,000	-	-	-	-	1,000
Seaton Lake	0611	5,640	-	11,960	-	99	17,699
Fraser River	0613	-	-	-	-	-	-
General Area	0699	1,000	1,360	-	11,520	-	13,880
SPENCES BRIDGE AREA 07							240
Skihist Provincial Park	0703	-	-	-	-	-	-
Pimainus Lake and Creek	0708	-	-	-	-	-	-
Quiltanton Lake	0710	-	-	-	-	-	-
Thompson River	0711	-	-	-	-	-	-
General Area	0799	-	-	-	240	-	240
GUICHON-HIGHLAND VALLEY AREA 08							2,200
Leighton Lake	0803	2,000	-	-	-	-	2,000
Logan Lake	0805	120	-	-	-	-	120
Lac Le Jeune	0808	-	-	-	-	-	-
General Area	0899	-	-	-	80	-	80
KAMLOOPS LAKE AREA 09							440
Kamloops Lake	0905	-	-	-	-	-	-
Dairy Lake	0910	-	-	-	-	-	-
General Area	0999	-	440	-	-	-	440
DEADMAN CREEK AREA 10		-	-	-	-	-	-
Cultus Lake	1004	-	-	-	-	-	-
Criss Creek	1005	-	-	-	-	-	-
Deadman Creek	1006	-	-	-	-	-	-
General Area	1099	-	-	-	-	-	-
SOUTH CARIBOO LAKES AREA 11							280
Canim Lake	1103	-	-	-	-	-	-
Horse Lake	1104	-	-	-	-	-	-
Sheridan Lake	1106	-	-	-	-	-	-
Bridge Lake	1107	-	-	-	-	-	-
Green Lake	1111	280	-	-	-	-	280
Machete Lake	1114	-	-	-	-	-	-
Bonaparte Lake	1116	-	-	-	-	-	-
Bonaparte River	1117	-	-	-	-	-	-
Young Lake	1118	-	-	-	-	-	-
Dare Lake	1120	-	-	-	-	-	-
General Area	1199	-	-	-	-	-	-
BIG BAR-CHILCOTIN AREA 12							200
Big Bar Lake	1203	-	-	-	-	-	-
Fraser River	1204	200	-	-	-	-	-
General Area	1299	-	-	-	-	-	-
NORTH THOMPSON-KAMLOOPS AREA 13							-
General Area	1399	-	-	-	-	-	-
NICOLA-STUMP LAKE AREA 14							560
Jacko Lake	1403	-	-	-	-	-	-
Roche Lake	1406	-	-	-	-	-	-
Douglas Lake	1415	-	-	-	-	-	-
General Area	1499	-	-	-	560	-	560
OTHER AREAS OUTSIDE REGION 15							1,240
General Area	1599	-	-	1,240	-	-	1,240
TOTAL		20,859	2,240	14,160	13,160	699	51,118

3.4 Distribution of Resident Miners' Recreation Activity by Zone

One of the anticipated impacts of the Hat Creek project is the effect of the incoming mine and plant workforce on local outdoor recreation resources. As a means of assessing the possible characteristics of this workforce in terms of their recreational preferences and level of use, a sample of open-pit miners employed in the Highland Valley mining industry and resident in Ashcroft were interviewed. (It was assumed that both the Highland Valley miners residing in Ashcroft and those required for the Hat Creek project would have similar characteristics.) The principal purpose of the analysis was to determine the degree to which the recreational pursuits of a mine workforce and their dependents vary from those of the local population.

As shown in the following table, Ashcroft miners were found to have recreation patterns similar to those of all Ashcroft residents. Closer inspection of the tables reveal the following differences, which may be of limited significance if the size of the sample is taken into consideration:

1. Miners show less inclination to visit the Hat Creek-Pavilion Lake area (3.2% of their recreation time as opposed to 9.7% of all Ashcroft residents' recreation time).

2. Miners show more inclination to visit the Spences Bridge area (4.2% as opposed to .2%) and the Clinton-Loon Lake area (14.1% as opposed to 9.2%).

COMPARISON OF ASHCROFT MINERS AND ALL ASHCROFT RESIDENTS RECREATIONAL PATTERNS*

Physiographic Recreation Zone	% Of Recreation Time Spent In The Zone By Ashcroft Miners **	% of Recreation Time Spent In The Zone By All Ashcroft Residents
Cache Creek Area 01	.9	1.9
Ashcroft-Oregon Jack Area 02	51.6	56.8
Hat Creek-Pavillion Lake Area 03	3.2	9.7
Lower Hat Creek Valley Area 04	3.9	3.2
Clinton-Loon Lake Area 05	14.1	9.2
Fraser-Lillooet Area 06	.9	-
Spences Bridge Area 07	4.2	.2
Guichon-Highland Valley Area 08	2.4	2.4
Kamloops Lake Area 09	2.3	.7
Deadman Creek Area 10	.6	.8
South Cariboo Lakes Area 11	8.4	8.0
Big Bar-Chilcotin Area 12	1.5	3.9
North Thompson-Kamloops Area 13	.1	.9
Nicola-Stump Lake Area 14	2.1	1.0
Other Areas Outside Region 15	3.8	1.3
TOTAL	100.0%	100.0%

* Based on unadjusted statistics from household survey, Strong Hall & Associates Ltd., 1977. Data from which percentages are computed are presented in Appendix Tables

** Employed by Bethlehem Mines or Lornex Mines.

SPATIAL DISTRIBUTION OF RECREATION DAYS BY ACTIVITY 1/
BETHLEHEM & LORNEX MINERS - RESIDENTS OF PRIMARY AREA COMMUNITIES
(SAMPLE SIZE = 25)

		Angling	Hunting	Lake & Shore	Back Road	Other	TOTAL
CACHE CREEK AREA 01							7 (3)
Bonaparte River	0104	-	-	-	-	-	-
Back Valley	0107	-	-	-	-	-	-
General Area	0199	-	3 (1)	-	4 (2)	-	7 (3)
ASHCROFT-CREGGH JACK AREA 02							421 (23)
Oregon Jack Creek	0203	-	-	-	-	99 (1)	99 (1)
Cornwall Lookout	0205	-	22 (2)	-	-	-	22 (2)
Barnes Lake	0206	31 (6)	22 (2)	2 (1)	-	12 (1)	67 (10)
Barnes Creek	0207	2 (1)	-	-	-	-	2 (1)
Thompson River	0208	160 (4)	-	-	-	-	160 (4)
General Area	0299	30 (1)	-	-	41 (4)	-	71 (5)
HAT CREEK-PAVILLION LAKE AREA 03							26 (6)
Pavillion Lake	0303	2 (1)	15 (1)	3 (1)	-	-	20 (3)
Crown Lake/Marble Canyon	0305	-	-	-	-	-	-
Anderson Creek	0306	-	-	-	-	-	-
Hat Creek	0307	1 (1)	-	-	-	-	1 (1)
Harry Lake	0309	-	-	-	-	-	-
McLean Lake	0310	-	-	-	-	-	-
General Area	0399	-	-	-	5 (2)	-	5 (2)
HAT CREEK VALLEY AREA 04							32 (2)
Hat Creek	0403	-	-	-	-	-	-
Headwaters	0404	-	-	-	-	-	-
Blue Earth Lake	0405	2 (1)	-	-	-	-	2 (1)
General Area	0499	-	-	-	30 (1)	-	30 (1)
CLINTON-LOON LAKE AREA 05							115 (5)
Seaverdam	0503	-	-	-	-	-	-
Chasm Park	0504	-	-	-	-	-	-
Bonaparte River	0505	-	-	-	-	-	-
Loon Lake	0506	7 (2)	8 (1)	99 (1)	-	-	114 (4)
Kersey Lake	0507	-	-	-	-	-	-
Scottie Creek	0509	-	-	-	-	-	-
Hihium Lake	0510	-	-	-	-	-	-
General Area	0599	-	-	-	1 (1)	-	1 (1)
FRASER-LILLOOET AREA 06							7 (1)
Kelly Lake and Creek	0604	-	-	-	-	-	-
Pavillion Creek	0605	-	-	-	-	-	-
Fraser River	0606	-	-	-	-	-	-
Cayoosh Provincial Park	0607	-	-	-	-	-	-
Yalacom River	0608	-	-	-	-	-	-
Carpenter Lake	0610	-	-	-	-	-	-
Seaton Lake	0611	-	-	-	-	-	-
Fraser River	0613	-	-	-	-	-	-
General Area	0699	7 (1)	-	-	-	-	7 (1)
SPENCES BRIDGE AREA 07							34 (2)
Skihist Provincial Park	0703	-	-	-	-	-	-
Pimainus Lake and Creek	0708	-	-	-	-	-	-
Quiltanton Lake	0710	-	-	-	-	-	-
Thompson River	0711	-	-	-	-	-	-
General Area	0799	30 (1)	-	-	4 (1)	-	34 (2)
QUILCHO-HIGHLAND VALLEY AREA 08							20 (8)
Leighton Lake	0803	4 (1)	5 (1)	-	-	-	9 (2)
Logan Lake	0805	2 (1)	-	-	-	-	2 (1)
Lac Le Jeune	0808	-	-	-	-	-	-
General Area	0899	-	-	-	9 (3)	-	9 (3)
KAMLOOPS LAKE AREA 09							19 (3)
Kamloops Lake	0905	-	-	5 (1)	-	12 (1)	17 (2)
Dairy Lake	0910	-	-	-	-	-	-
General Area	0999	2 (1)	-	-	-	-	-
DEADMAN CREEK AREA 10							5 (1)
Cultus Lake	1004	-	-	-	-	-	-
Criss Creek	1005	-	-	-	-	-	-
Deadman Creek	1006	5 (1)	-	-	-	-	5 (1)
General Area	1099	-	-	-	-	-	-
SOUTH CARIBOO LAKES AREA 11							69 (7)
Canim Lake	1103	-	-	-	-	-	-
Horse Lake	1104	-	-	-	-	-	-
Sheridan Lake	1106	-	-	-	-	-	-
Bridge Lake	1107	-	-	-	-	-	-
Green Lake	1111	-	-	30 (2)	-	-	30 (2)
Machete Lake	1114	-	-	-	-	-	-
Bonaparte Lake	1116	-	-	-	-	-	-
Bonaparte River	1117	3 (1)	-	-	-	-	3 (1)
Young Lake	1118	-	-	-	-	-	-
Bare Lake	1120	-	-	-	-	-	-
General Area	1199	-	-	-	36 (4)		36 (4)
BIG BAR-CHILCOTIN AREA 12							12 (2)
Big Bar Lake	1203	10 (1)	-	-	-	-	10 (1)
Fraser River	1204	-	-	-	-	-	-
General Area	1299	-	2 (1)	-	-	-	2 (1)
NORTH THOMPSON-KAMLOOPS AREA 13							1 (1)
General Area	1399	-	-	-	1 (1)	-	1 (1)
NICOLA-STUMP LAKE AREA 14							17 (2)
Jacko Lake	1403	-	-	10 (1)	-	-	10 (1)
Roche Lake	1406	7 (1)	-	-	-	-	-
Douglas Lake	1415	-	-	-	-	-	-
General Area	1499	-	-	-	-	-	-
OTHER AREAS OUTSIDE REGION 15							31 (2)
General Area	1599	6 (1)	-	-	25 (1)	-	31 (2)
TOTAL RECREATION DAYS		311	77	149	156	123	816
TOTAL RESPONDENTS		(27)	(9)	(7)	(20)	(3)	(66)

SPATIAL DISTRIBUTION OF RECREATION DAYS BY ACTIVITY
BETHLEHEM & LORNEX MINERS - RESIDENTS OF PRIMARY AREA COMMUNITIES
SAMPLE SIZE = 25 MULTIPLIER = 13.4

Area		Angling	Hunting	Lake & Shore	Back Road	Other	TOTAL	% TOTAL
CACHE CREEK AREA 01							94	.9
Bonaparte River	0104	-	-	-	-	-	-	
Back Valley	0107	-	-	-	-	-	-	
General Area	0199	-	40	-	54	-	94	
ASHCROFT-OREGON JACK AREA 02							5,642	51.6
Oregon Jack Creek	0203	-	-	-	-	1,327	1,327	
Cornwall Lookout	0205	-	295	-	-	-	295	
Barnes Lake	0206	415	295	27	-	161	396	
Barnes Creek	0207	27	-	-	-	-	27	
Thompson River	0208	2,144	-	-	-	-	2,144	
General Area	0299	402	-	-	549	-	951	
HAT CREEK-PAVILLION LAKE AREA 03							348	3.2
Pavillion Lake	0303	27	201	40	-	-	258	
Crown Lake/Marble Canyon	0305	-	-	-	-	-	-	
Anderson Creek	0306	-	-	-	-	-	-	
Hat Creek	0307	13	-	-	-	-	13	
Harry Lake	0309	-	-	-	-	-	-	
McLean Lake	0310	-	-	-	-	-	-	
General Area	0399	-	-	-	67	-	67	
HAT CREEK VALLEY AREA 04							429	3.9
Hat Creek	0403	-	-	-	-	-	-	
Headwaters	0404	-	-	-	-	-	-	
Blue Earth Lake	0405	27	-	-	-	-	27	
General Area	0499	-	-	-	402	-	402	
CLINTON-LOON LAKE AREA 05							1,541	14.1
Beaverdam	0503	-	-	-	-	-	-	
Chasm Park	0504	-	-	-	-	-	-	
Bonaparte River	0505	-	-	-	-	-	-	
Loon Lake	0506	94	107	1,327	-	-	1,528	
Kersey Lake	0507	-	-	-	-	-	-	
Scottie Creek	0509	-	-	-	-	-	-	
Hihium Lake	0510	-	-	-	-	-	-	
General Area	0599	-	-	-	13	-	13	
FRASER-LILLOOET AREA 06							94	.9
Kelly Lake and Creek	0604	-	-	-	-	-	-	
Pavillion Creek	0605	-	-	-	-	-	-	
Fraser River	0606	-	-	-	-	-	-	
Cayoosh Provincial Park	0607	-	-	-	-	-	-	
Yalacom River	0608	-	-	-	-	-	-	
Carpenter Lake	0610	-	-	-	-	-	-	
Seaton Lake	0611	-	-	-	-	-	-	
Fraser River	0613	-	-	-	-	-	-	
General Area	0699	94	-	-	-	-	94	
SPENCES BRIDGE AREA 07							456	4.2
Skihist Provincial Park	0703	-	-	-	-	-	-	
Pimainus Lake and Creek	0708	-	-	-	-	-	-	
Quiltanton Lake	0710	-	-	-	-	-	-	
Thompson River	0711	-	-	-	-	-	-	
General Area	0799	402	-	-	54	-	456	
GUICHON-HIGHLAND VALLEY AREA 08							269	2.4
Leighton Lake	0803	54	67	-	-	-	121	
Logan Lake	0805	27	-	-	-	-	27	
Lac Le Jeune	0808	-	-	-	121	-	121	
General Area	0899	-	-	-	-	-	-	
KAMLOOPS AREA 09							255	2.3
Kamloops Lake	0905	-	-	67	-	161	228	
Dairy Lake	0910	-	-	-	-	-	-	
General Area	0999	27	-	-	-	-	27	
DEADMAN CREEK AREA 10							67	.6
Cultus Lake	1004	-	-	-	-	-	-	
Criss Creek	1005	-	-	-	-	-	-	
Deadman Creek	1006	67	-	-	-	-	67	
General Area	1099	-	-	-	-	-	-	
SOUTH CARIBOO LAKES AREA 11							924	8.4
Canim Lake	1103	-	-	-	-	-	-	
Horse Lake	1104	-	-	-	-	-	-	
Sheridan Lake	1106	-	-	-	-	-	-	
Bridge Lake	1107	-	-	-	-	-	-	
Green Lake	1111	-	-	402	-	-	402	
Machete Lake	1114	-	-	-	-	-	-	
Bonaparte Lake	1116	-	-	-	-	-	-	
Bonaparte River	1117	40	-	-	-	-	40	
Young Lake	1118	-	-	-	-	-	-	
Bare Lake	1120	-	-	-	-	-	-	
General Area	1199	-	-	-	482	-	482	
BIG BAR-CHILCOTIN AREA 12							161	1.5
Big Bar Lake	1203	134	-	-	-	-	134	
Fraser River	1204	-	-	-	-	-	-	
General Area	1299	-	27	-	-	-	27	
NORTH THOMPSON-KAMLOOPS AREA 13							13	.1
General Area	1399	-	-	-	13	-	13	
NICOLA-STUMP LAKE AREA 14							228	2.1
Jacko Lake	1403	-	-	134	-	-	134	
Roche Lake	1406	94	-	-	-	-	94	
Douglas Lake	1415	-	-	-	-	-	-	
General Area	1499	-	-	-	-	-	-	
OTHER AREAS OUTSIDE REGION 15							415	3.8
General Area	1599	80	-	-	335	-	415	
TOTAL RECREATION DAYS		4,168	1,032	1,997	2,099	1,649	10,936	100.0

APPENDIX B

B1.0 INTRODUCTION

There is a great lack of information bearing directly on recreation patterns within British Columbia. The problem is particularly difficult when studying small areas and almost impossible when dealing with trends over time. Much of the evidence in changing recreation patterns is necessarily indirect - the number of tourists visiting an area; the number of licenses issued annually; increase in travel volumes over time; attendance at campgrounds and other public facilities. None of these directly indicate how many people actually partake in particular recreation activities at specific locations at certain periods. But they are useful as inferences, for tourists are usually sightseers, licensees are fishermen or hunters and travel (particularly in summer) is predominantly recreational.

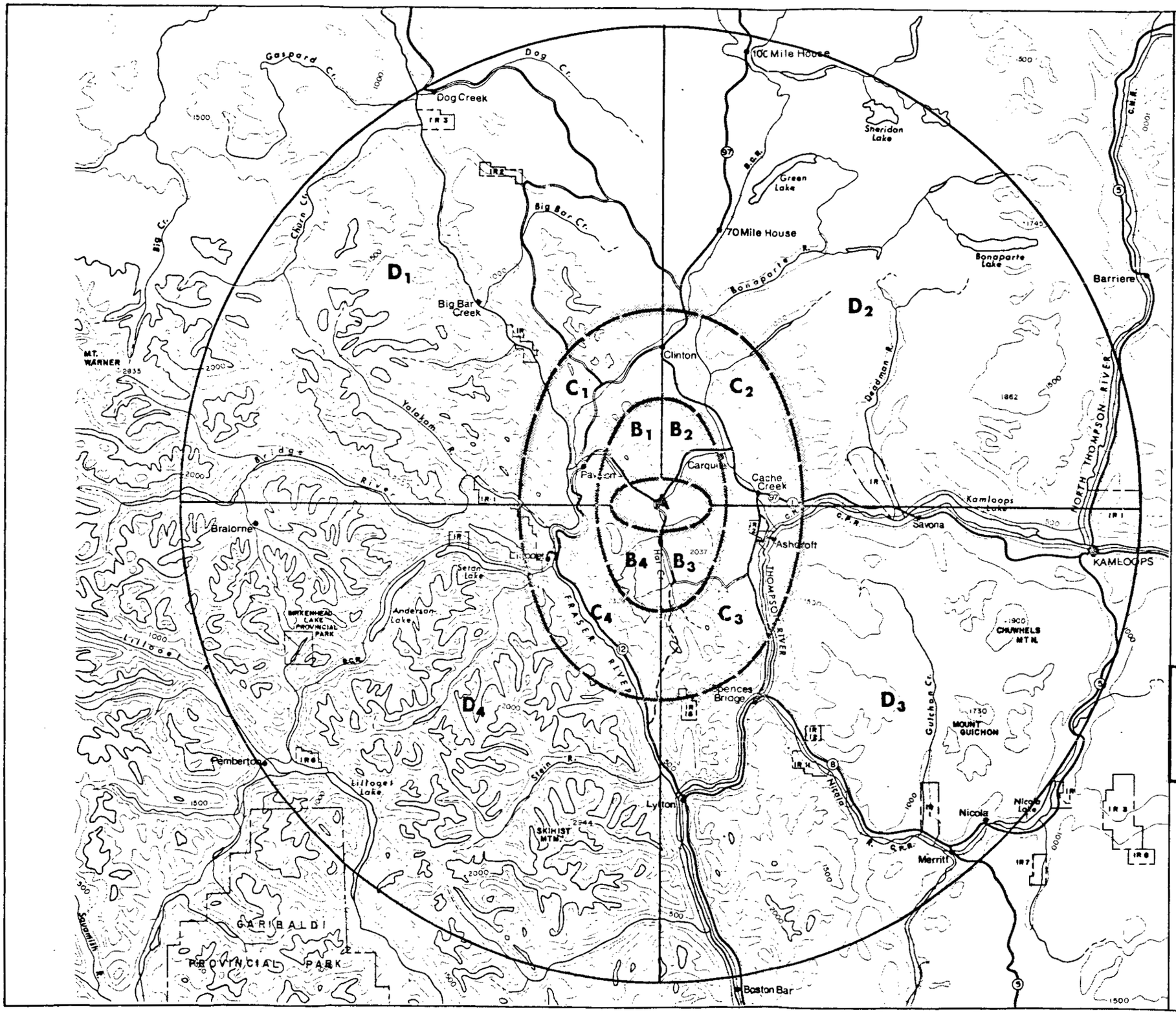
One inferential source of data on recreation patterns is the number of accommodation units an area provides. Data on accommodations has been published annually for many years by the Ministry of the Provincial Secretary as a service to tourists. Data from these publications, entitled "Directory of British Columbia Tourist Accommodation", was examined for selected years in the past, generally about five years apart. Specifically, data was secured from these publications for the years 1949, 1957, 1960, 1965, 1970, 1975 and 1977 and analyzed by type and location to provide an understanding of the growth in recreation and tourist accommodation in the Hat Creek study region over the years.

There are deficiencies in the data. Difference in definition between years have made comparisons somewhat difficult and there appears to be some underreporting of facilities, particularly small hunting and fishing establishments. In prior years, lodges, resorts and auto courts were important types of accommodations. These facilities have gone into decline in the past twenty years to be supplanted by a remarkable increase in motels, campsites

and trailer sites. In past years data on campsites and trailer sites were not always reported separately, which also makes comparisons difficult. In general, overall trends can be discerned from the data but as breakdowns are made by individual type of accommodation and by specific geographic area the data are less accurate. In particular, data for 1949 are unquestionably low as data on accommodation units was not reported for a number of the facilities that were listed.

Despite these shortcomings however, the data are sufficient to portray the important trends in the supply of accommodation units within the study area over the past two decades.

To aid in understanding just where growth in accommodation units has occurred, the data have been broken into the ring and sector sub-areas shown on Figure B1-1. These areas coincide with those used in the Recreation report, and are centered on the project site and divided into quadrants on north-south and east-west axis.



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SCALE - 1:750,000

10 0 Kilometres 10 20 30 40 50

CONTOUR INTERVAL - 500 METRES

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
HAT CREEK PROJECT

DETAILED ENVIRONMENTAL STUDIES

ANALYSIS AREAS FOR RECREATION ACCOMMODATION STUDY

FIGURE BI-1

B2.0 GENERAL FINDINGS

The overwhelming majority of accommodation units in the study region are provided privately. In 1977 there was an estimated 4200 privately provided accommodation units available at hotels, motels, camps and trailer sites, within 100 kilometers (62 miles) of the Hat Creek Project site. In the same year there were 520 campsites in Provincial Parks in the area.

B2.1 Growth in Total Accommodation Units

Although there are certainly inaccuracies in the data covering private facilities (most apparently due to underreporting) there is no questioning the overall figures which point to a spectacular rise in private accommodation growth over the years. Starting with just below 800 units in 1957, accommodation units had approximately trebled to over 2400 by 1965, continued the rapid rise to 1970 when approximately 3500 units were reported, followed by a slackening in growth to a level of over 4000 units in 1975 with slightly less than 4200 units reported to 1977.

B2.2 Types of Accommodation Units

Differences in definition over the years have tended to mask precise figures for each type of accommodation, but it appears clear that the dominant impetus to growth between 1957 and 1970 came from increases in hotels, motels, lodges and auto camps or cabins (now more commonly termed motels). This group of accommodations grew from less than 600 units in 1957 to over 2400 by 1970, at which time the number of units approximately stablized.

Between 1965 and 1977 growth in campsites and trailer sites was quite remarkable, rising from approximately 200 to over 1400. The very rapid growth between 1970 and 1975-77 is due in part to a change in definition. In 1970 and before, many hunting camps and dude ranches tended to aggregate all their

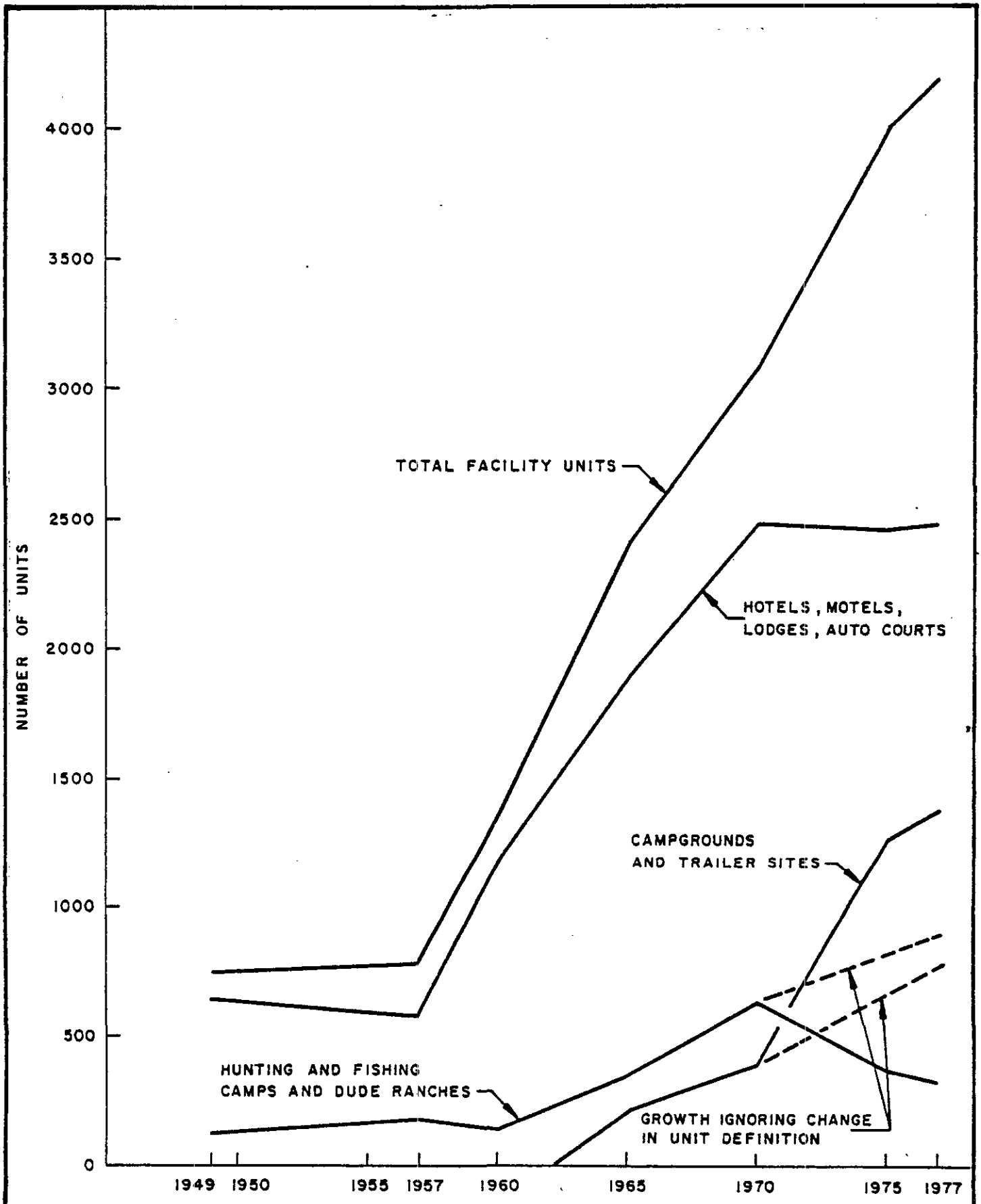
units together, including trailer and tent sites. In 1975 and 1977 these were separately reported. If reported as defined previously, growth would not have been as rapid in tent and trailer sites although still strongly upward. Figure B2-1 shows the growth in accommodation units for all three groups of facilities from 1949 to 1977, indicating the growth in campground and trailer sites since 1970 using both definitions.

Despite the change in categorization for trailer and tent sites growth has been strong since 1965. The growth in camper vehicles, trailers and other forms of motorized overnight accommodation which use these facilities has been documented for the Province as a whole by a study undertaken in 1974.* This trend is substantiated by data for the study region which indicates a leveling in hotel-motel accommodations in recent years at the same time that campgrounds and trailer sites have grown rapidly. More and more people are taking their accommodations with them.

A third category of accommodation is comprised of fishing camps, hunting camps, and dude ranches. These facilities are clearly recreation oriented and do not cater to the more casual tourists and sightseers who mostly travel the main roads and make use of the types of accommodations discussed previously. Unfortunately, data on hunting and fishing camps and dude ranches seems to be both spotty and underreported. Facilities reported in one year may disappear from the listing only to reappear later on. The data on these facilities therefore may be subject to considerable error.

Hunting and fishing camps and dude ranches within the study region underwent a growth period from 1960 to 1970 when their numbers grew from just over 100 accommodation units to well over 600. By 1975 and 1977 the number of units at these facilities had dropped to about 350. This drop is not a true indication of use however because of differences in definition. In 1970, campsites and trailer sites were included as "units" in many hunting and fishing camps and dude ranches, whereas in 1975 and 1977 there was a separation of units (cabins), campsites, and trailer sites. If these categories are re-

*Recreation Vehicle Use in British Columbia, Ward Associates, Vancouver, B.C 1974.



BRITISH COLUMBIA HYDRO AND POWER AUTHORITY

EBASCO SERVICES OF CANADA LIMITED; Environmental Consultants

APPROXIMATE RECREATIONAL FACILITY ACCOMMODATION UNITS WITHIN 100 Kms. OF THE HAT CREEK PROJECT SITE 1949 - 1977

THE HAT CREEK PROJECT – Detailed Environmental Studies

FIGURE B2-1

combined, fishing and hunting camps and dude ranches continue to show a growth. In all, somewhat less than 900 units of all kinds would be found in 1977 using the old definition, a total growth of about one third over 1970. Of these units, about 60% would be campsites and trailer sites.

B2.2 Location of Facilities

There is a great deal of asymmetry in the location of accommodation facilities within the study area. There were no tourist accommodations at all within the Hat Creek Valley in 1977 nor were any reported there over the preceding 20 years. The closest private facility to the site is the campground at Pavilion Lake located about 15 kilometers northwest of the mine which has 4 cabins and 18 campsites. Nearby, and somewhat closer to the site, is Marble Canyon Provincial Park (Provincial park facilities are within the project vicinity; the next closest are found in the Bonaparte Valley and at Cache Creek and Ashcroft within Area C.

By far the dominant location for accommodations is to the east of a line drawn north-south through the project site. Only about 325 of the over 4,000 1977 units within 100 kilometers (62 miles) of the site are located west of the site, concentrated at Clinton, Pavilion Lake and Lillooet - about 25 to 35 kilometers (15 to 21 miles) away. To the east, the closest concentrations are found at Cache Creek, Ashcroft and Spences Bridge, between 25 and 40 kilometers (15 and 24 miles) distant. In total there are over 450 units in these areas. The most significant locations for accommodation facilities are much farther away from the project. Kamloops, about 80 kilometers (50 miles) away, is the largest single site in the study area. Other facilities are found at the many lakes to the north and south of Kamloops, at Lytton and at Merritt.

B2.3 Growth by Sub-Area

Despite the limitations of data such as widely varying numbers of units bet-

tween inventory dates for some areas, it is possible to draw some reasonable conclusions about the relative growth of sub-areas within the entire study region from an examination of Table B2-1.

It is clear for example that Area D-3 is by far the most important segment of the study area for recreation accommodations. Not only did Area D-3 have about 60% of all the units in the study area in 1977, it has consistently grown in numbers since 1949 at an approximate rate of 100 units per year. The largest concentration of units within Area D-3 is found in and near Kamloops.

D-2 is the next most important area with about 900 units in 1977. Increases in Area D-2 were rapid between 1965 and 1970 after which growth stagnated and hovered in the vicinity of 860 to 900.

Area C-2 had the third largest number of units in 1977 with an estimated total of 383. Growth in Area C-2 has been steady over the years having increased at over 100 every 5 years since 1965.

All other areas have had somewhat erratic records of growth over the years. Area C-1 grew from 76 to 176 units from 1949 to 1965 then declined; C-3 has hovered in the vicinity of 75 to 90 units since 1965; Area C-4 has grown to over 100 units since 1970 after rising from over 50 units in 1960 and 1965; D-1 has grown from about 50 units in 1965 to over 100 in 1975; Area D-4 has shown an erratic pattern varying between zero and 109 units. Variations in the number of units in some areas may be due to underreporting as well as changes in the actual supply of units.

An indication of relative concentration of facilities in 1975 and 1977 is shown in Table B2-2. In both periods Areas D-2 and D-3 contained the largest concentration of facilities, in combination accounting for 77% and 81% of the total respectively. Area D-3, in which Kamloops is located, represents the largest single concentration of facilities. Over the twenty year period des-

TABLE B2-1

TOTAL NUMBER OF ACCOMMODATION UNITS BY SUB-AREA
WITHIN THE HAT CREEK PROJECT STUDY REGION 1949-77

YEAR	APPROXIMATE TOTAL ACCOMMODATION UNITS OF ALL TYPES							
	C-1	C-2	C-3	C-4	D-1	D-2	D-3	D-4
1949	79	14	30	-	2	301	256	62
1957	108	37	18	-	5	274	329	5
1960	120	89	187	53	-	55	849	-
1965	176	120	84	56	48	338	1455	-
1970	154	265	92	95	65	894	1838	109
1975	89	377	75	101	102	860	2399	6
1977	120	283	80	121	90	890	2504	6

TABLE B2-2

RELATIVE CONCENTRATION OF FACILITIES

1957 - 1977

Sub Area	1957 % of Total Units	1977 % of Total Units
C-1	14	3
C-2	5	9
C-3	2	2
C-4	-	2
D-1	1	2
D-2	35	21
D-3	42	60
D-4	1	-

Source: Ministry of the Provincial Secretary and Travel Industry, Directory of British Columbia Tourist Accommodation, Victoria, 1957 and 1977.

pite growth in other areas, D-3 became even more dominant, rising from 42% to 60% of the total units in the entire area. The only other area experiencing significant numberical growth was C-2. Significantly, both D-3 and C-2 are on the Trans Canada Highway.

B3.0 PROVINCIAL GOVERNMENT FACILITIES

The Provincial government also provides facilities for recreationists consisting of campsites and picnic tables. These facilities are found at Forest Service sites (where recreation is an adjunct to basic forestry functions) and at Provincial parks where recreation is a dominant activity. Data on facilities at Forest Service sites is not available in published form over the years whereas information on park sites was obtained for 1960 to the present from the Directory of British Columbia Tourist Accommodation, prepared by the Ministry of the Provincial Secretary and Travel Industry, the same source used in private accommodations presented in this report.

Forest Service sites consist of "primitive" or wilderness campsites with minimum facilities which are maintained on a regular basis during the summer season only. Users camp wherever they wish and facilities consist of pit toilets, picnic tables, garbage cans and in some cases fire pads and launching ramps. Use is predominantly local. In most cases these sites were already used by recreationists before the Forest Service provided facilities. Data on these sites is not reported in this study.

B3.1 Provincial Park Sites

In 1977 there were twelve Provincial park sites in the study region with facilities available. Table B3-1 summarizes the number of these facilities within the various sectors of the study area. It is apparent that Provincial park facilities, although few in number, reflect unequal distribution as do the privately owned facilities. The major concentration of facilities is within Area D-3 where about 55% of the campsites and over one-third of the picnic tables were found in 1977. The largest single site is at Lac La Jeune which has 144 campsites. Park facilities, unlike commercial facilities, are sited well away from population centres and are of two types: transient

TABLE B3-1

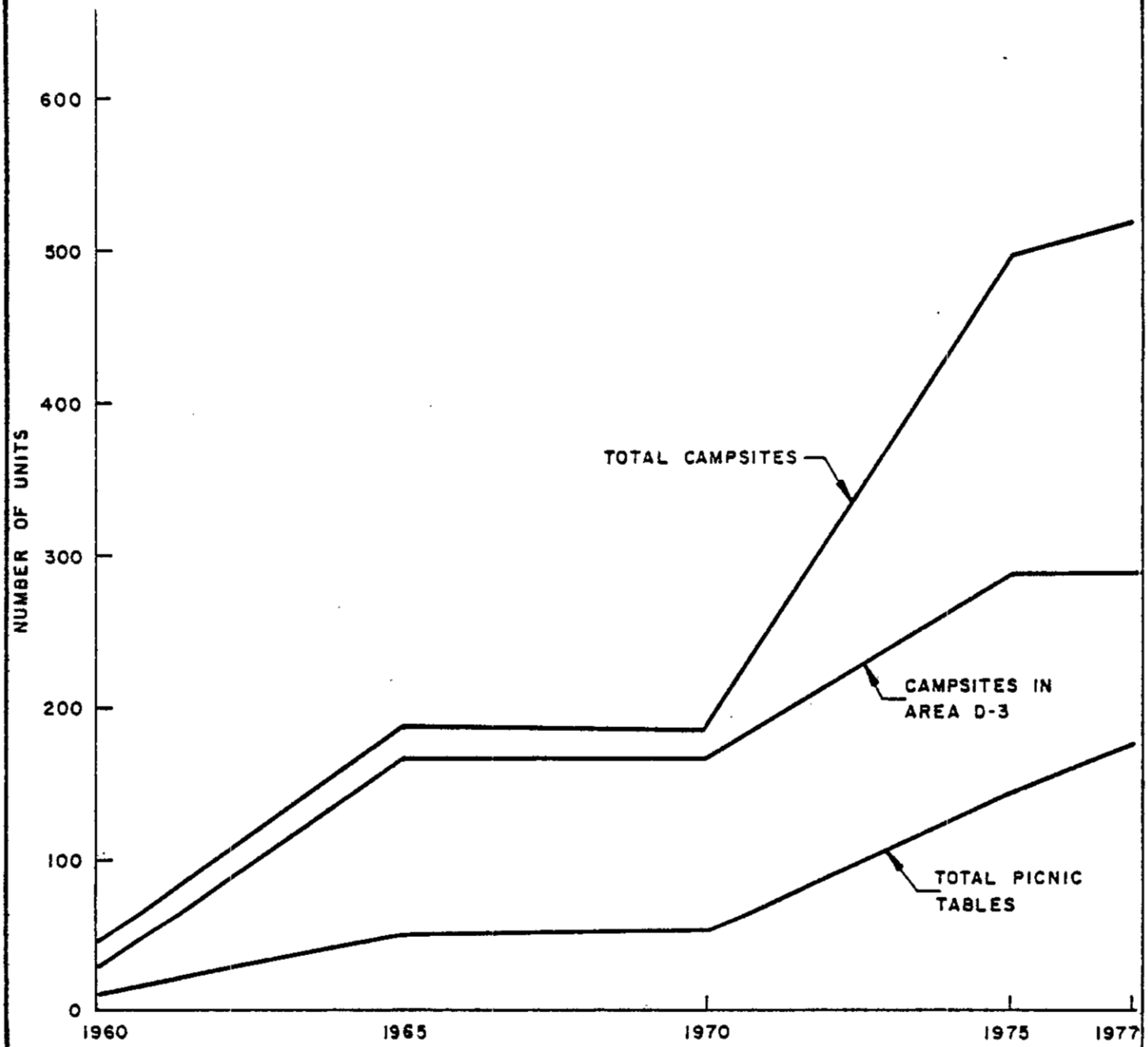
CAMPSITES AND PICNIC TABLES AT PROVINCIAL PARKS
WITHIN 100 KILOMETRES OF HAT CREEK PROJECT AREA
1960 - 1977

	Campsites					Picnic Tables				
Area	1960	1965	1970	1975	1977	1960	1965	1970	1975	1977
B-1	4	4	4	8	18	-	-	-	10	10
C-1	-	-	-	-	18	-	-	-	10	10
D-1	-	-	-	60	60	-	-	-	25	25
D-2	16	6	6	60	60	-	10	10	46	46
D-3	27	173	173	288	289	-	42	42	63	63
D-4	-	-	-	88	75	-	-	-	-	30
Ttl. B & C	4	4	4	8	36	-	-	-	20	20
Total D	43	179	179	496	484	-	52	52	134	164
Grand Total	47	183	183	504	520	-	52	52	154	184

Source: Ministry of the Provincial Secretary and Travel Industry, Directory of British Columbia Tourist Accommodation, Victoria, 1960 - 1977

such as Goldpan and Skihist Parks which serve the needs of the highway traveller, and destination sites which are usually located on lakes such as Loon Lake, Green Lake and Big Bear Lake. Growth in campsites at Provincial parks is shown in Figure B3-1.

According to data from the Directories, growth in facilities occurred strongly from 1960 to 1965 and from 1970 to 1975, approximately trebling in both periods. Area D-3 has consistently had over 50% of all campsites in the region in all years but a declining proportion of picnic tables.



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GROWTH IN CAMPSITES AND PICNIC TABLES IN PROVINCIAL PARKS 1960-1977

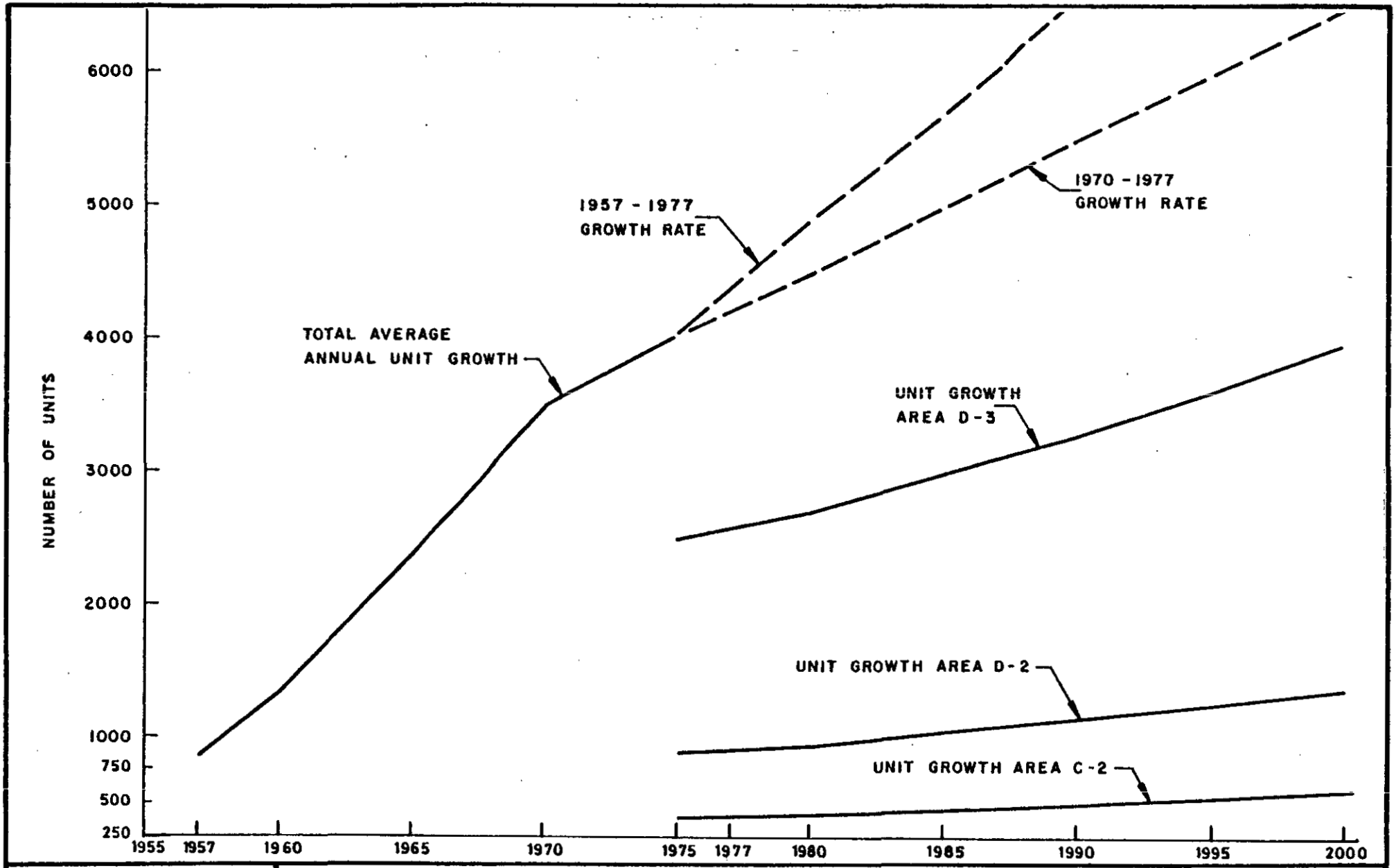
THE HAT CREEK PROJECT – Detailed Environmental Studies

FIGURE B3-1

B4.0 FUTURE PROSPECTS

Because the data on tourist accommodations may be underreported and thus somewhat inaccurate any projections of how many facilities and of what kind, assuming the Hat Creek project is not built may be subject to considerable error. Despite the limitations, the data for the past twenty years point to a continual upward growth. Increases in total accommodation units of all types have averaged about 170 per year between 1957 and 1977. The last seven years however have shown a decline in the rate of growth compared to preceding years. Taking the last seven years as an indicator of growth, annual increases would be slightly less than 100. An even slower rate of growth, averaging about 65 units per year, occurred between 1975 and 1977. This is too short a time period however to be indicative of longer range trends.

Considering the 1957-77 and the 1970-77 periods as two possible indicators of future growth, the more recent 1970-77 period may be a truer indicator of the future for two reasons. First the decline in the rate of growth between 1970 and 1975 continued between 1975 and 1977 thus the prior rate of more rapid growth was not resumed; second, between 1970 and 1977 there was virtually no change in the number of hotel, motel, lodge and auto court units indicating the possible saturation of those facilities. Within the longer term it is assumed that the Provincial Highway Department will undertake construction of a route between Hope and Merritt thus bypassing Cache Creek and the western portion of Kamloops Lake. This eventually would tend to stabilize or reduce transient units in Boston Bar, Spences Bridge, Cache Creek, Ashcroft and Savona. New units would likely be built at Merritt however and on the highway leading south from Kamloops. The net effect of these conditions would be to point toward a somewhat slower rate of growth for private facility accommodation units in future years than in the past. Assuming the lower rate of growth persists at approximately 100 units or less per year, there would be about 5000 units within the study area by 1985 and about 6500 by 2000. Projections of future growth are shown in Figure B4-1.



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PAST AND PROJECTED FUTURE GROWTH IN ACCOMMODATION UNITS WITHIN 100 KILOMETRES OF THE HAT CREEK PROJECT SITE

THE HAT CREEK PROJECT - Detailed Environmental Studies

FIGURE B4-1

Regarding the type of accommodation units, there is a definite trend toward trailer sites and campsites as the dominant type for the future. This trend in the private market is paralleled by the large growth in campsites at Provincial parks over the past decade. Undoubtedly there will continue to be activity in construction of motels, hotels and similar high per-unit investment cost types of accommodation, but the trend seems more and more to be toward recreationists investing in their own mobile accommodation in the form of campers, trailers and tents. As holiday periods lengthen and week-ends more frequently become three days long instead of two, the desirability of investing in mobile accommodations becomes more desirable when contrasted with expenditures for hotels, motels or lodges.

Growth in public campsites is more difficult to predict, dependent as it is on government policy and the appropriation of funds. It is quite possible however that recent trends will continue and that more facilities will be provided by both the Parks Branch and the Forest Service. However, investments in campgrounds represents a major capital and operating cost. A trend to dispersed, smaller types of minimum facility campsites as presently provided by the Forest Service may be more appropriate to serve the needs of the highly mobile, self sufficient type of accommodation favoured by recreationists today.

B4.1 Growth by Sub-Area

In future years, the distribution of future units could - and likely will - follow the patterns developed in past years. Areas D-2 and D-3 contain the Trans Canada Highway, the majority of existing hotel and motel units, and the bulk of the hunting and fishing camps which are found on the numerous lakes north and south of Kamloops. It is reasonable to assume these areas will continue to contain the majority of new units forecast. One the Coquihalla Highway is built as an alternate for Highway 1, the growth in Area C-2 would probably stabilize. Growth in all other areas is difficult

to predict using past trends, nor are there are proposals known for recreational developments that would create a definite rise in numbers for any particular area.

Looking closer to the Hat Creek site there are no accommodation developments proposed for the Hat Creek Valley itself nor are any likely to be, due to the strong tradition of agriculture in the area and a lack of significant water-based recreational resources. Recreational activities such as hunting and fishing will most certainly take place in the valley but they will not likely be sufficient in quantity to warrant the investment in the type of hunting and fishing camps found north and south of Kamloops. Forest Service facilities will likely be established in response to back-roads vehicle and camper travel but these will be very limited and far removed from the type of campsites provided by the Parks Branch.

Within Area C-1, because of very restricted access conditions, recreational activity growth at Pavilion Lake will be difficult. While changes in type of private accommodation have occurred at Pavilion Lake between 1949 and 1977 the level of accommodation has not increased and may even be less than in the past. Growth in cottaging at Pavilion Lake over the years is unknown but it is though to have been significant. The Marble Canyon Park campground at Crown Lake occupies a very limited site area. Expansion would likely be prohibitively expensive and is unlikely. In summary, no growth is predicted at either Marble Canyon or Pavilion Lake unless the Government acquires lands on Pavilion Lake to create a facility. Without the Hat Creek Project that prospect is considered to be of low - but not impossible - probability. With the population increases associated with the project the probability of such a development occurring would be much higher.

In the peripheral communities, growth in the C-2 area encompassing Cache Creek and the Bonaparte River Valley along Highway 97 could, because of Highway 1, be expected to increase at a rate of about 100 to 120 units every five years until such time as the Coquihala Highway between Hope and Merritt is

constructed. Assuming this occurs by 1990, Area C-2 could reach a total of 530 to 560 units after which the number of units would stabilize. Area C-3 would likely not experience any growth unless a major dude ranch or other recreation facility were to be built in the area. The eventuality of such an occurrence is unknown. No growth is expected in C-3 therefore, particularly as Cache Creek in Area C-2 has tended to receive the majority of accommodation units in past years along this portion of Highway 1.

Very slow growth - or no growth - is expected in Areas C-1, C-4, D-1 and D-4. All of these areas have shown fluctuating numbers of units in the past, due probably to underreporting and to fluctuations in the actual number of units. Conditions are not expected to change significantly in the future.

APPENDIX C

BRITISH COLUMBIA SUMMARY
CLI RECREATION CAPABILITY CLASSIFICATION

BRITISH COLUMBIA SUMMARY

CLI RECREATION CAPABILITY CLASSIFICATION

FEATURE	CLASS 1	CLASS 2	CLASS 3	CLASS 4	CLASS 5
A - Angling Land providing access to water with natural capability for harvesting and/or viewing of sport fish. The most common use of the A feature symbol is as a secondary feature in association with other shore features.	Excellent opportunities to view and angle anadromous fish runs.		Excellent fishing.	Good fishing.	Good fishing with access limitation or small boat hazard.
B - Beach Shoreland capable of supporting beach activities such as family bathing, swimming, sunbathing, paddling, camping, gathering and collecting, viewing, boating and water skiing.	Excellent warm water beach.	As primary feature, excellent warm water beach. As secondary feature, limited swimming use.	As primary feature, good swimming opportunities.	As primary feature, some swimming opportunities.	
C - Canoe Tripping Land fronting waterways with capability for canoe tripping; not "white water" sports. The C feature symbol is most often used as a secondary feature to viewing, angling, or camping.			Excellent canoeing.	Good canoeing.	Moderate canoeing.
E - Vegetation Land with significant vegetation.	Use of E feature symbol in classes 1, 2, or 3 indicates outstanding floristic communities.		Use of E feature symbol in lower classes indicates vegetative patterns varying in their attractiveness for extensive recreational use. See Landscape Description.		
F - Waterfalls & Rapids Classification is on the basis of water volume, height, setting.					Small, temporary falls
G - Glacier Area offering opportunity to view or explore a glacier.	Excellent view of glacier and potential for exploration and interpretation.		Good views of glacier but may lack support features and/or adequate development area.		Extensive icefield and glacier with occasional view sites.
H - Historic Site and archeological sites.				Unconfirmed or doubtful archeological sites.	
J - Gathering & Collecting Fruits, nuts, rocks, shells, minerals, fossils, shell fish, driftwood, artifacts	Usually a subordinate feature. Difficult to assess how much gathering and collecting a site can sustain before deterioration of the resource.				
K - Organized Camping Level, well drained sites with tree cover, normally occurring on shorelands or along streams and in association with other recreation features such as angling, viewing, beach or boating.	As a feature in classes 1, 2 and 3 the K symbol designates excellent camping capability. It is invariably associated with shorelands or rivers on glaciofluvial, deltaic or coarse textured alluvial landforms.			As primary feature, good camping capability on small lakes and streams. As secondary feature, part of unit with good camping capability.	Small sites suited to primitive camping and picnicking. Organized camping capability limited.
L - Landformd Hoodoos, canyons, volcanos, sand dunes, eskers, drumlins, mountain escarpments, (also see R - Rock Formations).	In classes 1, 2 and 3 L designates outstanding landform for viewing and interpretation.			For use of L feature in lower classes see Landscape Description.	
M - Small Surface Waters Frequent small water bodies or small continuous streams.	For use of M feature see Landscape Description				

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B - Beach Shoreland capable of supporting beach activities such as family bathing, swimming, sunbathing, paddling, camping, gathering and collecting, viewing, boating and water skiing.	Excellent warm water beach.	As primary feature, excellent warm water beach. As secondary feature, limited swimming use.	As primary feature, good swimming opportunities.	As primary feature, some swimming opportunities.	
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L - Landforms Hoodoos, canyons, volcanos, sand dunes, eskers, drumlins, mountain escarpments, (also see R - Rock Formations).	In classes 1, 2 and 3 L designates outstanding landform for viewing and interpretation.			For use of L feature in lower classes see Landscape Description.	
M - Small Surface Waters Frequent small water bodies or small continuous streams.	For use of M feature see Landscape Description				

APPENDIX D
PROJECT ALTERNATIVES

The basic purpose of the Hat Creek Project is the generation of electric energy by burning coal mined nearby the plant site. Supporting this specific function are coal mining, ash disposal, water supply, access and other related services and activities. In total, the function of the project is simple enough, but within many of the project's subcomponents options are available that could have different environmental impacts. Options are of two kinds: (1) locational, where shifting the site of a project component could create differences in impact; and (2) operational, where a choice of operational equipment may result in impact differences. Project alternatives investigated are listed in Table D-1.

An evaluation of the impacts of component alternatives on recreational activities are presented in Table D-2. Data presented in Table D-2 are largely judgmental and based in part on a review of other project reports, many of which were available only in draft form. Each alternative is ranked beginning with 1 as the least impact alternative. No attempt is made to distinguish between relative differences in impact as data to support such a finding is unavailable in most instances. Where available data and judgement point to a significant difference between ranks the letter "s" is used to indicate that a given alternative is thought to be substantially better than the next ranked alternative. Where no important differences in impact are thought to occur, an equal sign is entered in the appropriate box.

No attempt has been made to distinguish which recreation activities are most - or least - important. While it might be assumed that total activity days by recreation type could be an appropriate measure, or perhaps dollars expended per activity days, there is nothing to support the contention that an activity day in one recreational pursuit is worth more in satisfaction to one person than some other activity is to another person.

Project Component	Type of Alternative		
	Locational	Operational	Location & Operational
(1) Air Quality Control System		1,200' Stack Uncontrolled 1,200' Stack - MCS 1,200' Stack-FGD 800' Stack MCS	
(2) Cooling Towers		Two Natural Draft, Four Mechanical Draft, Four Natural Draft, Four Rectangular Mechanical Draft	
(3) Ash Disposal	Medicine Creek - Wet, Harry Lake - Wet		Harry Lake - Dry
(4) Water Supply	Thompson River Intake:	River Bottom Intake Infiltration Gallery Radial Well	Hat Creek Dam - Diversion
(5) Airstrip	Site A Site B Site C		
(6) Construction Camp	87,000 N, 25,000 E Power Plant Location		
(7) Offloading	BCR - Kelly Lake CNR - Ashcroft CPR - Spences Bridge		

*Source: Hat Creek Project Description Reports

	Project Alternatives	Recreation Activity: Fishing H C Valley	Fishing Thompson	Fishing Area C & D	Hunting Birds	Hunting Big Game	Sightseeing	Camping	Picnicking	Swimming Boating	Hiking
Air Quality	1200' stack Uncontrolled	4	4	4	4	4	4	4	4	4	4
	1200' stack MCS	2	2	2	2	2	3	3	3	3	2
	1200' stack FGD	ls	1	1	ls	ls	2	2	2	2	1
	800' stack MCS	3	3	3	3	3	1	1	1	1	3
Cooling Tower	2 Natural Draft	=	=	=	2	=	2	2	2	2	2
	4 Round Mechanical Draft	=	=	=	1	=	1	1	1	1	1
	4 Natural Draft	=	=	=	3	=	3	2	2	2	2
	4 Rectangular Mechanical Draft	=	=	=	1	=	1	1	1	1	1
Ash Disposal	Medicine Creek - wet	=	=	=	2	2	2	=	=	=	=
	Harry Lake - wet	=	=	=	1	1	1	=	=	=	=
	Harry Lake - dry	=	=	=	1	1	1	=	=	=	=
Water	Thompson River Intake	ls	2	=	1	1	2	=	=	=	=
	Hat Creek Dam - Division	2	1	=	2	2	1	=	=	=	=
Air-strip	Site A	=	=	=	=	=	=	=	=	=	=
	Site B	=	=	=	=	=	=	=	=	=	=
	Site C	=	=	=	=	=	=	=	=	=	=
C. Camp	N 87,000 E 25,000	=	=	=	=	=	=	=	=	=	=
	Power Plant	=	=	=	=	=	=	=	=	=	=
Offload	BCR Kelly Lk	=	1	1	=	=	3	3	3	2	3
	CNR Ashcroft	=	2	2	=	=	1	1	1	1	1
	CPR Spences Br	=	2	2	=	=	2	2	2	2	2

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IMPACT RANKS OF PROJECT ALTERNATIVES ON RECREATION ACTIVITIES

THE HAT CREEK PROJECT - Detailed Environmental Studies

TABLE D-2

Assumptions have been made concerning the breadth of impact. Most impacts occur in the Hat Creek Valley in areas A & B but others may spread to outlying areas (or actually take place in these areas), particularly Area C.

Air quality impacts are generally correlated with the level of flue gas treatment. Because of potential impacts on vegetation and water in the Hat Creek Valley, the highest treatment level is considered to be a significantly better alternative in effects on fishing and hunting than the next best alternate. Vegetation and water impacts which indirectly affect hunting and fishing are long term impacts in contrast to sightseeing, camping, picnicking and swimming which are temporary, short-term activities occuring predominantly northwest of the plant site in natural surroundings. For these short-term activities the possible visual intrusion of a higher stack within a scenic natural setting could have more impact than the dispersion of air contaminants, thus a lower stack would be probable. Hiking trails for the most part are distant from the project site, hence visual impacts are less important than vegetation and wildlife impacts. A 1200 foot stack with FGD is therefore ranked best for hiking.

Except for differences in height, the impact of alternate cooling tower systems on recreational activities is negligible. Higher towers have a greater visual impact and will possibly carry the plume to a higher elevation thus making the presence of the project more evident than would smaller or lower towers. These visual differences are reflected in the rankings assigned. No impacts are caused to fishing and hunting activities except for birds which may fly into tall cooling structures during migration thus indirectly affecting hunting capability.

The various ash disposal schemes make little difference to recreational activities except for hunting and sightseeing where the preferred option is to cluster facilities closer to the plant site thus concentrating impacts in fewer geographic areas.

Water options involve taking water from the Thompson or alternatively damming Hat Creek and using it as a water source. Impacts involving preemption of land and possible loss of the fishery could occur if Hat Creek is dammed. In contrast, taking water from the Thompson could affect the salmon fishery. These impacts are reflected in the ranks assigned.

No significant impact differences are attributable to the alternate airstrip sites or the location of the construction camp. The impact of alternate off-loading sites could affect fishing in the Thompson and scenic values in Marble Canyon. Trucking supplies and equipment from Kelly Lake to the project site would disturb the natural setting of the Pavilion Lake - Marble Canyon area.