

# FRASER RIVER ACTION PLAN



## Survey of Outdoor Recreation Experiences in the Fraser River Basin



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**SURVEY OF OUTDOOR  
RECREATION EXPERIENCES  
IN THE FRASER RIVER BASIN**

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The sole responsibility for this report's contents lies with its author, Crane Management Consultants Ltd. Environment Canada reviewed this report and approved it for publication. This approval does not signify that the contents reflect the views and policies of Environment Canada.

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## EXECUTIVE SUMMARY

### INTRODUCTION

This study provides information on the location, amount and value of 1993 water based recreation activity in the Fraser River Basin. It drains a quarter of British Columbia [Dorcey et al 1991] and stretches from the Rocky Mountain Trench, along the B.C.-Alberta border to the Lower Mainland of south-west B.C. and from Bulkley House in north-central B.C. to the Skagit River Valley, below the 49th parallel,



The information source is a random sample mail and phone survey of 1,980 adult British Columbians.

### THE SURVEY

In early 1994, pre-tested questionnaires were mailed to 4,902 randomly selected adult British Columbians. The potential respondents received a personally addressed covering letter, a questionnaire, a one page diary for recording the recreation activities and a map of the Fraser River Basin. The sample was disproportionately stratified by region to ensure that the sub-samples in the non-Lower Mainland portion of the Basin were large enough for statistical analysis. The response rate was 52 percent<sup>1</sup>, 1,980 questionnaires were completed.

The survey instrument included a wide spectrum of questions so that a detailed picture of outdoor recreation in the Fraser Basin could be developed. The questions covered the following topics.

#### **Demographics**

- ⊙ gender
- ⊙ age
- ⊙ education
- ⊙ heritage
- ⊙ income

#### **Residency**

- ⊙ place of residence

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<sup>1</sup> The rate was calculated by dividing the number of completed questionnaires by completed questionnaires plus the refused to answer figure. It indicates the rate of completions for those who could be contacted by phone. A portion of the mailed distribution could not be contacted by phone. The questionnaires had to be completed through a phone interview.

- ⊗ size of place of residence

**Economics**

- ⊗ economic value of a day of outdoor recreation

**Values**

- ⊗ environmental ethic

**Outdoor recreation**

- ⊗ type of activity
- ⊗ location of activity
- ⊗ duration of activity
- ⊗ amount of activity
- ⊗ setting of activity
- ⊗ season of activity
- ⊗ perceived level of recreation involvement

Respondents were grouped by residency into four regions, three in the Basin, Lower Mainland, Thompson, and Interior (other Fraser Basin) and one covering non-Basin B.C. and referred to as Other B.C.

In total, the respondents cited a great many locations for their recreation, approximately 500. To facilitate analysis, the locations were grouped by the Basin's 13 watersheds and the activities were reported as happening in them rather than at the sites listed in the diaries.

A list of 25 recreation activities guided respondents and they could cite additional activities as well.

The range of questions allows for an extensive analysis of results through cross-tabulation, factor analysis, and regression. For example, the primary activity data can be cross-tabulated against many other variables, including residency, location, respondent profile characteristics, location features, season, secondary activity, trip features and economic value.

**PARTICIPATION RESULTS**

Table ES1 highlights the distribution of respondents who participated in some outdoor recreation in the Fraser Basin in 1993 and those who did not do so. The participants are defined as those who noted at least one instance in their diaries of undertaking a recreation activity somewhere in the Basin. The non-participants are not necessarily non-recreationists; they did not recreate in the Fraser Basin in 1993 but may have done so elsewhere.

**Table ES-1: Distribution of Basin Recreation Participants and Non-Participants**

<b>Region of Residence</b>	<b>Fraser Recreation Participant<sup>2</sup></b>	<b>Non-Participants</b>	<b>Total Sample</b>
<b>Lower Mainland</b>	18.0(35)%	33.4(65.0)%	51.4(100.0)%
<b>Thompson</b>	2.0(52.1)	1.9(47.9)	3.9( 100.0)
<b>Interior</b>	2.4(51.8)	2.2(48.2)	4.6(100.0)
<b>Other BC</b>	4.2(10.4)	35.9(89.6)	40.1(100.0)
<b>Total</b>	26.6	73.4	100

Of the weighted total sample, 26.6 percent participated in at least one outdoor recreation activity in the Fraser Basin, while 73.4 percent did not do so. The main reason for the high proportion of non-participants is that only 35 percent of the Lower Mainland respondents stated that they undertook an activity in the Fraser Basin. The basin does not include many of the most popular recreation sites in the Lower Mainland, such as the Capilano, Cheakamus and Seymour River systems, Burrard Inlet and Indian Arm, and the many Greater Vancouver ocean beaches. Many, if not most, of the Basin non-participants probably undertook at least one recreation activity in these non-Basin sites, such as a walk along English Bay and the Stanley Park Seawall. Another reason for the low percentage of participants is that the focus is only on water-based recreation. The non-participants could have been involved in another type of recreation activity, such as alpine skiing, or did not perceive water as an important part of their Basin recreation experiences.

## **ECONOMIC VALUE RESULTS**

Since there are no competitive marketplaces for recreational services of environmental amenities, their net economic values must be estimated through indirect methods. Contingent Valuation Method (CVM) questions were used in the survey to elicit a willingness to pay (WTP) dollar amount for a day of recreation. Econometric analysis yielded an estimate of the mean amount that the sample would be willing to pay for a day of recreation in the Fraser River Basin.

Table ES2 contains the following estimates:

- ⊙ number of days of water-based outdoor recreation in the Fraser River Basin by all British Columbians in 1993
- ⊙ per day net economic value for broad recreation activities

<sup>2</sup>The figures in brackets are the proportions within the region. The unbracketed figures are the weighted proportions of the region within the adult population.



- ⊙ aggregate net economic value estimates; ie. the total number of days of recreation multiplied by the per day economic value figures.

<b>Table ES2: 1993 Aggregate WTP Value for Water-based Outdoor Recreation in the Fraser Basin By B.C. Residents</b>			
<b>Activity</b>	<b>Activity volume (days)</b>	<b>Mean per day WTP value</b>	<b>Aggregate WTP value (\$1993)</b>
<b>Boating</b>	2,080,157	\$33.45	\$69,581,251
<b>Fishing</b>	3,645,021	27.21	99,180,994
<b>Beach/Cabin</b>	3,820,519	27.89	106,554,020
<b>Hunting</b>	399,891	26.39	10,553,123
<b>Hiking</b>	3,274,536	15.35	50,264,127
<b>Nature Study</b>	140,507	17.19	2,415,315
<b>Biking/Driving</b>	1,383,582	24.48	33,870,087
<b>Other</b>	801,789	26.39 <sup>3</sup>	21,159,211
<b>Total</b>	<b>15,531,804</b>		<b>\$688,908,890</b>

## SUMMARY AND CONCLUSIONS

The random sample survey of 1,980 adult British Columbians yielded a large amount of data and subsequent statistical calculations has provided a detailed quantitative picture of recreation use in the Fraser Basin in 1993. Perhaps the most critical piece of information is that there was an estimated 15,531,804 days of water based outdoor recreation in the Basin and their economic value totals almost three-quarters of a billion dollars, at \$688,908,890. The per day WTP economic values lay within a \$15 to \$30 range, with hiking and nature study at the bottom end and boating, fishing and just relaxing at a cabin, campsite or the beach at the top end of the range. Because of its large population, the Lower Mainland consumes the most recreation days in the Basin by far, 68 percent of the total.

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<sup>3</sup>Because the Other category includes a diversity of activities, its WTP value was not estimated; the All activities mean is used as a proxy.

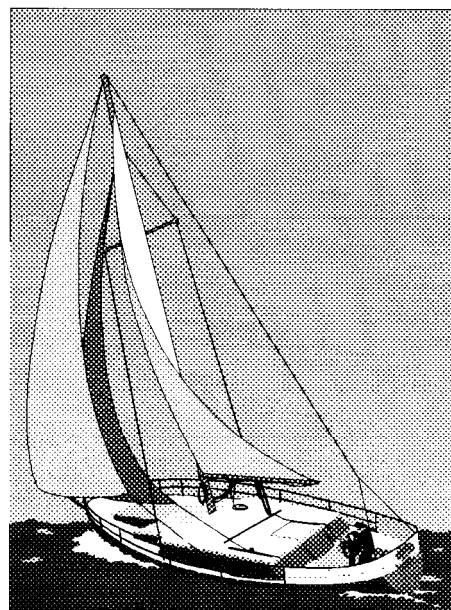
The information from this study could be incorporated into several types of initiatives.

- ⊙ education and communication
- ⊙ planning
- ⊙ benefit-cost analysis
- ⊙ negotiation and litigation for compensation and mitigation claims over resource damage



## 1. INTRODUCTION

The Fraser River Basin (“the Basin”) drains a quarter of British Columbia [Dorcey et al 1991]. A map of the Basin appears on the opposite page. The Basin stretches from the Rocky Mountain Trench, along the B.C.-Alberta border to the Lower Mainland of south-west B.C. and from Bulkley House in north-central B.C. to the Skagit River Valley, below the 49th parallel. Named after a European explorer, the Fraser Basin has been occupied for thousands of years by Aboriginal peoples. In the mid 19th century, gold strikes on its Thompson tributary and at Barkerville initiated a change in settlement and economic activity which persists today. The water resource of the Basin has assumed a fundamental role, providing a water highway for the forest industry, a major manufacturing input for the pulp and paper and mining industries, a habitat for the commercial and recreational fisheries, a water source for farms and ranches and the basis for a wide variety of recreation activities.



The Basin does not have legislated borders as does a political jurisdiction; Westwater Research Institute (Westwater) has defined its borders from an ecological perspective, ie. water shed boundaries, and others have adopted its practice<sup>4</sup>.

A key feature of the Westwater definition is its inclusion of several major tributary river watersheds. The Fraser’s drainage catchment includes: the Nechako and Stuart sub-basins in the north; the West Road, Quesnel and Chilcotin sub-basins in the mid-region, the Thompson Rivers from the east; and, in the south, the Harrison-Lillooet sub-basins and the Chilliwack, Pitt, Coquitlam and Sumas Rivers.

The intent of this study is to provide primary research on the outdoor recreation use of the Basin’s water resources. Through the efforts of a few organizations, such as Westwater, a information on the Basin’s water resources is growing. The creation of the Fraser River Basin Management Program in 1993 undoubtedly accelerated this process. There is a knowledge gap on recreation use of the Basin’s water resources. The better, recent recreation surveys do not focus on the Basin itself. The well done national fishing survey collects data on a Ministry of Environment administrative unit basis rather than by watershed. What is available tends to focus on the Fraser River’s estuary and is older [GVRD 1977]. Westwater’s excellent “Water in Sustainable Development: Exploring Our Common Future in the Fraser River Basin” examined the whole basin and brought

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<sup>4</sup> For example, the recently created, multi-agency Fraser River Basin Management Board and DFO use the Westwater boundaries for its planning units.

together some recreational activity data, along with much other secondary information, but its focus was not primary research.

The absence of recreation research directed at the Basin is understandable but unfortunate. The lack arises for several reasons. One is that private recreation providers are relatively small and not organized into strong trade associations. A second is that recreationists are important providers of recreation opportunities (by combining different items into experiences), but they are organized into small, underfunded activity specific groups. Another reason is that the lack of private ownership of environmental amenities leaves few incentives for individuals or companies to develop data; it is difficult to award private ownership for environmental amenities, including water, which have non-rival and/or non-exclusive<sup>5</sup> characteristics. The responsibility has largely fallen to governments to undertake or sponsor primary research in order to provide an information base for improved management. However, special interest organizations can influence government spending priorities and the relatively weak recreation and tourism associations means that other priorities often garner more attention and funding from cash strapped government agencies.

Persons can derive many kinds of economic goods or services from a stream, river or lake in the Fraser River Basin. The figure on the opposite page illustrates this breadth. The obvious items are water for irrigation, industrial plants, and household use. Often a price, albeit not a competitive market price, is attached to them. Many widely enjoyed recreational activities, such as swimming, fishing and boating, depend on water. Natural resources can be enjoyed off-site, or through non-use if you will, as well as through on-site use, such as for outdoor recreation. The diverse, non-use benefits of natural resources are often collectively referred to as preservation benefits. Another term is intrinsic benefits. Perhaps the most widely understood preservation benefit is the intellectual or emotional enjoyment of knowing that a certain environmental amenity exists. People can come to know, and therefore value, natural resources without leaving home through books, films, and even personal conversations.

Basin water resources are limited, in terms of quantity and quality. To attempt to ensure that the most benefit is generated from their use, their stewards, the Federal, B.C. and municipal governments, must often ration their use. With so many uses and the rationing requirement, comes the potential for conflicts, high potential when the water is in well-populated areas of strong and competing demands.

The stewards of the resource should take into account several perspectives when planning for Basin water resources. The economic efficiency perspective is considered in this study. There are others, such as jobs, social values, First Nations, and ecological impacts, and they are sometimes brought together in a multi-objectives or multiple accounts

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<sup>5</sup> non-rival - one person's consumption does not diminish another's consumption

non-exclusive - not feasible to exclude anyone else from consuming a good, eg. viewing a landscape

analysis [BC Government 1993]. The information herein could be incorporated into a multiple accounts analysis or a benefit-cost analysis.

This study examines only the recreational use of Fraser River Basin water. Two primary pieces of information are produced, estimates of recreational activity (annual number of days) and net economic values (\$ per day per activity).

There are a large number of stakeholders for the Basin's water resources including governments of all levels, First Nations, fishermen, industries which dot the river banks, and interest groups representing environmentalists and recreationists. Their understanding of the system's degradation, especially in the Fraser's lower reaches, has led to some programs to reverse the resource's slide. The threat of flooding spurred the earliest government initiatives in the late 1800s to manage the river system. Drainage and dyking concerns led to the first basin-wide planning initiative in 1948, the Dominion-Provincial Board, but it seemingly foundered on the complexity and size of the Basin [Dorcey 1991]. Subsequently there have been various planning efforts but none at the basin-wide level until the 1993 establishment of the Fraser River Basin Management Program, a multi-organizational body having a mandate to improve coordination of planning and regulatory efforts in the Basin and to develop and disseminate information on it. Prior to its creation, the highest profile initiatives were the Fraser River Estuary Study, which proceeded under a Federal-B.C. Government agreement between 1977 and 1982 and the Fraser River Estuary Management Program, started in 1985. Management of the large watershed's resources falls to a myriad of agencies [Dorcey 1991].

Through its ongoing national and B.C. programs, the Federal Government sponsors a large number of initiatives which affect the Basin and in addition there is a five year research program on the Fraser Basin under the Green Plan. As part of the research initiative, this study is a scientific sampling of British Columbians' use of the Basin's water resources for recreation purposes.

A questionnaire was mailed to 4,902 B.C. residents. The sample was stratified by three regions.

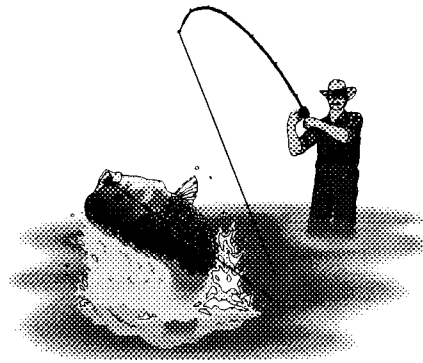
- ⊙ Lower Mainland - 2,356 (48%) - Greater Vancouver; the Fraser Valley; Hope area; Fraser Canyon up to Boston Bar; and the Whistler area
- ⊙ Fraser River Basin Interior - 1,479 (30%) - Fraser Canyon above Boston Bar; the Thompson region; the Prince George area including the Robson Valley; and the Bulkley-Nechako region
- ⊙ Other B.C. - 1,067 (22%) - the rest of the province

The distribution of completed questionnaires is very close to the target distribution as reflected in the initial mailing. Neither the regional breakdown of the returns nor the breakdown of the distributed questionnaires reflects the actual population of the three regions. This result was purposefully brought about because the regional sub-samples had to be sufficiently large for statistical analysis.

The response rate<sup>6</sup> of 52 percent is in the same range as several other CVM surveys on environment/recreation subjects [Ministries of Forests and Environment 1994; Ministry of Forests 1991; Hagen et al 1992; Mitchell and Carson 1989].

Appendix I contains a detailed explanation of the research methodology.

This study is divided into five chapters. The Introduction highlighted the study's focus and provided some background to it. Chapter two lays out a profile of the respondents from the survey results. It includes a comparison of the general population to the survey population. The next chapter reports on the respondents' recreational activities by type, location, duration, season and Recreational Opportunity Spectrum (ROS) setting. It includes an estimate of total days of recreation in the Basin by all BCers. The fourth chapter provides net economic value or consumer surplus estimates for Basin recreational experiences. The final chapter is a summary and contains suggestions for using the study's information. There are three appendices which describe the survey methodology, the calculation of the net economic value estimates and the survey materials.



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<sup>6</sup> The response rate is calculated by dividing the number of completed, analyzable questionnaires by the completed questionnaires plus the refused to answer figure. It indicates the rate of completions for those who could be contacted by phone. A portion of the mailed distribution could not be contacted by phone. The questionnaires had to be completed through a phone interview..

## 2. SURVEY SAMPLE CHARACTERISTICS

The survey instrument posed several background questions but its key element was a diary. Respondents were asked to recall their 1993 outdoor recreation activities, which occurred in close proximity to a Fraser Basin water body, and record them in a supplied diary. They were asked to give locations, activity types (by choosing a number from our supplied list), Recreational Opportunity Spectrum settings, number of trips for the activity at the location, and the average duration of the trips. They weren't asked for dates but were asked to supply the seasons when their activities occurred.



The respondents provided economic value estimates by answering a dichotomous choice question. The dichotomous choice question has become the popular approach to obtaining net economic values in CVM surveys because it confronts respondents with a simple yes or no question thereby avoiding the complexities of other question formats [Freeman 1993]. A series of per day dollar values were randomly printed in a column of the diaries. They circled yes or no as to whether or not they would pay the stated amount, over and above their actual per day expenditures, for the activity at the stated location. A second question elicited whether or not they attached any economic value if they answered no to the stated amount or if they answered yes, what was their upper limit.

The survey instrument appears in Appendix III. It contains questions on the following items.

### **Demographics**

- ⊙ gender
- ⊙ age
- ⊙ education
- ⊙ heritage
- ⊙ income

### **Geographic questions**

- ⊙ place of residence
- ⊙ size of place of residence
- ⊙ location of outdoor recreation activity

### **Economic questions**

- ⊙ economic value of a day of outdoor recreation

### **Value questions**

- ⊙ environmental ethic

### **Recreation activity**

- ⊙ type of activity



- ⊙ number of trips
- ⊙ duration of trips
- ⊙ setting of activity
- ⊙ season of activity
- ⊙ general recreation involvement

The range of questions makes possible the composition of a detailed picture of outdoor recreation activity in the Fraser River Basin. Throughout the report, respondents are grouped in different ways to best illustrate the survey results.

## **2.1. GENDER**

Table 2-1 shows the gender breakdown for the total survey sample.

<b>Table 2-1: Gender Distribution of Survey Sample and BC Population</b>		
<b>Gender</b>	<b>Sample</b>	<b>BC Population</b>
<b>Male</b>	54.5%	49.5%
<b>Female</b>	45.4	50.5
<b>No Answer</b>	0.2	
<b>Total</b>	100.0%	100.0%

The total sample has a similar male/female ratio as the actual B.C. population. The basin recreationist grouping had a higher proportion of males (65 percent) as expected because of the nature of the outdoor recreation sampled. Since water is involved, male oriented activities, such as fishing and boating, are included whereas some activities, such as aerobics and tennis, which have high female participation rates are not included. In previous outdoor recreation surveys male participation rates have been much higher than female rates [BC Parks 1991 (a); BC Ministry of Forests 1991].

## **2.2. AGE**

Only adult British Columbians defined as 18 years of age and over were included in the sample . Younger British Columbians extensively participate in outdoor recreation but the questionnaire included an economic value question that under 18s may have had difficulty answering so they were not included. The study results should be interpreted as applying to adults only . The estimated recreation activity in the Basin would be higher if younger residents were sampled. The age answers were divided into three representative categories.

The total sample has a similar age breakdown as the province's actual distribution. The Basin participants, Basin non-participants and total sample groupings have dissimilar proportions across the regions The Other BC and Lower Mainland regions have a similar

distribution as for the total sample. The Interior region shows a much younger distribution and the Thompson, a much older distribution for their Basin participant groupings. The differences arise from the type of activities which are popular in the regions. For example, fishing which has an older age distribution has a large share of Thompson recreation activities.

<b>Table 2-2: Age Distribution of Survey Sample and BC Population<sup>7</sup></b>		
<b>Age</b>	<b>Sample</b>	<b>BC Population</b>
<b>18 - 34</b>	<b>33.0%</b>	<b>34.9%</b>
<b>35 - 54</b>	<b>43.1</b>	<b>36.3</b>
<b>55+</b>	<b>22.9</b>	<b>28.7</b>
<b>No Answer</b>	<b>1.0</b>	
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>

### 2.3. ETHNIC HERITAGE

Table 2-3 compares the sample's ethnic heritage with that of the province.

<b>Table 2-3: Ethnic Distribution of Survey Sample and BC Population</b>		
<b>Ethnic Origin</b>	<b>Sample</b>	<b>BC Population<sup>8</sup></b>
<b>Asian</b>	<b>5.3%</b>	<b>9.3%<sup>9</sup></b>
<b>Black</b>	<b>0.4</b>	<b>n/a</b>
<b>East Indian</b>	<b>1.8</b>	<b>4.6</b>
<b>Aboriginal</b>	<b>2.1</b>	<b>3.8</b>
<b>Caucasian</b>	<b>86.1</b>	<b>64.8</b>
<b>Other</b>	<b>3.3</b>	<b>17.5</b>
<b>No Answer</b>	<b>1.0</b>	
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>

The questionnaire did not have as detailed a breakdown of ethnic heritage as Statistics Canada develops. As to be expected, the sample slightly under-represents Asian and East Indian BCers. These groups are more likely to have language difficulties in responding to the mailed questionnaire because of the larger portions of recent immigrants in their numbers.

<sup>7</sup> All BC population information is based on 1991 Census data unless otherwise noted.

<sup>8</sup> Includes population with single ethnic origin only.

<sup>9</sup> Includes Chinese only.

## 2.4. OCCUPATION

There was a slight over-representation of professionals and tradespersons and some under-representation of salespersons and clerks in the sample. Otherwise the sample provides a good correlation with the actual provincial distribution of occupations.

<b>Table 2-4: Occupation Distribution of Survey Sample and BC Population</b>		
<b>Occupation</b>	<b>Sample</b>	<b>BC Population<sup>10</sup></b>
<b>Professional<sup>11</sup></b>	<b>13.7%</b>	<b>9.9%</b>
<b>Trades</b>	<b>7.9</b>	<b>4.6</b>
<b>Sales</b>	<b>3.1</b>	<b>6.8</b>
<b>Clerk</b>	<b>7.6</b>	<b>12.0</b>
<b>Labourer<sup>12</sup></b>	<b>10.9</b>	<b>12.7</b>
<b>Farmer</b>	<b>0.2</b>	<b>1.7</b>
<b>Manager</b>	<b>8.2</b>	<b>6.7</b>
<b>Other</b>	<b>14.7</b>	<b>12.1</b>
<b>Occupations</b>		
<b>Unemployed</b>	<b>1.9</b>	
<b>Non-Labour Force</b>		
<b>Homemaker</b>	<b>9.1</b>	
<b>Retired</b>	<b>16.0</b>	
<b>Student</b>	<b>6.1</b>	
<b>Subtotal</b>	<b>31.2</b>	<b>33.5</b>
<b>No Answer</b>	<b>0.4</b>	
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>

## 2.5. EDUCATION

As expected with a mail questionnaire, where literacy skills assume some importance, the sample shows a markedly different education pattern than do the Census figures. The survey sample's portion with less than high school graduation is smaller because the

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<sup>10</sup> Includes portion of population that is 15 years or older.

<sup>11</sup> Includes Census occupations in: natural sciences, engineering and math; social sciences and related fields; teaching and related occupations; and medicine and health.

<sup>12</sup> Includes Census occupations in: fishing, trapping and related occupations; forestry and logging; mining, quarrying and oil and gas fields; processing; machining and related occupations; product fabricating, assembling and repair; transport equipment operating; material handling and related occupations; other crafts and equipment operating occupations.

Census includes 15 to 17 year olds in its first age cohort and the mail questionnaire requires high school reading skills.

<b>Table 2-5: Education Distribution of Survey Respondents and Adult BC Population</b>		
<b>Education</b>	<b>Sample</b>	<b>BC Population<sup>13</sup></b>
< High School	15.1%	34.1%
High School	27.7	13.8
Some Post Secondary	27.2	19.3
Diploma/Degree	29.4	32.8
No Answer	0.5	
<b>Total</b>	100.0%	100.0%

## 2.6. HOUSEHOLD INCOME

Table 2-6 indicates that the sample's household income distribution has a close correspondence with the provincial one. A small portion, 10.3 percent, of the sample opted not to answer this sensitive question.

<b>Table 2-6: Household Income Distribution of Survey Sample and BC Population</b>		
<b>Household Income</b>	<b>Sample</b>	<b>BC Population</b>
< \$30,000	27.3%	36.8%
\$30 - 60,000	37.7	36.2
> \$60,000	24.7	27.0
No Answer	10.3	
<b>Total</b>	100.0%	100.0%

## 2.7. COMMUNITY SIZE

The sample exhibited an under representation from residents of very small communities, less than 2,500. This result is to be expected in a mail survey. The survey's source of names and addresses is Dominion Directory, the phone book publisher. It has incomplete addresses for rural areas. Often a postal code will enable the mail to be delivered in a rural area but in some cases there may not be enough information in the phone directory to link a name with a postal code. In a large survey with automatic sorting, the lack of a postal code eliminates delivering a letter to an address with just a place name. At the other end

<sup>13</sup> Includes portion of population that is 15 years or older.

of the community size scale, there is a good correlation between the sample and the actual population.

<b>Table 2-7: Community Size Distribution for Survey Sample and BC Population</b>		
<b>Community Size</b>	<b>Sample</b>	<b>BC Population</b>
Rural or < 2,500	2.0%	13.7%
2,500 - 25,000	17.4	18.0
25,000 - 100,000	45.3	36.9
100,000 - 250,000	12.8	8.9
> 250,000	22.4	22.5
No Answer	0.3	
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>

## 2.8. ENVIRONMENTAL PROTECTION OPINIONS

In addition to background questions on age, etc., the survey instrument included a couple of questions to help further characterize the sample. One question solicited a general opinion on environmental protection and another obtained perceptions on the general level of personal involvement in recreation<sup>14</sup>.

Some 74.2 percent of respondents felt that protection of the environment was very important and 24.3 percent felt that this was somewhat important. Table 2-8 shows that those who recreated on the Fraser River drainage were slightly more in favour of environmental protection with 78.1 percent finding environmental protection very important and only 21.5 percent finding it only somewhat important.

<b>Table 2-8: Distribution of Response to Importance of Environmental Protection Question</b>			
<b>Response</b>	<b>Fraser Recreationist</b>	<b>Non-Fraser Recreationist</b>	<b>Weighted Average</b>
<b>Very Important</b>	78.1%	72.3%	74.2%
<b>Somewhat Important</b>	21.5	25.9	24.3
<b>Not Very Important</b>	0.3	1.3	1.1
<b>Not at All Important</b>	0.0	0.3	0.2
<b>No Answer</b>	0.1	0.2	0.2
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

<sup>14</sup> This study includes distributions, cross-tabulations and logistic regressions. It does not include factor analysis. The respondents in this study are analyzed by their residency or other individual characteristics. Through factor analysis, the responses from the background questions and these two questions can be combined to develop respondent groups characterized by attitudes and demographics. The recreation activity could then be analyzed through these new groupings.

Table 2-9 illustrates the respondents' feelings toward environmental protection by region of residence. Thompson residents appear to be the most concerned with 77.6 percent stating that protection is very important. Lower Mainland residents appear to be somewhat less concerned, at 72.8 percent, but not significantly different. The Interior and Other BC residents are very close to the overall average.

<b>Table 2-9: Distribution of Response to Importance of Environmental Protection Question by Region</b>					
<b>Response</b>	<b>Lower Mainland</b>	<b>Thompson</b>	<b>Interior</b>	<b>Other B.C.</b>	<b>Weighted Average</b>
Very Important	72.8%	77.6%	74.2%	74.1%	74.2%
Somewhat Important	25.4	22.2	23.5	24.6	24.3
Not Very Important	1.4	0.3	1.4	0.8	1.1
Not at All Important	0.1	0.0	0.3	0.4	0.2
No Answer	0.3	0.0	0.6	0.0	0.2
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

## 2.9. RECREATION PARTICIPATION

The respondents who did not become involved in water based outdoor recreation in the Basin may have done so at some other location in 1993. They are not necessarily non-recreationists. The following question was asked to divide the sample by recreation participation into a few distinct levels.

In general, how would you rank yourself in terms of the amount of outdoor recreation that you engage in?

There were four possible answers:

- ⊙ very active
- ⊙ somewhat active
- ⊙ not very active
- ⊙ not active at all

If the first two answers define the recreationists and the last two define the non-recreationists then the total sample breaks down along the following lines.

- ⊙ recreationists 72.8%
- ⊙ non-recreationists 27.2%

As to be expected, there were noticeable differences between the persons who undertook recreation in the Basin and those who did not. The Fraser recreationist includes only

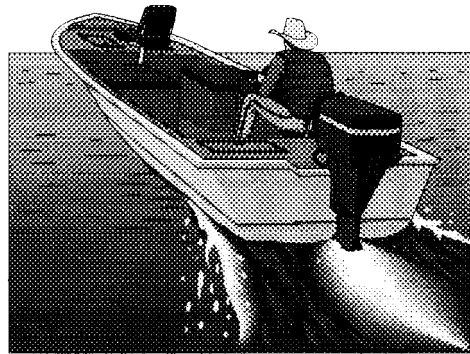
those who undertook recreation activity whereas the non-participant group included persons who recreated elsewhere than the Basin and those who don't see themselves as participating in outdoor recreation. Table 2-10 shows the percentages of participants and non-participants for the different groupings.

<b>Table 2-10: Distribution of Outdoor Recreation Involvement By Basin Use</b>			
<b>Response</b>	<b>Fraser Participant</b>	<b>Non-Participant</b>	<b>Weighted Average</b>
<b>Very Active</b>	29.3%	17.9%	21.9%
<b>Somewhat Active</b>	56.2	48.0	50.9
<b>Not Very Active</b>	13.8	25.6	21.5
<b>Not at All Active</b>	0.6	8.4	5.7
<b>No Answer</b>	0.1	0.1	0.1
<b>Total</b>	100.0%	100.0%	100.0%

Table 2-11 shows the level of outdoor activity by region of residence. The sharpest difference comes up between the Lower Mainland and all the other regions in the Very Active and Not Very Active categories between. There are proportionately fewer Lower Mainland residents in the Very Active and more in the Not Very Active categories. This difference may arise because of the different ethnic make-up between the Lower Mainland and the rest of the province. A recent BC Parks [1991 (b)] survey revealed that BCers of Asian and East Indian heritage participated less in outdoor recreation than the general population. This difference may be a temporary phenomena as recent immigrants become more interested in the outdoor recreation possibilities of B.C.



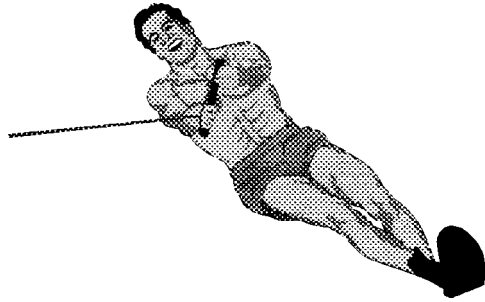
<b>Table 2-11: Distribution of Response to Level of Outdoor Activity Question by Region</b>					
<b>Response</b>	<b>Lower Mainland</b>	<b>Thompson</b>	<b>Interior</b>	<b>Other B.C.</b>	<b>Weighted Average</b>
<b>Very Active</b>	17.5%	22.4%	24.9%	26.3%	21.9%
<b>Somewhat Active</b>	49.8	54.6	50.7	49.9	50.9
<b>Not Very Active</b>	24.9	19.1	19.9	18.8	21.5
<b>Not at All Active</b>	7.6	3.9	4.2	5.0	5.7
<b>No Answer</b>	0.1	0.0	0.3	0.0	0.1
<b>Total</b>	100.0%	100.0%	100.0%	100.0%	100.0%



### 3. OUTDOOR RECREATION RESULTS

#### 3.1. INTRODUCTION

Outdoor recreation is a term which doesn't have an official definition. A U.S. Government task force defined the experience in very broad terms, "...outdoor recreation is a leisure moment outdoors, freely enjoyed.". The Dictionary of Concepts in Recreation and Leisure defines it as "a pleasurable activity which may be relatively sedentary, largely pursued for intrinsic motivation during leisure" [Smith 1990]. It mentions that there is no widely held definition. There are a variety of classification schemes and several separate out water activities. An early example in the 1960s adopted four clusters: active recreation, passive recreation, backwoods recreation and water recreation. Another by Parks Canada classified 27 activities into four groups: social, recreational, educational and water-related [Smith 1990].



This study adopts a conventional activity-based approach. There are many recreational activities which can be undertaken in the outdoors. The focus in this study are the activities in the Basin locations where rivers, lakes or streams have important roles. The survey respondents were asked to document their Basin recreation activities from the following list <sup>15</sup>.

#### Boating

1. canoeing
2. water-skiing
3. kayaking
4. motor-boat cruising
5. river rafting
6. sailing
7. windsurfing

#### Fishing

8. fishing for salmon
9. fishing for steelhead
10. fishing for other species, such as trout

#### Beach / Cabin

11. swimming / sunbathing
12. picnicking beside a river, lake or creek

<sup>15</sup> No complaints were received about the list's comprehensiveness.

- 13. camping beside a river, lake or creek
- 14. relaxing at a rented or owned cabin or at a waterside hotel/motel

**Hunting**

- 15. waterfowl hunting
- 16. big game hunting (deer, bear, moose, etc.)
- 17. small game and bird hunting

**Hiking / Viewing**

- 18. hiking / backpacking / walking
- 19. wildlife viewing / bird watching
- 20. horseback riding

**Biking / Driving**

- 21. mountain biking on dirt or mountain trails
- 22. motor biking on dirt or mountain trails
- 23. driving a 4 wheel drive on dirt or mountain trails
- 24. highway driving for pleasure
  
- 25. Other \_\_\_\_\_

The respondents first identified a site then the primary activity. It was left to the respondent to decide whether or not water was an important aspect of their recreation at the site.

The questionnaire's depth offers many different ways to present its results. Questions can be cross-tabulated against each other, factor analysis combining several answers is possible and even a Geographic Information System (GIS) layer is a possibility because the recreation activity is reported by location<sup>16</sup>.

The following data is presented and discussed in this chapter.

- ⊗ Fraser Basin recreation participants versus non-participants
- ⊗ trip data by activity
- ⊗ trip data by activity and residence
- ⊗ estimate of activity for B.C. population and regions
- ⊗ activity by location
- ⊗ activity by location and residence
- ⊗ activity by environmental setting
- ⊗ primary activity by secondary activity
- ⊗ activity by age

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<sup>16</sup> The pivotal information is presented in this report. More analysis at this point might detract from the report's primary objective of providing an overview of outdoor recreation activity. This report shouldn't be interpreted as exhaustive. More cross-tabulations, statistical analysis of differences, factor analysis and a GIS layer could be undertaken after this report is distributed and reviewed.

© activity by household income

### 3.2. FRASER RECREATION PARTICIPANTS VERSUS NON-PARTICIPANTS

Table 3-1 highlights the distribution of respondents who participated in some outdoor recreation in the Fraser Basin in 1993 and those who did not do so. The participants are defined as those who noted at least one instance in their diaries of undertaking a recreation activity somewhere in the Basin. The non-participants are not necessarily non-recreationists; they may have recreated elsewhere but not in the Basin in 1993.

<b>Table 3-1: Distribution of Basin Recreation Participants and Non-Participants</b>			
<b>Region of Residence</b>	<b>Fraser Recreation Participant<sup>17</sup></b>	<b>Non-Participants</b>	<b>Total Sample</b>
<b>Lower Mainland</b>	18.0(35)%	33.4(65.0)%	51.4(100.0)%
<b>Thompson</b>	2.0(52.1)	1.9(47.9)	3.9(100.0)
<b>Interior</b>	2.4(51.8)	2.2(48.2)	4.6(100.0)
<b>Other BC</b>	4.2(10.4)	35.9(89.6)	40.1(100.0)
<b>Total</b>	26.6	73.4	100

Of the weighted total sample, 26.6 percent participated in at least one outdoor recreation activity in the Fraser Basin and fully 73.4 percent did not do so. The main reason for the high proportion of non-participants is that only 35 percent of the Lower Mainland respondents stated that they undertook an activity in the Fraser Basin. The Basin does not include many of the most popular recreation sites in the Lower Mainland, such as the Capilano, Cheakamus and Seymour River systems, Burrard Inlet and Indian Arm, and the many Greater Vancouver ocean beaches. Many, if not most of the Basin non-participants probably undertook at least one recreation activity in these non-Basin sites, such as a walk along English Bay and the Stanley Park Seawall. Another reason for the low percentage of participants is that the focus is only on water-based recreation. The non-participants could have been involved in another type of recreation activity, such as skiing, or did not perceive water as an important part of their Basin recreation.

Only ten percent of respondents who resided outside of the Basin got involved in outdoor recreation in the Basin. Respondents from the much less populous Thompson and Interior regions, those who are surrounded by the Basin, had an approximate 50/50 split between Basin participants and non-participants.

<sup>17</sup> The figures in brackets are the proportions within the region. The unbracketed figures are the weighted proportions of the region within the adult population.

It should be noted that this study does not try to probe participation in all outdoor recreation so its results can only be compared to parts of other studies of recreation activity of B.C. residents.

The distribution of participants between regions was expected. The Lower Mainland has approximately half of the province's adult population whereas the rest of the Basin has only about 8.5 percent.

The survey results were used to develop an estimate of 1993 Fraser Basin recreation participants by region of residence. They are as follows.

- ⊙ Lower Mainland - 484,716
- ⊙ Thompson - 54,849
- ⊙ Interior - 63,535
- ⊙ Other BC - 112,419
- ⊙ Total - 715,519

The Lower Mainland share of the total is high, 68 percent, by virtue of its much larger population base and to a lesser extent, its significant share of the sample's Basin users. Although the Other BC region has a larger population, ten times more than either the Thompson or Interior regions, its number of Basin users is somewhat low because the sample had a much lower proportion of Basin users from it.

The question of whether the non-participants are recreationists is answered through the responses to the question on general recreation involvement. Table 3-2 shows the distribution by region for this question.

<b>Table 3-2: Distribution of Recreation Involvement By Region</b>					
<b>Response</b>	<b>Lower Mainland</b>	<b>Thompson</b>	<b>Interior</b>	<b>Other B.C.</b>	<b>BC-wide</b>
<b>Basin Recreation Participants</b>					
<b>Very Important/ Somewhat Important</b>	<b>84%</b>	<b>87%</b>	<b>87%</b>	<b>86%</b>	<b>86%</b>
<b>Not Very Important/ Not At All Important</b>	<b>16</b>	<b>13</b>	<b>13</b>	<b>14</b>	<b>14</b>
<b>Basin Recreation Non-Participants</b>					
<b>Very Important/ Somewhat Important</b>	<b>58%</b>	<b>66%</b>	<b>64%</b>	<b>75%</b>	<b>66</b>

<b>Not Very Important/ Not At All Important</b>	42	34	36	25	34
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Those who participated in Fraser Basin recreation uniformly view themselves as being fairly active. Although somewhat lower, the proportion seeing themselves as fairly active in recreation remains high for the Basin non-participants, the province-wide figure is 66 percent. The Lower Mainland respondents indicated the lowest level of recreation involvement and is accounted for by the slightly higher age distribution of this part of the sample and the low recreation involvement of the East Indian and Asian respondents.

### 3.3. TRIP DATA BY ACTIVITY

Table 3-3 contains the following information for each type of recreation activity<sup>18</sup>.

- ⊙ average annual number of trips
- ⊙ average trip duration
- ⊙ average annual total days
- ⊙ total days for sampled Basin recreationists<sup>19</sup>
- ⊙ percentage of total days

The following are some of the distinct differences between activities for the trip characteristics.

- ⊙ Hiking/backpacking had the highest average number of annual trips in 1993 at 14.7<sup>20</sup>. Following this were mountain biking, motor biking and water-skiing at 10.1, 9.7 and 9.4 trips in 1993, respectively.
- ⊙ Big game hunting and camping trips had the longest duration at an average of 3.6 days. Staying in a cabin or motel lasted an average 3.5 days and motor boating trips averaged 2.6 days.
- ⊙ The total trip days for the year was highest for relaxing in a cabin or motel at an average of 18.9 days. This was followed by motor biking, windsurfing and water-skiing with average total trip days of 17.3, 15.5 and 13.9 days, respectively.
- ⊙ When the total number of sample participants is accounted for in each activity *other* fishing came out on top as having the most active days in the Fraser River drainage at, 17.8 percent of total active days. Hiking/backpacking followed closely behind at 16.0 percent, followed by staying in a cabin or motel at 10.9 percent and camping at 8.8 percent.

<sup>18</sup> Respondents recorded a primary activity and secondary activities in their diaries. The information in this section pertains to the primary activity.

<sup>19</sup> The total days figure applies only to the sample. An estimate of total days for the B.C. population is developed in a later section of this report.

<sup>20</sup> This figure applies to those who reported at least one hiking trip, not to the full sample of recreationists.

**Table 3-3: Primary Activity by Trip Information**

<b>Primary Activity</b>	<b>Average No. of Trips</b>	<b>Average Trip Duration (days)</b>	<b>Average Number of Total Trip Days</b>	<b>Number of Total Trip Days for All Participants</b>	<b>Percent of Total Trip Days<sup>21</sup></b>
<b>Canoeing</b>	4.9	2.0	6.5	683	3.9%
<b>Water-Skiing</b>	9.4	2.0	13.9	681	3.9
<b>Kayaking</b>	6.1	1.4	8.2	139	0.8
<b>Motor-Boating</b>	5.7	2.6	13.3	1,144	6.5
<b>River Rafting</b>	1.3	1.7	2.1	46	0.3
<b>Sailing</b>	4.1	1.9	8.3	58	0.3
<b>Windsurfing</b>	8.5	2.3	15.5	171	1.0
<b>Salmon Fishing</b>	5.2	2.2	9.0	684	3.9
<b>Steelhead Fishing</b>	5.0	1.7	9.2	212	1.2
<b>Other Fishing</b>	3.7	2.2	7.4	3,145	17.8
<b>Swimming/ Sunbathing</b>	6.1	1.5	7.6	1,132	6.4
<b>Picnicking</b>	3.2	1.2	3.9	406	2.3
<b>Camping</b>	2.1	3.6	6.8	1,564	8.8
<b>Cabin/Motel</b>	7.1	3.5	18.9	1,928	10.9
<b>Waterfowl Hunting</b>	5.4	1.4	6.6	33	0.2
<b>Big Game Hunting</b>	2.8	3.6	8.8	554	3.1
<b>Small Game/Bird Hunting</b>	4.3	1.5	4.6	60	0.3
<b>Hiking/Backpacking</b>	14.7	1.5	10.7	2,836	16.0
<b>Wildlife Viewing</b>	5.0	1.0	4.3	219	1.2
<b>Horseback Riding</b>	5.3	1.5	6.8	109	0.6
<b>Mountain Biking</b>	10.1	1.3	12.4	682	3.9
<b>Motor biking</b>	9.7	2.3	17.3	52	0.3
<b>4-Wheel Driving</b>	2.2	1.1	3.0	42	0.2
<b>Highway Driving</b>	5.4	2.4	5.9	437	2.5
<b>Other</b>	11.7	1.7	10.6	657	3.7
<b>Total</b>				17,673	100.0%

<sup>21</sup> Percent is weighted by total number of locations where the respondent engaged in the primary activity.



3.4. ESTIMATE OF ACTIVITY FOR B.C. POPULATION<sup>22</sup>

The total trip days in the previous table refers to the sample's experience. The data from this survey was used as the basis for an estimate of outdoor recreation in the Fraser Basin by all adult BCers in 1993<sup>23</sup>. The Basin total is approximately 15.5 million days.

Table 3-4: Primary Activity Estimate (1993 Total Trip Days)

Primary Activity	Lower Mainland	Thompson	Interior	Other BC	BC Total
Canoeing	255,455	94,974	72,542	4,498	427,469
Water-Skiing	456,170	85,083	43,899	15,743	600,895
Kayaking	19,320	13,714	27,522	0	60,556
Motor-Boating	296,242	161,908	111,922	206,912	776,984
River Rafting	30,054	1,459	4,689	24,964	61,166
Sailing	62,790	5,515	1,359	0	69,664
Windsurfing	39,177	43,417	0	0	82,594
Salmon Fishing	864,040	9,454	43,253	98,958	1,015,705
Steelhead Fishing	323,434	7,178	2,039	0	332,651
Other Fishing	1-307,330	342,929	385,984	259,990	2,296,233
Swimming/Sunbathing	658,316	145,365	84,740	42,507	930,928
Picnicking	171,914	52,520	34,793	56,226	3 15,453
Camping	910,194	202,349	113,994	64,773	1,291,310
Cabin/Motel	542,753	166,139	324,349	236,150	1,269,391
Waterfowl Hunting	0	7,936	2,039	0	9,975
Big Game Hunting	135,241	56,022	85,623	74,219	351,105
Small Game/Bird Hunting	22,898	12,459	1,359	0	36,716
Hiking/Backpacking	2,704,820	212,882	192,347	60,724	3,170,773
Wildlife Viewing	74,776	29,528	24,464	13,494	142,262
Horseback Riding	94,454	15,173	680	2,249	112,556
Mountain Biking	500,893	66,380	57,592	6,747	631,612
Motor biking	7,156	0	16,309	0	23,465
4-Wheel Driving	66,905	584	1,019	0	68,508
Highway Driving	280,142	16,807	21,202	343,880	662,031
Other	708,405	35,014	48,384	0	791,803
<b>Total</b>	<b>10,532,879</b>	<b>1,784,786</b>	<b>1,702,103</b>	<b>1,512,036</b>	<b>15,531,804</b>

The main factor behind the regional differences is the much larger Lower Mainland population leading to more recreation days. Another factor is the low proportion of Basin

<sup>22</sup> The activity data reflects current availability of opportunities, supply rather than demand. It may be that sites are scarce for a particular activity, perhaps they are operating at or near capacity, so demand is not fully met. If more opportunities were available then the number of visits might be higher.

<sup>23</sup> The estimate was undertaken with Census demographic data by regional district, a 1993 BC Stats population estimate for the Fraser Basin and the following data from the survey: average annual total days; total days percentage share by activity; number of Basin recreationists; and total number of respondents by region.

users from the Other BC region (ie. outside the Basin) thereby providing much lower Basin recreation days per resident than the three Basin regions. The average total number of recreation days per Basin user for the different regions is as follows.

- ⊙ Lower Mainland - 2 1.73 days
- ⊙ Thompson - 32.54 days
- ⊙ Interior - 26.93 days
- ⊙ Other B.C. - 13.45 days

The higher Interior and Thompson figures are expected because more of their outdoor recreation is going to occur in the Basin whereas the Lower Mainland and Other B.C. residents have other locations in closer proximity.

The differences in preferences is a factor, too. For example, the range of recreation possibilities which do not involve water is much larger in a metropolitan area. In the smaller and medium size communities, water-based recreation is expected to take up more of a person's available leisure time.

### **3.5. ACTIVITY BY TOTAL TRIPS BY RESIDENCE**

Table 3-5 lists total number of trips for a particular activity where there are marked differences, in the number of annual trips of an average respondent, between residence of the activity participants (i.e. Lower Mainland water-skiers).

Thompson water-skiers made an average of over 20 trips in 1993, well above Lower Mainland (6.9 trips) and Interior (5.4 trips) water-skiers. Thompson mountain bikers and highway drivers also went on many more trips than average with 17.4 mountain biking trips and 13.2 highway trips. The overall average for these activities was 10.1 trips and 5.5 trips, respectively.

Lower Mainland resident salmon fishers clearly had the most salmon fishing trips at 7.1 trips in 1993. Thompson and Interior residents trips totaled only 1.8 and 2.3 trips, respectively. As for staying in a cabin or motel, Interior residents went on an average of 11.2 trips, Lower Mainland residents had only 3.0 trips and Interior residents managed 7.1 trips.

<b>Table 3-5: Average Annual Number of Total Trips by Activity and by Residence</b>					
<b>Activity</b>	<b>Lower Mainland</b>	<b>Thompson</b>	<b>Interior</b>	<b>Other BC</b>	<b>Average</b>
<b>Water-Skiing</b>	6.9	20.1	5.4	1.0	9.4
<b>Salmon Fishing</b>	7.1	1.8	2.3	4.0	5.2
<b>Cabin/Motel</b>	3.0	7.1	11.2	5.5	7.1
<b>Mountain Biking</b>	8.1	17.4	8.4	1.5	10.1
<b>Highway Driving</b>	3.8	13.2	1.9	2.3	5.5

### 3.6. ACTIVITY BY TOTAL ANNUAL DAYS AND BY RESIDENCE

Table 3-6 lists total annual days for activities, where there are marked differences by residence.

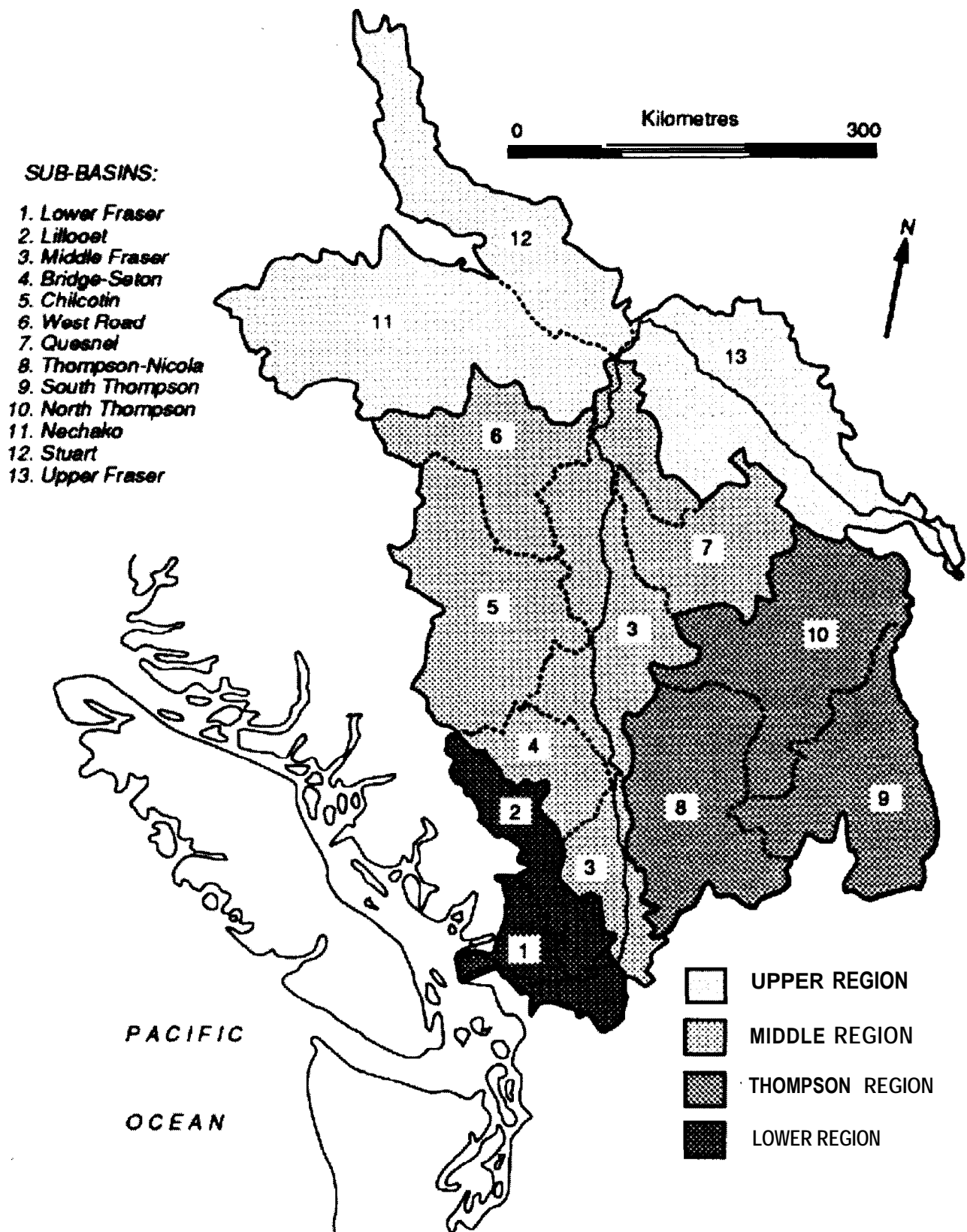
Thompson water-skiers devoted much more time to their sport than did water-skiers in other regions at 24.3 days in 1993, well above the B.C.-wide average of 13.9 days. Interior and Other BC water-skiers were approximately half of the provincial average. Additionally, water-skiing was the only activity to show any marked differences for trip duration by residence. Trips of Lower Mainland water-skiers averaged 8.8 days, whereas the trips of Thompson and Interior water-skiers lasted, on average, only 1.9 and 1.2 days, respectively. The difference probably comes up because the Lower Mainland water-skiers often go away for week-ends or longer to enjoy their sport within the Fraser Basin.

In other boating activities, the average Interior kayaker spent the most days kayaking at 13.5 days, well above the Lower Mainland's average of 1.8 days. Thompson and Other BC motor-boaters spent an average of 17.9 and 18.4 days, respectively, on this activity. Lower Mainland motor-boaters spent an average of 7.2 days and the B.C.-wide average was 13.3 days.

Lower Mainland salmon and Steelhead anglers have a similar profile with 10.5 days for salmon and 11.3 days for steelhead. Thompson participants are well below this, at 3.6 days (salmon) and 4.1 days (Steelhead) and Interior residents are in the middle at 6.7 days (salmon) and 6.0 days (Steelhead). The overall average for salmon fishing is 9.0 days and 9.2 days for Steelhead fishing. The 22 days of salmon fishing reported for Other BC was the result of only two respondents.

Lower Mainland residents relaxing in a cabin or motel did so for an average total of 8.2 days, below the B.C.-wide average of 18.9 days. Thompson residents were near this average, however, Interior residents relaxing at a a cabin or motel did so for an average of 25.8 days. The Other BC average of 52.5 days included only 2 respondents.

<b>Table 3-6: Average Annual Number of Total Trip Days by Activity and by Residence</b>					
<b>Activity</b>	<b>Lower Mainland</b>	<b>Thompson</b>	<b>Interior</b>	<b>Other BC</b>	<b>Average</b>
<b>Water-Skiing</b>	15.1	24.3	6.8	7.0	13.9
<b>Kayaking</b>	1.8	9.4	13.5	0.0	8.2
<b>Motor-Boating</b>	7.2	17.9	12.2	18.4	13.3
<b>Salmon Fishing</b>	10.5	3.6	6.7	22.0	9.0
<b>Steelhead Fishing</b>	11.3	4.1	6.0	0.0	9.2
<b>Cabin/Motel</b>	8.2	21.9	25.8	52.5	18.9



The Four Major Regions of the Fraser River Watershed and Their Respective 13 Sub-basins.

### 3.7. ACTIVITY BY LOCATION

Table 3-7 gives the proportion of trips by activity for each of the thirteen destination regions (a map of the regions is shown on the opposite page). It indicates the activity pattern throughout the Basin and if there is an area where most of the activity occurs.

The Lower Fraser and South Thompson regions, and to a lesser degree the Middle Fraser, host the bulk of trips. The weighted proportions of the total for these regions are 22.5, 21.4 and 13.4 percent, respectively.

The Lower Fraser is the most popular for canoeists, where 25.5 percent of all canoeing trips take place, and for kayaking (50.0 percent), sailing (42.9 percent), salmon fishing (52.6 percent), Steelhead fishing (60.9 percent), hiking/backpacking (39.8 percent), wildlife viewing (40.4 percent), horseback riding (3 1.3 percent), mountain biking (38.6 percent), 4-wheel driving (21.4 percent) and highway driving (24.3 percent).

The South Thompson is popular for motor boating, attracting 39.5 percent of all motorboat trips, and for swimming/sunbathing, (41.1 percent), picnicking (26.9 percent), camping (26.3 percent), staying in a cabin or motel (30.4 percent), and small game/bird hunting (3 8.5 percent).

The Middle Fraser is popular for river rafting (27.3 percent), and big game hunting (27.0 percent), and the Thompson-Nicola drainage attracts windsurfing (45.5 percent) and other fishing (17.7 percent).

The shares reflect the attributes of the regions in terms of the needs for the recreation activity. For example, there are many more salmon available for sport fishing in the Lower Fraser than in the other regions. Another set of factors is the recreational preferences of regional residents. For example, kayaking is a sport which has gained some popularity in the Lower Mainland in recent years. A big factor is the sheer weight of population numbers. The table clearly shows the Lower Fraser as having large shares of trips for almost all activities. By contrast, the sparsely populated Lillooet region has very small shares<sup>24</sup>.

Table 3-7 does not provide a basis for some type of congestion index but it does point to where there might be problems from over-crowding or conflicts with other uses.

<sup>24</sup> Regression analyses of the results against some of these explanatory variables could perhaps provide a statistical explanation for the shares.

**Table 3-7: Distribution of Primary Activity by Drainage (Part I)**

Primary Activity	Lower Fraser	Lillooet	Middle Fraser	Bridge-Seton	Chil-cotin	West Road	Quesnel	Thompson -Nicola
Canoeing	25.5%	3.8%	20.8%	0.9%	0.9%	0.0%	0.0%	4.7%
Water-Skiing	16.3	2.0	12.2	4.1	0.0	0.0	0.0	6.1
Kayaking	50.0	0.0	5.6	0.0	5.6	0.0	0.0	0.0
Motor-Boating	19.8	3.5	10.5	0.0	1.2	0.0	2.3	2.3
River Rafting	18.2	0.0	27.3	4.5	0.0	0.0	4.5	9.1
Sailing	42.9	0.0	0.0	0.0	0.0	0.0	0.0	28.6
Windsurfing	27.3	9.1	0.0	0.0	0.0	0.0	0.0	45.5
Salmon Fishing	52.6	5.1	6.4	0.0	0.0	2.6	2.6	3.8
Steelhead Fishing	60.9	8.7	17.4	0.0	0.0	0.0	0.0	4.3
Other Fishing	8.8	1.4	10.7	1.4	2.8	0.5	7.2	17.7
Swimming/Sunbathing	19.2	8.6	9.9	0.7	0.0	0.0	1.3	4.0
Picnicking	22.1	7.7	17.3	0.0	0.0	0.0	1.9	8.7
Camping	17.2	5.2	9.1	3.0	1.7	0.4	1.7	10.3
Cabin/Motel	8.8	9.8	9.8	2.9	1.0	1.0	1.0	4.9
Waterfowl Hunting	0.0	0.0	0.0	0.0	0.0	0.0	0.0	60.0
Big Game Hunting	3.2	1.6	27.0	0.0	3.2	1.6	9.5	9.5
Small Game/Bird Hunting	15.4	0.0	23.1	0.0	0.0	0.0	0.0	7.7
Hiking/Backpacking	39.8	9.3	17.1	3.7	0.4	0.4	1.5	2.2
Wildlife Viewing	40.4	0.0	9.6	0.0	1.9	0.0	0.0	7.7
Horseback Riding	31.3	0.0	18.8	0.0	0.0	0.0	0.0	18.8
Mountain Biking	38.6	8.8	17.5	0.0	0.0	0.0	1.8	3.5
Motor biking	0.0	33.3	66.7	0.0	0.0	0.0	0.0	0.0
Q-Wheel Driving	21.4	14.3	7.1	21.4	0.0	0.0	0.0	0.0
Highway Driving	24.3	9.5	17.6	2.7	0.0	0.0	1.4	4.1
Other	17.7	8.1	16.1	0.0	1.6	3.2	4.8	8.1
Weighted Average	22.5%	5.4%	13.4%	1.7%	1.2%	0.5%	2.9%	8.5%

**Table 3-7: Distribution of Primary Activity by Drainage (Part II)**

Primary Activity	South Thompson	North Thompson	Nechako	Stuart	Upper Fraser	N/A	Total
Canoeing	17.9%	10.4%	2.8%	2.8%	5.7%	3.7%	100.0%
Water-Skiing	6.1	34.7	0.0	10.2	14.3	0.0	100.0
Kayaking	5.6	5.6	0.0	0.0	0.0	27.8	100.0
Motor-Boating	39.5	1.2	5.8	8.1	2.3	3.5	100.0
River Rafting	13.6	4.5	0.0	4.5	4.5	9.1	100.0
Sailing	28.6	0.0	0.0	0.0	0.0	0.0	100.0
Windsurfing	18.2	0.0	0.0	0.0	0.0	0.0	100.0
Salmon Fishing	10.3	3.8	0.0	2.6	2.6	7.7	100.0
Steelhead Fishing	8.7	0.0	0.0	0.0	0.0	0.0	100.0
Other Fishing	17.4	8.4	8.6	3.7	3.0	8.4	100.0
Swimming/Sunbathing	41.1	0.7	1.3	7.9	4.0	1.3	100.0
Picnicking	26.9	2.9	1.0	2.9	7.7	1.0	100.0
Camping	26.3	7.3	2.2	4.3	3.9	7.3	100.0
Cabin/Motel	30.4	4.9	9.8	4.9	5.9	4.9	100.0
Waterfowl Hunting	20.0	0.0	20.0	0.0	0.0	0.0	100.0
Big Game Hunting	6.3	9.5	4.8	3.2	7.9	12.7	100.0
Small Game/Bird Hunting	38.5	7.7	0.0	0.0	0.0	7.7	100.0
Hiking/Backpacking	13.8	4.1	2.6	0.0	1.9	3.3	100.0
Wildlife Viewing	25.0	3.8	0.0	0.0	5.8	5.8	100.0
Horseback Riding	25.0	0.0	0.0	0.0	0.0	6.3	100.0
Mountain Biking	21.1	1.8	0.0	1.8	3.5	1.8	100.0
Motorbiking	0.0	0.0	0.0	0.0	0.0	0.0	100.0
4-Wheel Driving	7.1	0.0	0.0	7.1	7.1	14.3	100.0
Highway Driving	23.0	5.4	4.1	0.0	8.1	0.0	100.0
Other	17.7	3.2	3.2	1.6	8.1	6.5	100.0
Weighted Average	21.4%	6.0%	3.8%	3.4%	4.3%	5.1%	100.0%



### Residence Effects

Three activities were selected to demonstrate the effect of residency on a destination region's share. Motor boating, camping and hiking/backpacking were chosen because of their larger sample sizes and the range of equipment needed to undertake them. Tables 3-8, 3-9 and 3-10 provide the details of these cross tabulations.

<b>Table 3-8: Cross Tabulation of Motor Boating Locations by Residence</b>					
<b>ROW % COLUMN %</b>	<b>Lower Mainland</b>	<b>Thompson</b>	<b>Interior</b>	<b>Other BC</b>	<b>ROW % TOTAL</b>
<b>Drainage</b>					
<b>Lower Fraser</b>	88.2% 68.2%	5.9% 3.2%	0.0% 0.0%	5.9% 20.0%	20.5%
<b>Lillooet</b>	100.0 13.6	0.0 0.0	0.0 0.0	0.0 0.0	3.6
<b>Middle Fraser</b>	33.3 13.6	22.2 6.5	44.4 16.0	0.0 0.0	10.8
<b>Bridge-Seton</b>	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0
<b>Chilcotin</b>	0.0 0.0	100.0 3.2	0.0 0.0	0.0 0.0	1.2
<b>West Road</b>	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0
<b>Quesnel</b>	0.0 0.0	0.0 0.0	100.0 8.0	0.0 0.0	2.4
<b>Thompson-Nicole</b>	0.0 0.0	50.0 3.2	50.0 4.0	0.0 0.0	2.4
<b>South Thompson</b>	2.9 4.5	76.5 83.9	8.8 12.0	11.8 80.0	41.0
<b>North Thompson</b>	0.0 0.0	0.0 0.0	100.0 4.0	0.0 0.0	1.2
<b>Nechako</b>	0.0 0.0	0.0 0.0	100.0 20.0	0.0 0.0	6.0
<b>Stuart</b>	0.0 0.0	0.0 0.0	100.0 28.0	0.0 0.0	8.4
<b>Upper Fraser</b>	0.0 0.0	0.0 0.0	100.0 8.0	0.0 0.0	2.4
<b>COLUMN % TOTAL</b>	26.5%	37.3%	30.1%	6.0%	100.0%

For motor-boating, 81.8 percent of the Lower Mainland participants' trips remained within their region of the Lower Fraser and Lillooet drainages. The rest went to the Middle Fraser (13.6 percent) and South Thompson (4.5 percent). Eighty-seven percent of motor-boater trips from the Thompson region remained within the region, while 3.2 percent were active in the Lower Fraser drainage, 6.5 percent in the Middle Fraser and 3.2 percent in

the Chilcotin drainage. Eighty percent of motor-boat trips originating in the Interior remained in the region and the remaining 20 percent went to the Thompson region. The Interior motor-boaters were generally more dispersed among drainages.

Some 85.3 percent of Lower Mainland hikers remained within their region with the rest dispersing throughout the other two regions. Of Thompson hikers, 71.8 percent remained within the region, 9.5 percent went to the Middle Fraser drainage and the rest dispersed into the Lower Mainland and Interior regions. Interior hikers remained largely within their region at 95.9 percent, while the remainder was split equally between the Lower Fraser and the North Thompson residents.

**Table 3-9: Cross tabulation of Backpacking/Hiking Locations by Residence**

ROW % COLUMN %	Lower Mainland	Thompson	Interior	Other BC	ROW % TOTAL
<b>Drainage</b>					
<b>Lower Fraser</b>	91.6% 68.5%	3.7% 6.3%	0.9% 2.1%	3.7% 80.0%	41.2%
<b>Lillooet</b>	96.0 16.8	4.0 1.6	0.0 0.0	0.0 0.0	9.6
<b>Middle Fraser</b>	17.4 5.6	13.0 9.4	67.4 64.6	2.2 20.0	17.7
<b>Bridge-Seton</b>	50.0 3.5	20.0 3.1	30.0 6.3	0.0 0.0	3.8
<b>Chilcotin</b>	0.0 0.0	0.0 0.0	100.0 2.1	0.0 0.0	0.4
<b>West Road</b>	0.0 0.0	0.0 0.0	100.0 2.1	0.0 0.0	0.4
<b>Quesnel</b>	0.0 0.0	50.0 3.1	50.0 4.2	0.0 0.0	1.5
<b>Thompson-Nicola</b>	66.7 2.8	33.3 3.1	0.0 0.0	0.0 0.0	2.3
<b>South Thompson</b>	8.1 2.1	91.9 53.1	0.0 0.0	0.0 0.0	14.2
<b>North Thompson</b>	0.0 0.0	90.9 15.6	9.1 2.1	0.0 0.0	4.2
<b>Nechako</b>	14.3 0.7	42.9 4.7	42.9 6.3	0.0 0.0	2.7
<b>Stuart</b>	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0
<b>Upper Fraser</b>	0.0 0.0	0.0 0.0	100.0 10.4	0.0 0.0	1.9
<b>COLUMN% TOTAL</b>	55.0%	24.6%	18.5%	1.9%	100.0%

Only 51.1 percent of Lower Mainland camper trips remained within this region. The remainder went to the Thompson region (30.4 percent) and the Interior (18.5 percent).

On the other hand, Thompson residents were much more inclined to remain near home. Some 83.0 percent of camping trips were within the Thompson region and of this 55.9 percent of camping trips were in the South Thompson drainage. The rest of the trips were in the Interior (11.8 percent) and the Lower Fraser drainage (4.4 percent). For Interior residents 71.4 percent of camping trips remained within the region with the rest traveling to the Thompson region.

<b>Table 3-10: Cross Tabulation of Camping Locations by Residence</b>					
<b>ROW % COLUMN % Drainage</b>	<b>Lower Mainland</b>	<b>Thompson</b>	<b>Interior</b>	<b>Other BC</b>	<b>ROW % TOTAL</b>
<b>Lower Fraser</b>	90.0% 39.1%	7.5% 4.4%	0.0% 0.0%	2.5% 16.7%	18.6%
<b>Lillooet</b>	91.7 12.0	0.0 0.0	0.0 0.0	8.3 16.7	5.6
<b>Middle Fraser</b>	47.6 10.9	23.8 7.4	23.8 10.2	4.8 16.7	9.8
<b>Bridge-Seton</b>	71.4 5.4	28.6 2.9	0.0 0.0	0.0 0.0	3.3
<b>Chilcotin</b>	25.0 1.1	0.0 0.0	75.0 6.1	0.0 0.0	1.9
<b>West Road</b>	0.0 0.0	0.0 0.0	100.0 2.0	0.0 0.0	.5
<b>Quesnel</b>	0.0 0.0	0.0 0.0	100.0 8.2	0.0 0.0	1.9
<b>Thompson-Nicola</b>	41.7 10.9	45.8 16.2	12.5 6.1	0.0 0.0	11.2
<b>South Thompson</b>	23.0 15.2	62.3 55.9	9.8 12.2	4.9 50.0	28.4
<b>North Thompson</b>	23.5 4.3	47.1 11.8	29.4 10.2	0.0 0.0	7.9
<b>Nechako</b>	0.0 0.0	0.0 0.0	100.0 10.2	0.0 0.0	2.3
<b>Stuart</b>	0.0 0.0	0.0 0.0	100.0 20.4	0.0 0.0	4.7
<b>Upper Fraser</b>	11.1 1.1	11.1 1.5	77.8 14.3	0.0 0.0	4.2
<b>COLUMN % TOTAL</b>	42.8%	31.6%	22.8%	2.8%	100.0%

Hiking, which is very much a day trip oriented activity, shows a low share for trips outside of the region of origin and so too motor-boating. Camping is by definition an overnight activity. Lower Mainland campers, with fewer sites in the Fraser Basin relative to its total population, take half of their trips in other regions. The Thompson and Interior campers have a greater predilection to stay in their regions.

### 3.8. RECREATION OPPORTUNITY SPECTRUM (ROS) SETTING

Respondents were given the choice of five environmental settings, along with brief definitions of each, to characterize the location of their activities. The settings were as follows:

- ⊙ rural - accessible by a highway vehicle, a substantially modified environment and extensive evidence of human use; recreational facilities such as developed campgrounds
- ⊙ roaded resource - accessible by a highway vehicle but with a natural environment; you will meet others in cars, trucks and on motorbikes; landscape may be altered by logging, farming, mining or grazing; recreation facilities such as remote camps

**Table 3-11: Distribution of Primary Activity by Environmental Setting**

<b>Primary Activity</b>	<b>Primitive</b>	<b>Semi-Primitive</b>	<b>Roaded Resource</b>	<b>Rural</b>	<b>Urban</b>	<b>N/A</b>	<b>Total</b>
<b>Canoeing</b>	15.1%	21.7%	24.5%	29.2%	9.4%	0.0%	00.0%
<b>Water-Skiing</b>	2.0	6.1	12.2	67.3	12.2	0.0	100.0
<b>Kayaking</b>	0.0	27.8	5.6	38.9	0.0	27.8	100.0
<b>Motor-Boating</b>	5.8	19.8	16.3	31.4	25.6	1.2	100.0
<b>River Rafting</b>	13.6	27.3	18.2	36.4	4.5	0.0	100.0
<b>Sailing</b>	0.0	0.0	14.3	57.1	28.6	0.0	100.0
<b>Windsurfing</b>	9.1	18.2	36.4	18.2	18.2	0.0	100.0
<b>Salmon Fishing</b>	7.7	19.2	37.2	26.9	9.0	0.0	100.0
<b>Steelhead Fishing</b>	0.0	17.4	26.1	43.5	13.0	0.0	100.0
<b>Other Fishing</b>	6.3	21.9	38.1	28.8	4.9	0.0	100.0
<b>Swimming/Sunbathing</b>	4.6	5.3	23.2	49.7	17.2	0.0	100.0
<b>Picnicking</b>	1.9	7.7	18.3	50.0	22.1	0.0	100.0
<b>Camping</b>	3.0	10.8	35.8	42.7	7.3	0.4	100.0
<b>Cabin/Motel</b>	1.0	8.8	26.5	49.0	14.7	0.0	100.0
<b>Waterfowl Hunting</b>	0.0	80.0	0.0	20.0	0.0	0.0	100.0
<b>Big Game Hunting</b>	19.0	31.7	33.3	14.3	0.0	1.6	100.0
<b>Small Game/Bird Hunting</b>	0.0	53.8	30.8	15.4	0.0	0.0	100.0
<b>Hiking/Backpacking</b>	11.5	17.8	19.0	24.5	26.8	0.4	100.0
<b>Wildlife Viewing</b>	0.0	30.8	15.4	44.2	9.6	0.0	100.0
<b>Horseback Riding</b>	12.5	12.5	18.8	37.5	18.8	0.0	100.0
<b>Mountain Biking</b>	7.0	26.3	14.0	26.3	26.3	0.0	100.0
<b>Motor biking</b>	0.0	0.0	100.0	0.0	0.0	0.0	100.0
<b>4-Wheel Driving</b>	0.0	42.9	35.7	21.4	0.0	0.0	100.0
<b>Highway Driving</b>	0.0	1.4	16.2	52.7	29.7	0.0	100.0
<b>Other</b>	4.8	14.5	11.3	43.5	25.8	0.0	100.0
<b>Weighted Average</b>	6.3%	16.9%	26.5%	35.8%	14.1%	0.4%	00.0%

- ⊙ semi-primitive - a natural environment, minimal evidence of human use, no motorized access, access is by trail; basic recreational facilities, if any
- ⊙ primitive - a natural environment, minimal evidence of human use, no motorized access, access is by trails; basic recreational facilities, if any
- ⊙ urban - cities, towns, large resorts and major ski area with buildings, paved roads and lots of people. Many developed recreational facilities and easy vehicle access

A rural setting attracted most activity participants, 35.8 percent of all trips took place there. Roaded resource land had 26.5 percent of all trips. Semi-primitive and urban were the third and fourth most popular environmental setting at 16.9 percent and 14.1 percent, respectively. The least popular setting was primitive at 6.3 percent.

The majority of activities had most of the trips in a rural setting. On the other hand, windsurfing, salmon fishing, *other* fishing and big game hunting found a roaded resource setting most popular. Small game/bird hunting, mountain biking and 4-wheel driving participants made most of their trips in a semi-primitive setting. Interestingly, backpackers and hikers (which includes walking) had most of their trips in an urban environment<sup>25</sup>. No activities had primitive as the most popular setting.

### **3.9. RELATIONSHIPS BETWEEN PRIMARY AND SECONDARY ACTIVITIES**

Table 3-12 contains cross-tabulation results of primary activity by secondary activity. Most of the boating (canoeing, water-skiing, river rafting and sailing), all fishing, swimming/sunbathing and camping had beach and cabin type activities as the most popular secondary activity. Hiking had wildlife viewing as its most selected secondary activity. Other interesting relationships includes kayaking and motor-boating with fishing as the main secondary activity type and relaxing in a cabin or motel having boating as the main secondary activity type.

River rafting, salmon and Steelhead fishing, mountain biking, 4-wheel driving and highway driving had the largest percentage of trips with no secondary activity. These are the type of day trip oriented activities which consume most or all of a day leaving little time for other activities.

<b>Table 3-12: Distribution of Primary Activity by Secondary Activity Type (%)</b>									
<b>Primary Activity</b>	<b>Boating</b>	<b>Fishing</b>	<b>Beach/ Cabin</b>	<b>Hunting</b>	<b>Hiking/ Viewing</b>	<b>Biking/ Driving</b>	<b>Other</b>	<b>No 2ndary</b>	<b>Total</b>
<b>Canoeing</b>	4.7	17.0	32.0	0.0	14.1	4.6	2.8	27.4	100.0
<b>Water-Skiing</b>	24.4	0.0	51.0	0.0	0.0	0.0	2.0	22.4	100.0
<b>Kayaking</b>	5.6	33.3	11.2	0.0	16.7	0.0	0.0	33.3	100.0

<sup>25</sup> The survey captured afternoon and evening walks as well as day hikes.

<b>Motor-Boating</b>	20.1	26.8	23.3	0.0	11.6	2.3	0.0	16.3	100.0
<b>River Rafting</b>	0.0	9.1	40.8	0.0	0.0	4.5	0.0	45.5	100.0
<b>Sailing</b>	0.0	14.3	42.9	0.0	14.3	0.0	0.0	28.6	100.0
<b>Windsurfing</b>	9.1	0.0	27.3	0.0	9.1	54.5	0.0	0.0	100.0
<b>Salmon Fishing</b>	20.6	11.6	23.0	0.0	6.4	0.0	1.3	37.2	100.0
<b>Steelhead Fishing</b>	8.6	17.3	21.7	0.0	0.0	0.0	0.0	52.2	100.0
<b>Other Fishing</b>	15.9	0.4	33.3	4.9	11.4	2.3	1.4	30.5	100.0
<b>Swimming/ Sunbathing</b>	9.9	2.0	41.7	0.0	25.8	5.3	0.0	15.2	100.0
<b>Picnicking</b>	6.8	0.0	26.0	0.0	31.8	6.7	3.8	25.0	100.0
<b>Camping</b>	11.7	16.3	33.6	0.0	22.0	5.1	0.9	10.3	100.0
<b>Cabin/Motel</b>	24.5	12.8	19.6	3.0	19.6	6.9	2.0	11.8	100.0
<b>Waterfowl Hunting</b>	0.0	0.0	0.0	60.0	40.0	0.0	0.0	0.0	100.0
<b>Big Game Hunting</b>	4.8	15.9	12.7	22.2	19.1	0.0	0.0	25.4	100.0
<b>Small Game/Bird Hunting</b>	0.0	7.7	15.4	0.0	53.9	0.0	0.0	23.1	100.0
<b>Hiking/Backpacking</b>	4.1	2.6	24.6	0.0	28.7	5.9	3.0	31.2	100.0
<b>Wildlife Viewing</b>	0.0	0.0	15.4	0.0	26.9	25.0	3.8	28.8	100.0
<b>Horseback Riding</b>	0.0	0.0	18.9	6.3	43.8	0.0	0.0	31.3	100.0
<b>Mountain Biking</b>	5.3	0.0	15.8	1.8	35.1	0.0	3.5	38.6	100.0
<b>Motor biking</b>	33.3	0.0	0.0	0.0	0.0	33.3	0.0	33.3	100.0
<b>4-Wheel Driving</b>	14.3	28.5	0.0	0.0	28.6	0.0	0.0	28.6	100.0
<b>Highway Driving</b>	2.7	2.7	19.0	0.0	21.7	2.8	9.5	41.9	100.0
<b>Other</b>	1.6	11.3	12.9	0.0	17.8	6.4	1.6	48.4	100.0

### 3.10. ACTIVITY BY AGE

Table 3-13 shows the primary activity by the age profile of respondents. The boating activities, canoeing, kayaking, motor-boating, and sailing, are dominated by the 35 to 54 age group. The more strenuous or higher physical risk activities of water-skiing and river rafting have larger proportions of the 18 to 34 age group. An apparent anomaly is windsurfing, a physically demanding sport, that the 35 to 54 age group dominates. It had a very small sample size, however.

Salmon fishing and other fishing had relatively similar proportions, in the 40 percent area, of the 18 to 34 and 35 to 54 age cohorts. On the other hand, Steelhead fishing had 60.9 percent of respondents in the 18 to 34 age group and only 21.7 percent in the 35 to 54 age group. All three fishing categories had smaller proportions in the over 55 age group, in the 10 to 20 percent range.

**Table 3-13: Age Distribution by Primary Activity**

<b>Primary Activity</b>	<b>18 - 34</b>	<b>35 - 54</b>	<b>55 +</b>	<b>No Answer</b>	<b>Total</b>
<b>Canoeing</b>	24.5%	66.0%	8.5%	0.9%	100.0%
<b>Water-Skiing</b>	63.3	32.7	4.1	0.0	100.0
<b>Kayaking</b>	38.9	61.1	0.0	0.0	100.0
<b>Motor-Boating</b>	27.9	48.8	23.3	0.0	100.0
<b>River Rafting</b>	50.0	50.0	0.0	0.0	100.0
<b>Sailing</b>	0.0	57.1	42.9	0.0	100.0
<b>Windsurfing</b>	18.2	81.8	0.0	0.0	100.0
<b>Salmon Fishing</b>	39.7	47.4	12.8	0.0	100.0
<b>Steelhead Fishing</b>	60.9	21.7	17.4	0.0	100.0
<b>Other Fishing</b>	43.0	40.9	16.0	0.0	100.0
<b>Swimming/Sunbathing</b>	43.0	51.0	6.0	0.0	100.0
<b>Picnicking</b>	24.0	50.0	23.1	2.9	100.0
<b>Camping</b>	45.3	46.1	6.5	2.2	100.0
<b>Cabin/Motel</b>	30.4	54.9	13.7	1.0	100.0
<b>Waterfowl Hunting</b>	40.0	20.0	40.0	0.0	100.0
<b>Big Game Hunting</b>	33.3	58.7	7.9	0.0	100.0
<b>Small Game/Bird Hunting</b>	53.8	46.2	0.0	0.0	100.0
<b>Hiking/Backpacking</b>	28.3	58.4	13.4	0.0	100.0
<b>Wildlife Viewing</b>	13.5	51.9	28.8	5.8	100.0
<b>Horseback Riding</b>	43.8	56.3	0.0	0.0	100.0
<b>Mountain Biking</b>	47.4	43.9	8.8	0.0	100.0
<b>Motor biking</b>	33.3	66.7	0.0	0.0	100.0
<b>4-Wheel Driving</b>	50.0	21.4	28.6	0.0	100.0
<b>Highway Driving</b>	21.6	55.4	23.0	0.0	100.0
<b>Other</b>	32.3	51.6	16.1	0.0	100.0

In the more passive activities, there were strong similarities in the age profiles of camping and swimming/sunbathing which were different from the profiles of cabin/motel and picnicking which themselves were similar. For camping and swimming/sunbathing, the 18 to 34 group amounted to 45.3 and 43.0 percent, respectively, and the over 55 age group amounted to 6.5 and 6.0 percent, respectively. The picnicking and cabin/motel 18 to 34 age groups were relatively smaller than their camping and swimming counterparts, at 24.0 and 30.4 percent, and their over 55 age groups were relatively larger at 23.1 and 13.7 percent, respectively. The 35 to 54 age group was similar in all four categories at approximately 50 percent.

In the hunting categories, the waterfowl hunters sample is too small to comment on. Big game hunters appear to be concentrated in the 35-54 age group at 58.7 percent. Small

game/bird hunters are skewed toward the younger 18 to 34 age group at 53.8 percent. There are no hunters in the over 55 age group in this category.

Hiking/Backpacking is dominated by the 35 to 54 age group at 58.4 percent and wildlife viewing has a similar profile but with a greater number in the over 55 age group and a lower number in the 18 to 34 age group. Horseback riding has 43.8 percent of respondents in the 18 to 34 age group and 56.3 percent in the 35 to 54 age group. There were no horseback riders in the over 55 age group.

In the biking/driving categories, mountain biking and 4-wheel driving have similar levels in the 18 to 34 age groups at 47.4 percent and 50.0 percent, respectively. They differ in the older categories with biking having 43.9 percent and 8.8 percent in the 35 to 54 and over 55 age groups, respectively and 4-wheeling having 21.4 percent and 28.6 percent in these categories, respectively. Highway driving has 55.4 percent of the respondents in the 35 to 54 age group and relatively equal amounts in the other two age groups. The motor biking sample is too small for comment.

The activities of picnicking, relaxing at a cabin or motel and big game hunting showed some differences in the age profile between residence. Cross tabulations of these have been listed in Table 3-14. Other BC figures have been included but the sample size is very small. In the activities of picnicking and cabin/motelling, Thompson participants have a much older profile than Lower Mainland and Interior participants. While Thompson picnickers have only 5.6 percent in the 18 to 34 age group, Lower Mainland and Interior picnickers have 35.7 and 34.4 percent in this age group, respectively. The 35 to 54 age group has similar proportions among all three of these regions and in the over 55 age group Thompson has 44.4 percent of their picnickers, while Lower Mainland has only 10.7 percent and the Interior has only 12.5 percent. The pattern is very similar for those staying in cabins and motels.

In big game hunting, there are differences between all three regions. Lower Mainland residents have 100.0 percent of these hunters in the 35 to 54 age group. Thompson hunters have 60.0 percent of their total in the 18 to 34 age group and 71.4 percent of Interior hunters are from the 35 to 54 age group.

<b>Table 3-14: Cross Tabulation of Age by Residence for Picnicking, Cabin/Motel and Big Game Hunting</b>					
<b>ROW % COLUMN %</b>	<b>Lower Mainland</b>	<b>Thompson</b>	<b>Interior</b>	<b>Other BC</b>	<b>ROW % TOTAL</b>
<b>Picnicking Age</b>					
<b>18-34</b>	<b>40.0%</b> <b>35.7%</b>	<b>8.0%</b> <b>5.6%</b>	<b>44.0%</b> <b>34.4%</b>	<b>8.0%</b> <b>40.0%</b>	<b>24.8%</b>



35 - 54	28.8 53.6	34.6 50.0	32.7 53.1	3.8 40.0	51.5
55 +	12.5 10.7	66.7 44.4	16.7 12.5	4.2 20.0	23.8
<b>COLUMN % TOTAL</b>	27.7	35.6	31.7	5.0	100.0%
<b>Cabin/Motel Age</b>					
18 - 34	48.4 41.7	12.9 15.4	35.5 29.7	3.2 50.0	30.7
35 - 54	30.4 47.2	28.6 61.5	41.1 62.2	0.0 0.0	55.4
55 +	28.6 11.1	42.9 23.1	21.4 8.1	7.1 50.0	13.9
<b>COLUMN % TOTAL</b>	35.6	25.7	36.6	2.0	100.0
<b>Big Game Hunting Age</b>					
18 - 34	0.0 0.0	57.1 60.0	38.1 28.6	4.8 33.3	33.3
35 - 54	32.4 100.0	13.5 25.0	54.1 71.4	0.0 0.0	58.7
55 +	0.0 0.0	60.0 15.0	0.0 0.0	40.0 66.7	7.9
<b>COLUMN % TOTAL</b>	19.0%	31.7%	44.4%	4.8%	100.0%

### 3.11. ACTIVITY BY HOUSEHOLD INCOME

Table 3-15 lists primary activities by household income. Many of the activities do not differ much from the average profile of Fraser Basin recreationists, however there are some that differ significantly and are worthy of discussion. In the boating categories, water-skiing remains below or equal to the B.C. average up to a household income of \$90,000 but, as expected given the capital and operating cost of this activity, is well above the provincial average of 8.2 percent for household incomes over \$90,000 at 22.5 percent. Kayaking participants appear to be concentrated in the middle income bracket with 83.3 percent of respondents having household incomes between \$30,000 and \$60,000. Of river rafting participants, 90.8 percent have household incomes between \$30,000 and \$90,000 compared to 67.8 percent of all recreation participants falling into this income range.

**Table 3-15: Distribution of Primary Activity by '000\$ of Household Income**

Primary Activity	< 15	15-30	30-45	45-60	60-75	75-90	90-105	> 105	N/A	Total
Canoeing	6.6%	5.7%	21.7%	25.5%	13.2%	17.9%	3.8%	1.9%	3.8%	00.0%
Water-Skiing	4.1	10.2	16.3	18.4	14.3	10.2	8.2	14.3	4.1	100.0
Kayaking	0.0	0.0	44.4	38.9	11.1	0.0	5.6	0.0	0.0	100.0
Motor-Boating	4.7	11.6	18.6	25.6	12.8	9.3	4.7	7.0	5.8	100.0
River Rafting	0.0	4.5	31.8	22.7	22.7	13.6	0.0	4.5	0.0	100.0
Sailing	0.0	0.0	42.9	14.3	0.0	0.0	0.0	28.6	14.3	100.0
Windsurfing	0.0	0.0	36.4	0.0	9.1	0.0	0.0	54.5	0.0	100.0
Salmon Fishing	2.6	9.0	28.2	28.2	7.7	7.7	2.6	6.4	7.7	100.0
Steelhead Fishing	0.0	13.0	30.4	26.1	8.7	17.4	0.0	4.3	0.0	100.0
Other Fishing	2.8	17.9	17.9	29.5	17.7	7.0	0.9	2.6	3.7	100.0
Swimming/Sunbathing	5.3	13.9	24.5	27.8	13.9	7.3	3.3	2.6	1.3	100.0
Picnicking	3.8	17.3	23.1	19.2	16.3	10.6	1.9	3.8	3.8	100.0
Camping	4.3	13.8	25.4	21.1	14.2	10.8	3.0	0.9	6.5	100.0
Cabin/Motel	2.9	6.9	16.7	18.6	21.6	12.7	6.9	5.9	7.8	100.0
Waterfowl Hunting	0.0	0.0	40.0	60.0	0.0	0.0	0.0	0.0	0.0	100.0
Big Game Hunting	3.2	17.5	11.1	25.4	14.3	3.2	6.3	9.5	9.5	100.0
Small Game/Bird Hunting	0.0	0.0	46.2	46.2	0.0	7.7	0.0	0.0	0.0	100.0
Hiking/Backpacking	3.7	16.7	17.5	21.9	16.7	11.5	4.5	4.5	3.0	100.0
Wildlife Viewing	0.0	7.7	28.8	21.2	17.3	9.6	1.9	5.8	7.7	100.0
Horseback Riding	6.3	18.8	37.5	18.8	12.5	6.3	0.0	0.0	0.0	100.0
Mountain Biking	0.0	14.0	12.3	29.8	12.3	15.8	5.3	7.0	3.5	100.0
Motorbiking	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	100.0
4-Wheel Driving	7.1	28.6	14.3	0.0	7.1	42.9	0.0	0.0	0.0	100.0
Highway Driving	0.0	9.5	21.6	23.0	12.2	24.3	1.4	6.8	1.4	100.0
Other	6.5	6.5	21.0	17.7	14.5	21.0	3.2	4.8	4.8	100.0
Average	4.6%	15.1%	22.1%	21.8%	14.8%	9.1%	4.0%	4.2%	4.3%	00.0%

Salmon and Steelhead fishing have above average proportions of household incomes between \$30,000 and \$60,000 at 56.4 percent and 56.5 percent compared to 43.9 percent for all activities.

As expected, participants staying in cabins and motels are skewed toward higher incomes. Household incomes less than \$30,000 account for only 9.8 percent of this activity, whereas, the all activities average has 19.7 percent at less than \$30,000. This is offset by a 34.3 percent share in the \$60,000 to \$90,000 bracket which is 10.4 percent above the share for the all activities average. This is very similar to the highway sightseer's profile, 9.5 percent in the under \$30,000 category and 36.5 percent in the \$60,000 to \$90,000 bracket.

Big game hunters have a large portion of participants above the \$90,000 level. This category accounts for 19.0 percent of big game participants and is more than double the all activities average of 8.2 percent.

The activities with higher shares of lower household incomes, less than \$45,000, include rafting, swimming, picnicking, camping and hiking. These are activities which have relatively lower capital and operating expenses.

Several of the other activities that appear different from the average largely result from low sample sizes.

An interesting effect from the residence of respondents was apparent with water-skiing participants. The cross tabulation showed a clear difference in the income profile of Lower Mainland water-skiers than that of the Thompson and Interior participants. Of Lower Mainland water-skiers, 26.7 percent had household incomes below \$60,000 and 73.7 percent above \$60,000. On the other hand, Thompson and Interior water-skiers had 58.3 percent and 67.9 percent, respectively, below household incomes of \$60,000 and only 41.7 percent and 32.1 percent above \$60,000. Steelhead and salmon fishing participants have similar profiles.

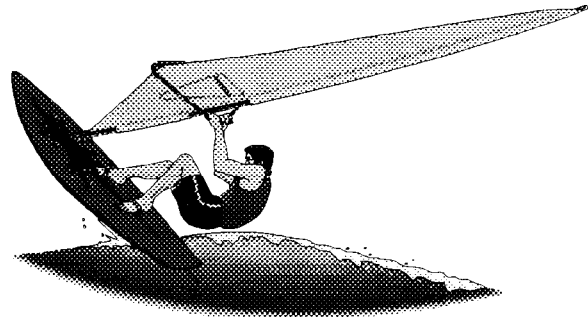
**Table 3-16: Cross Tabulation of Water-Skier Household Income by Residence**

<b>ROW % COLUMN %</b>	<b>Lower Mainland</b>	<b>Thompson</b>	<b>Interior</b>	<b>Other BC</b>	<b>ROW % TOTAL</b>
<b>Income</b>					
<b>&lt; \$15,000</b>	0.0% 0.0%	50.0% 8.3%	50.0% 5.3%	0.0% 0.0%	4.3%
<b>\$15 - 30,000</b>	20.0 6.7	40.0 16.7	40.0 10.0	0.0 0.0	10.6
<b>\$30 - 45,000</b>	0.0 0.0	12.5 8.3	87.5 36.8	0.0 0.0	17.0
<b>\$45 - 60,000</b>	33.3 20.0	33.3 25.0	33.3 15.8	0.0 0.0	19.1
<b>\$60 - 75,000</b>	85.7 40.0	14.3 8.3	0.0 0.0	0.0 0.0	14.9
<b>\$75 - 90,000</b>	40.0 13.3	20.0 8.3	40.0 10.5	0.0 0.0	10.6
<b>\$90 - 105,000</b>	25.0 6.7	75.0 25.0	0.0 0.0	0.0 0.0	8.5
<b>&gt; \$105,000</b>	28.6 13.3	0.0 0.0	57.1 21.1	14.3 100.0	14.9
<b>COLUMN % TOTAL</b>	31.9%	25.5%	40.4%	2.1%	100.0%

## 4. NET ECONOMIC VALUE

### 4.1. INTRODUCTION

An important objective of this study is to obtain net economic value estimates for outdoor recreation experiences in the Fraser Basin. Market prices provide a measure of the value of some goods and services. It is easy to look up the price of lumber. However, many goods and services, including the recreation services of natural resources, do not get traded under normal market conditions.

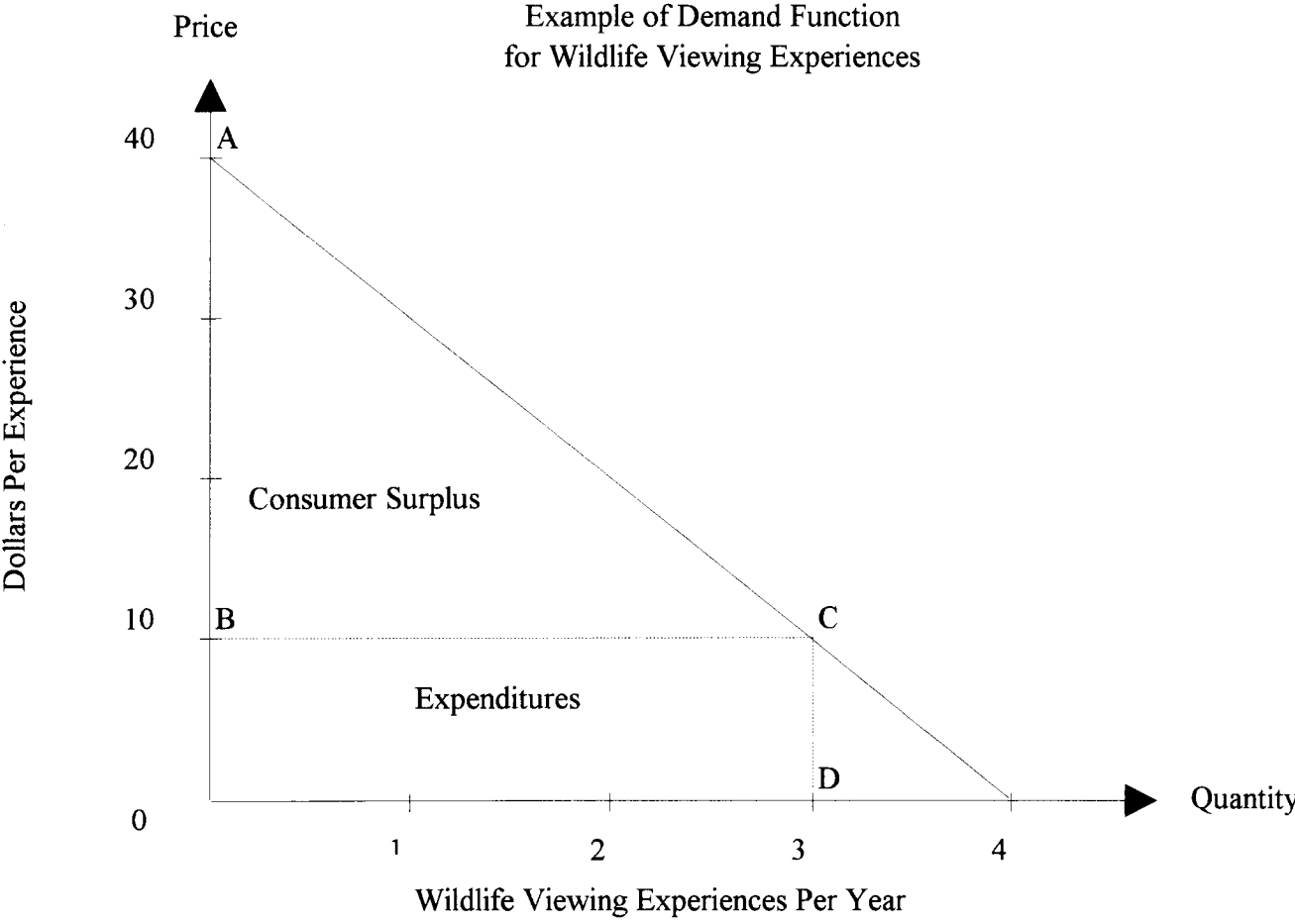


The differences between economic and financial values for natural resources is often confusing to non-economists. Consumer and producer surplus must be measured to arrive at economic value.

Where there is perfect competition and small changes in resource quantity, economic and financial values are almost synonymous. Competition does not rise to the marketplace ideal when the consequences of resource use and therefore value are not accounted for in the marketplace. The market for water resources has three basic weaknesses which drive a wedge between financial and economic value. Water is a non-rival resource, i.e. it can be used by two or more individuals without one person's consumption diminishing the amount available to others. Another issue is non-exclusivity, i.e. a situation where excluding additional users is practically infeasible. The third market weakness is interdependence, i.e. the external effects of resource consumption between users are not accounted for in the marketplace. The classic example is water pollution.

Economists rely on market prices to determine the economic value of commodities, including water and its associated natural resources such as fish. When the aforementioned problems are evident, market prices may not exist and if they do exist, they will not reflect the benefits and costs associated with resource consumption and enjoyment. The concept of consumer surplus is often received skeptically because it represents money which has not been paid to a business or government agency. It is the value associated with a recreation resource after all the costs of use have been paid. It is not equivalent to a price in the sense that one pays a certain price for a loaf of bread. It neither represents the cost of providing the recreation opportunity nor the intersection of supply and demand functions. Consumer surplus could be equivalent to a price if a government agency was able to establish an individualized access fee for a resource it absolutely controlled. It would be the difference between the maximum amount that an individual would pay, rather than forgo the activity, and all the costs, including fees that the person does pay.

Example of Demand Function  
for Wildlife Viewing Experiences



Consumer surplus represents the benefits to the consumer, profit if you will, from the workings of an efficient marketplace. It is neither the price of an item nor the sum of expenditures to undertake an activity. It is the difference between the maximum amount that an individual would pay, rather than forgo the activity, and all the costs, including fees that the person does pay. The figure on the opposite page will help illustrate the concept for outdoor recreation. The figure shows the amount of trips that a person might take at different prices. If the price is \$10, a person derives a benefit from not having to pay \$30 or \$20. The area of triangle ABC represents the amount of net economic value or consumers surplus that this person derives from paying only \$10 for each of three trips. The area of the rectangle BCDO shows the cost of taking the three trips, a cost to society and not a benefit.

Even where there is no price, consumers enjoy a surplus of benefits because they would be willing to pay a certain amount to consume or enjoy the services of the resource(s). In the case of recreational use or non-use of natural resources the absence of prices is the norm. Sometimes entrance or permit fees are seen as market prices but they are rarely accurate representations of economic value. These prices are almost never set within a competitive market framework. They increase government financial receipts and decrease individual financial resources, money moves from one pocket to another, they do not change net economic value that individuals or B.C. society attach to the resource(s).

Often spending or economic activity studies are carried out but they do not convey information about net economic value. They can be used for weighing relative job creation capability of projects or for tracking spending through economic sectors. Expenditures or costs are not accurate representations of economic value because they are benefits foregone. If more money is spent and leads to higher cost, there is less net benefit. And costs of engaging in an activity can easily exceed revenues. In the situation where expenditures exceed revenues, the project is actually detrimental because the expenditures could have been made elsewhere and returned a net benefit. If the opportunity to go hiking is lost for some reason, for example, an area is logged, the hiking trip expenditures would not be lost to the economy, they would be spent on something else. There might be an economic loss in the difference between the consumer surplus given by the hikers and the producer and consumer surplus gained through the logging<sup>26</sup>.

Relying on expenditures as the measure of economic benefits is an easy error to make when considering recreation issues. Actual expenditures on gas, food, lodging, equipment, etc. can be readily obtained but consumer surplus, net economic value, of recreation experiences must be inferred through statistical estimations.

Net economic value can often readily be determined from marketplace determined prices, even in monopoly or oligopoly situations. For example the benefit to society of a hydroelectric power dam is the avoided capital and operating cost of the next most

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<sup>26</sup> There is no inconsistency in using stumpage value to measure the producer surplus, and therefore net economic value, of logging and using consumer surplus for recreation experiences as both provide willingness to pay (WTP) measures.

expensive alternative. Where there are no marketplaces for products or services, there are no official prices. There is a large academic literature on why environmental amenities lack prices and the implication of this factor [Freeman 1993]. There is no marketplace for the several environmental amenities, including water, which are essential to providing a sport fishing experience. The government license fee is not a price because it is not set within a competitive marketplace; it is intended to help off-set regulatory and stocking costs. If you ask anglers for the amount of money they would be willing to pay but do not, above and beyond their trip costs, gas, food, etc., to enjoy sport fishing, they will quote a dollar figure. This is equivalent to the net economic value or consumers surplus they place on the services of the environmental amenities which go to make up their sport fishing experience.

Aggregating the per day net economic values for a recreation experience in a region or at a site over the annual number of recreationists yields an estimate of net economic value for the recreation experiences in the region.

#### **4.2. UNIT OF ANALYSIS**

The trip is generally considered the logical unit of analysis for recreation behaviour (Clawson and Knetsch 1971). This involves the total experience, not only an on-site visit, but also anticipation, travel and recollection. The consumer is viewed as demanding a trip or experience. The recreation trip or experience is produced by recreationists and by public and private owners and managers of resources (Bockstael and McConnell 1981). There is a two step process to provide the supply of trips, not just recreation sites and facilities, that the consumer demands. In the first step, public and private managers and owners make different kinds of opportunities available through development and regulation. In the second step, consumers combine the opportunities with their own knowledge, equipment, travel and technology to produce recreational trips or experiences. This production process gives the consumer an unusually significant influence in shaping the quality and amount of recreation supply. The common unit of activity is per day, defined as one person on-site for any part of a day (Walsh et al 1991).

#### **4.3. ESTIMATION APPROACHES**

The lack of observed market prices for outdoor recreation experiences means that their net economic value must be estimated. A few methodologies have been developed and gained wide acceptance. For this project, the choice was between the Contingent Valuation Method (CVM) and Travel Cost Method (TCM). The other alternatives are not satisfactory for the proposed study. Choices about how to implement either method affects their results: in survey design and data analysis with the CVM and in selection of model specification and price with the TCM. Although TCM is sometimes referred to as the direct method and CVM as indirect, in practise both are indirect in their estimation of environmental benefits. In Canada, there are no official prescriptions about the choice of method. The now disbanded U.S. Federal inter-agency committee, U.S. Water Resources

Council (1983), authorized use of both methods but recommended CVM. Its detailed water project analysis guidelines are used and maintained by the Bureau of Reclamation in the U.S. Department of Interior. The Environmental Protection Agency's guidelines (1983) contained similar views.

More recently, the Exxon Valdez oil spill has brought non-market values and CVM into the forefront of American jurisprudence. The U.S. Department of Interior sanctioned the use of CVM to assess non-market values losses arising from chemical spills. Its decision was upheld in a landmark court case, *Ohio v. U.S. Department of Interior*. Subsequently the agency responsible for administering the Oil Pollution Act, National Oceanic and Atmospheric Administration, composed a blue ribbon panel, including two Nobel prize winners in economics, to investigate the worthiness of CVM. The panel concluded that ".contingent valuation (CV) can produce estimates of interim lost value, including lost passive use value, that are reliable enough for use in a judicial or administrative determination of natural resource damages, including lost passive use value" [NOAA 1993].

The main shortcoming of TCM is that it can not estimate non-use preservation values, only recreation use values. Its secondary disadvantages are its greater reliance on statistical methods and its overt reliance on the indirect connection between trip cost and recreation activity value. The requirement for sophisticated statistics expertise limits the ability to conduct in-house studies and raises questions from general readers about the need to fall back on complex mathematics to come up with seemingly simple estimates of value. The theoretical basis of TCM compounds the difficulty in communicating to a wider audience, of even resource management professionals, the meaning of the net economic value concept. The primary advantages of CVM are its ability to provide estimates of preservation non-use, in addition to recreation use, and the confidence that a more general reader has in understanding its basis. The academic criticism of CVM stems from its reliance on respondent intentions, as opposed to actual behaviour.

A critical contributor to the validity of a CVM estimate is the structure of the survey and the wording of the questions. In the interests of simplicity and directness, researchers sometimes use a basic question about the respondent's perception of value without providing enough information through this question, or the others, for the respondent to fully understand what is being asked. A trade-off between brevity and detail is necessary but it shouldn't be done at the point where it compromises the integrity of the research effort. There is a significant amount of academic writing on CVM; a recent bibliography runs to 1,672 entries [Carson et al 1994]. A portion directly addresses experience with survey and question structure (Freeman 1993; Smith and Kopp 1992; Mitchell and Carson 1989; Johnson and Johnson 1990; U.S. Water Resources Council 1983; Smith and Desvouses 1986; Cummings et al 1986; Whitehead and Blomquist 1991).

A few different types of CVM questions, open-ended, dichotomous choice or referendum, bidding game and contingent ranking, have been developed to ascertain a respondent's value perceptions. A dichotomous choice (yes/no) question was selected for this study.



The disadvantage of this type of question is that the analysis of the responses is relatively more complex. The responses give a distribution of WTP values when used within a statistical model. For this study, a logistic regression model was employed, where the probability of a no response is a function of the stated willingness to pay amount.

To establish a context for the choice question, the questionnaire instructed respondents to consider substitute sites and their own budgetary constraints and informed them that the survey was not an attempt to acquire a better understanding of what they might pay in the way of a license fee. These instructions helped to avoid some of the pitfalls of the hypothetical nature of the CVM format.

The character of sites is such that there are substitutes available in all but a few instances. This does not imply that recreation in the Basin is of low value. The character of the region is such that there are many sites which are similar in terrain, habitat, etc. This means that there are many available substitutes. In relative terms, this will lower consumer surplus. How much would a recreationist be willing to pay when he or she can go ten miles down the road and carry out their favourite activity under virtually the same conditions and expenditures? Respondents were specifically instructed to consider this matter.

The results might be biased if respondents didn't consider the impact of their choice on their household budgets. They were instructed to consider "your own ability to pay and how this payment fits in with the others you must make."

The warning, that the survey was not tied into a plan to raise license fees, helps to avoid problems with strategic responses, where respondents understate values or refuse to answer.

#### 4.4. ESTIMATING RECREATIONIST NUMBERS

There are three basic methods to estimate the "market".

- ⊙ license and permit data
- ⊙ sample survey of referent society
- ⊙ sample survey of site users

As previous described, a random sample survey was used for this study. Some recreationists and tourists, such as sport fishermen and hunters, require an annual government issued license while others, such as campers, require a daily permit. Some providers of recreational opportunities are government licensed, such as whitewater rafting and guiding companies. The licensing and permit data provides reasonably inclusive figures on the total number of recreationists and tourists engaged in an activity on a province-wide basis. By surveying license holders, an average annual number of activity days can be estimated. With the annual average days estimate and the license

data, a total days estimate can be developed for the province. Licensing data has the advantage of including non-residents. There are few licensing instances, fishing and hunting, and the data is not collected by watershed so it was not an acceptable option. Another sampling approach is to count users and conduct in-person interviews on random days. This approach requires a single site or system of sites with a limited number of access points. An example would be a swimming lake where there is a single access road and parking for users. It is neither a feasible alternative for a larger area such as the Fraser Basin nor even a small portion of it.

#### 4.5. NET ECONOMIC VALUE ESTIMATES

Based on the survey results, the average per day net economic value estimates for water-based outdoor recreation in the Fraser Basin are shown, by region of residence and activity, in Table 4- 1. For further information on estimation procedures and results, refer to Appendix II.

<b>Table 4-1: Net Economic Value Estimates By Region (1993\$)</b>				
<b>Activity</b>	<b>B.C.</b>	<b>Lower Mainland</b>	<b>Thompson</b>	<b>Interior</b>
<b>All</b>	<b>\$26.39</b>	<b>\$33.44</b>	<b>\$22.61</b>	<b>\$23.63</b>
<b>Boating</b>	<b>33.45</b>	<b>31.23</b>	<b>37.77</b>	<b>25.58</b>
<b>Fishing</b>	<b>27.21</b>	<b>37.84</b>	<b>17.22</b>	<b>21.88</b>
<b>Beach/ Cabin</b>	<b>27.89</b>	<b>40.71</b>	<b>24.16</b>	<b>20.04</b>
<b>Hunting</b>		<b>17.88</b>		<b>11.31</b>
<b>Hiking</b>	<b>15.35</b>	<b>19.18</b>	<b>10.64</b>	<b>9.86</b>
<b>Nature Study</b>	<b>17.19</b>		<b>19.08</b>	<b>26.74</b>
<b>Biking</b>	<b>24.48</b>	<b>41.49</b>	<b>6.51</b>	

The estimates from this study correspond with other B.C. CVM estimates of outdoor recreation [Crane Management Consultants 1992]. On a province-wide basis, boating, fishing, and relaxing at the beach or a cabin are slightly above the mean for all activities of \$26.39. Hiking, nature study and hunting are markedly below the all activities mean. In other studies where economic values for several activities are estimated, the hiking and nature study categories have values well below the others. In this study, this difference can be attributed to the markedly lower income levels of hiking and nature study participants versus the other major categories.

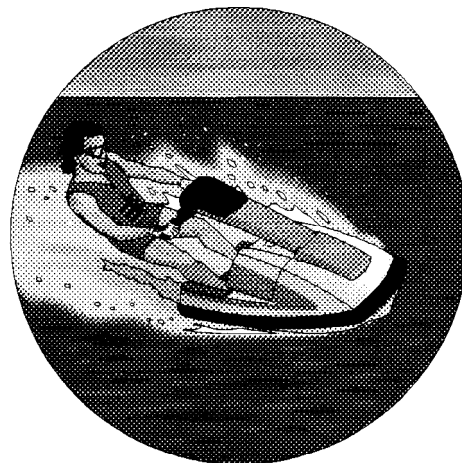
The range of approximately 15 to 30 dollars is relatively narrow. These estimated mean values stand up to intuitive scrutiny if the prices of leisure substitutes are considered such as the ticket price for a spectator sporting event or a round of golf. The Lower Mainland mean values are well above the Thompson and Interior values except in the case of Thompson boating. Given the greater abundance and variety of substitute locations, in close proximity, available to Thompson and Interior residents, it is to be expected that

their mean values should be lower than those of Lower Mainland respondents. The income differences between the regions were not sufficiently marked to expect them to translate into mean value differences.

The estimates of total number of days of recreation in 1993 from Section 3.4 is multiplied by the per day figures to produce an aggregate net economic value estimate. The aggregate estimates represent a valuation for 1993 of water-based outdoor recreation in the Fraser Basin. The aggregate estimate for recreation by B.C. residents is shown in Table 4-2.

<b>Table 4-2: 1993 Aggregate WTP Value for Water-based Outdoor Recreation in the Fraser Basin By B.C. Residents</b>			
<b>Activity</b>	<b>Activity volume (days)</b>	<b>Mean per day WTP value (1993%)</b>	<b>Aggregate WTP value (1993\$)</b>
<b>Boating</b>	<b>2,080,157</b>	<b>\$33.45</b>	<b>\$69,581,251</b>
<b>Fishing</b>	<b>3,645,021</b>	<b>27.21</b>	<b>99,180,994</b>
<b>Beach/ Cabin</b>	<b>3,820,519</b>	<b>27.89</b>	<b>106,554,020</b>
<b>Hunting</b>	<b>399,891</b>	<b>26.39</b>	<b>10,553,123</b>
<b>Hiking</b>	<b>3,274,536</b>	<b>15.35</b>	<b>50,264,127</b>
<b>Nature Study</b>	<b>140,507</b>	<b>17.19</b>	<b>2,415,315</b>
<b>Biking/ Driving</b>	<b>1,383,582</b>	<b>24.48</b>	<b>33,870,087</b>
<b>Other</b>	<b>801,789</b>	<b>26.39<sup>27</sup></b>	<b>21,159,211</b>
<b>Total</b>	<b>15,531,804</b>		<b>\$688,908,890</b>

The aggregate economic value for the Basin's estimated 15,531,804 days of water based outdoor recreation in 1993 is almost three-quarters of a billion dollars, \$688,908,890. The fishing and swimming/ relaxing category have the largest shares of the total, at approximately 15 percent each. Although hiking has well over 3 million days of activity, as do the fishing and swimming categories, its lower per day WTP value lessens its aggregate economic value.



<sup>27</sup> Because the Other category includes a diversity of activities, a WTP value was not estimated for it; the All activities mean is used as a proxy.

## 5. SUMMARY AND CONCLUSIONS

The random sample survey of 1,980 adult British Columbians yielded a large amount of data and subsequent statistical calculations have provided a detailed quantitative picture of recreation use in the Fraser Basin in 1993. Perhaps the most critical piece of information is that there was an estimated 15,531,804 days of water based outdoor recreation in the Basin and their economic value totals almost three-quarters of a billion dollars, at \$688,908,890. The per day WTP economic values lay within a \$15 to \$30 range with hiking and nature study at the bottom end and boating, fishing and just relaxing at a cabin, campsite or the beach at the top end of the range. Because of its large population, the Lower Mainland consumes the most recreation days by far, 68 percent of the total.



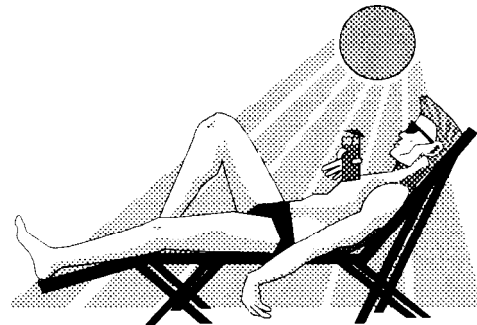
The information from this study could be used for several purposes. One is for education and communication, to inform various individuals and groups of the volume and characteristics of water-based recreation activity in the Basin and its economic value. Part of the education process might be to explain non-market issues associated with recreation and how they affect decisions on resource management. The study's volume and characteristics information can be brought into the various planning processes for the Basin's waterways. Other purposes might be to incorporate it into a benefit-cost analysis. For example, if there is a project, such as a hydro-electric power dam, which will reduce or eliminate outdoor recreation in the Fraser River Basin, the per day values could be used to help estimate foregone benefits. Another example is a chemical spill into a Fraser waterway. If recreation is reduced or eliminated in the spill area then the per day economic values and the activity estimates could be used to quantify compensation for the economic loss of the recreation. These situations have sprung up in the U.S. where the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and Oil Pollution Act (OPA) allow for the recovery of non-market damages<sup>28</sup>. Another

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<sup>28</sup> The B.C. and Federal Governments have accessed this legislation. On December 22, 1988 the barge *Nestucca* spilled 230,000 gallons of no. 6 fuel oil into the ocean off Gray's Harbour in Washington state. The spill harmed marine resources, especially seabirds and the shoreline in southwest B.C., as well as in Washington. The B.C. Government was a party to a lawsuit to recover damages. It also commissioned a contingent valuation method study to estimate the economic value to British Columbians of natural resource injuries caused by the *Nestucca* spill. The suit was settled out of court and compensation covered clean-up costs of approximately \$1 million and damaged resource values of approximately \$3.4 million. The insurer is making payments over a ten year period so the present value of the award is somewhat less, depending on the discount rate. The Federal and B.C. Governments jointly administer the settlement proceeds for the benefit of wildlife.

possibility is a supply and demand analysis for land with recreation capabilities. Classifying the recreation capability of land and water bodies is undertaken on a limited basis. The most widely used system is the Recreation Opportunity Spectrum (ROS), which classifies land by five or six broad categories. The activity locations were identified by ROS category for this study so it is possible to state the proportion of activities by type occurring within ROS categories. This information provides the basis for identifying shortages and overcapacities and economic benefits and losses by ROS category in recreation supply and demand projections.

Primary research into estimating these values is an expensive undertaking. Many times in the past the values were described rather than quantified or simply overlooked because of this research cost issue. Instead a benefits transfer approach is becoming popular to carry over non-market values derived from other settings, such as the work in this study, to a watershed under study. Values are “transferred” into the comparable context with adjustments made for assumptions, methodology, and the characteristics of the resource itself. The benefits transfer approach is gaining popularity as a less expensive and less time-consuming method than the rigorous surveying methods often employed to generate original non-market data [Smith 1993; AERE 1992]. It has been the basis for many legal arguments in important environmental damage suits in the U.S. [Ward and Duffield 1992]. This study’s cost can be leveraged by incorporating the results into other studies through a benefits transfer approach.



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## APPENDIX I SURVEY METHODOLOGY

The study's data was developed through a random sample survey of the B.C. population, 18 years of age and over.

### DATA COLLECTION

Data collection proceeded in two steps; first, a mailing of the questionnaire, map and instructions and second, a phone campaign to solicit answers to the questionnaire.

An initial mailing was needed for a couple of reasons. One, respondents had to have a map, outlining the Fraser River Basin, an unfamiliar geographical term, to answer the questions. Two, completion of the recreation diary required some reflection about the number, activities and sites of 1993 trips or experiences. This information could not easily be conveyed in a conventional phone survey.

This mailing followed the prescriptions of the Total Design Method (TDM). Dillman [ 1978] developed this detailed approach to optimize the three researcher controlled variables of content development, questionnaire construction and survey implementation. The TDM is an "...identification of each aspect of the survey process (even the minute ones) that may affect response quantity or quality and shaping them in a way that will encourage good response.". The mailed items are included in Appendix III.

Crane Management Consultants mailed a personally addressed 9x12 envelope, containing the following items.

- ⊙ a personally addressed introductory letter
- ⊙ a small map of the Fraser River Basin, including an explanation of its boundaries
- ⊙ a questionnaire
- ⊙ a diary

The prospective respondents were asked to complete the questionnaire in anticipation of a phone call from Crane Management Consultants. A week after mailing the questionnaires, representatives of Crane Management Consultants started to phone the prospective respondents. The interviewers wrote down the prepared responses. More than one call was often necessary because the questionnaires and diaries had not been completed at the time of the first or second call.

The interviews occurred in the late March - early April 1994 period. Weekday interviewing was conducted between 5 :00 and 9:30 pm and week-end interviewing between 10:00 am and 4:00 pm. The questionnaire contained 10 items and the diary had 10 columns. There were two basic groups of respondents. Those who did recreate in 1993 in the Fraser River Basin and those who did not do so. Interviews with the latter

group were quite quick, a matter of a few minutes at the maximum. The length of interviews with the former group depended on the number of locations they visited in the Basin. The requirement that respondents complete the questionnaires and diaries prior to the phone canvass greatly facilitated the exercise.

Experienced interviewers conducted the phone canvass. They were briefed in advance, their phone calls were monitored on a random basis and they were supervised at all times.

The survey instruments and techniques were pre-tested on a sample of 20 persons from throughout the Basin. Based on the results, a few questions and instructions were modified to provide greater clarity and greater use of phone follow-up was introduced to maximize response rates.

To obtain a representative gender breakdown, the person, 18 and over, who last had a birthday was requested to complete the questionnaire and diary. Near the start of the phone call, the interviewers asked the prospective respondents if they had completed the questionnaire and diary. If they had not done so, the interviewer asked them to do so and arranged a time to phone the person back. It required the respondent to recall locations of recreation experiences, categorize them and attach an economic value to them.

The interviewers wrote the responses onto a Call Record Sheet. The Call Record Sheets were edited to eliminate any recreation activity sites which were not located in the Fraser River Basin. The recorded responses were inputted into an Excel spreadsheet. It became quite large because each respondent had to be accorded the same space as the person with the most locations. Each completed Call Record Sheet was given an identification number. Only the identification number appears in the Excel file.

The Excel spreadsheet data was transferred to an SPSS file for data aggregation and statistical analysis.

## **SAMPLE**

A random sample was purchased from Dominion Directory, the subsidiary of BC Tel which prints phone directories and the Yellow Pages. It conducted the random selection procedure. The first step in the sampling procedure was to divide the province into three regions. Within each region, a sampling procedure was employed which is based on mapping the linkage between the geographic location of individual telephone exchanges and the Statistics Canada enumeration data for the regions. BC Tel divides the province into small areas with switching centres. Within each switching area, all phone numbers begin with the same two digits. Using census data the switching centres were divided by region. Phone numbers were generated using a random process from the switching centres in each of the regions.

This source was used in order to obtain an address, postal code and a phone number. The shortcoming of the Dominion Directory data is that some B.C. households are not included in the population that the sample is drawn from.

- ⊙ households who are not listed in the phone directories
- ⊙ households without phones
- ⊙ households with incomplete addresses so postal codes can not be attached to them
- ⊙ persons who are resident in institutions such as senior citizen homes
- ⊙ customers of Prince Rupert Telephone
- ⊙ customers of Yukon Tel in the northwest corner of B.C.

Another shortcoming of the sample is endemic to all voluntary opinion surveys. Compared with the overall population, there may be a bias between those who agree to answer the questions and those who do not. The average bias is tied to the response rate, 52 percent for this survey. The quantitative level of bias is not known for this survey. The main reason given for not participating was a lack of time/too busy. The survey does not involve a controversial topic. It would appear that there is no bias from the standpoint of recreation participation versus non-participation. All surveys experience some level of bias from not being able to reach persons with weak skills in the language of the survey.

The effect of non-response depends on the response rate and the extent to which those not responding are different from the sampled population. Budget size is the fundamental determinant of response rate. If more contacts, and as important, sophisticated contacts, are possible, then the response rate will increase.

The widely reported phone surveys are based on random-digit dialing where a very large number of phone numbers are used. The survey firms phone until they find a willing respondent. This has the advantage of reducing costs because the number of call backs is reduced. A mail survey usually requires more lead time and there is a cost for each mailed item so it has fewer potential respondents. There is no time to mail another wave if the response to the first mailing is not satisfactory. The smaller pool reduces the potential for bias.

The literacy requirements of mail surveys usually generate a bias because they stimulate a disproportionate response from the better educated. This problem was diminished in this project because phone interviewers recorded the responses. It does not entirely avoid the problem because respondents required English language literacy skills to read the mailed questionnaire.

An oft-noted bias with mail surveys is that persons with a direct interest in the subject are more likely to respond than those who have a lesser interest. For this survey, the largest groups which have widely different interests are recreationists and non-recreationists. A comparison of initial respondents and the persons who initially refused to respond and later did so shows a similar split between recreationists and non-recreationists but the group of late respondents is too small to test a hypothesis. An instinctive reason that there

should not be a significant bias because of non-recreationists choosing not to respond and recreationists choosing to do so is that non-recreationists had to make a much smaller effort to complete the survey.

The mailing was sent to 4,902 addresses. The sample was stratified by three regions.

- ⊙ Lower Mainland - 2,356 (48%) - Greater Vancouver; the Fraser Valley; Hope area; Fraser Canyon up to Boston Bar; and the Whistler area
- ⊙ Fraser River Basin Interior -1,479 (30%) - Fraser Canyon above Boston Bar; the Thompson region; the Prince George area including the Robson Valley; and the Bulkley-Nechako region
- ⊙ Other B.C. - 1,067 (22%) - the rest of the province

The distribution of the estimated 1993 adult population<sup>29</sup> within these three regions is as follows.

- ⊙ Lower Mainland - 1,384,905 -51.4%
- ⊙ Fraser River Basin Interior - 227,931 - 8.5%
- ⊙ Other B.C. - 1,080,949 - 40.1%

The disproportionate stratification was necessary because a proportionate stratification would have produced fewer respondents with Fraser River Basin recreational experiences; the Other B.C. strata was not likely to contain many Fraser River Basin recreational experiences. A primary study objective is to provide descriptive information on the recreational experiences hence the disproportionate regional stratification.

As shown in Chapter 2, the sample closely resembles the B.C. population for gender, age, and income.

## **RESPONSE**

Table A1 displays the survey's response totals. The second column lists the number of questionnaires which were mailed. The third column shows the distribution of the mailing by region. The number of undeliverable questionnaires plus wrong numbers plus disconnected phone lines is shown in the fourth column. The fifth column shows the number of completed questionnaires. In the sixth column is the distribution of completed questionnaires by region,. The seventh column shows the number of persons who refused to answer the questionnaire. The last column provides figures for those households where the adult with the last birthday could not be reached despite upwards of ten callbacks.

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<sup>29</sup> The adult population estimate was developed by updating to 1993 a BC Stats [1993] estimate of the Basin's 1991 population by Regional District with BC Stats estimates of Regional District 1991-93 population growth and applying 1991 Census proportions for the 18 and over population in the Basin's Regional Districts.

<b>Table A1: Response Totals</b>							
<b>Region</b>	<b>Distrib- uted Question- naires</b>	<b>% of Total Distrib- ution</b>	<b>Undeliv- erable/ discon- nected/ wrong #</b>	<b>Completed Question- naires</b>	<b>% of Completes</b>	<b>Refused to answer</b>	<b>Not Available for interview</b>
<b>Lower Main- land</b>	2,356	48%	159	775	39%	973	449
<b>Interior</b>	1,479	30	80	722	36.5	471	206
<b>Other B.C.</b>	1,067	22	51	483	24.5	378	155
<b>Total</b>	<b>4,902</b>	<b>100</b>	<b>290</b>	<b>1,980</b>	<b>100</b>	<b>1,822</b>	<b>64</b>

The distribution of completed questionnaires is very close to the target distribution as reflected in the initial mailing. Since a phone survey of specific households was used to collect the responses, a portion of the sample could not be reached for various reasons: no answer despite several attempts to phone the household; disconnected phone line; wrong number; and household moved.

The next table shows two response rates for the survey. The first is based on figures for completed questionnaires divided by completed questionnaires plus refused to answer. It indicates the rate of completions for those who could be contacted by phone. The second response rate is based on figures for completed questionnaires divided by distributed questionnaires minus undeliverables, wrong numbers and disconnected phone lines.

<b>Table A2: Response Rates (%)</b>		
	<b>Response Rate/ not available for interview excluded</b>	<b>Response Rate/ not available for interview included</b>
<b>Lower Mainland</b>	<b>44%</b>	<b>35%</b>
<b>Interior</b>	<b>61</b>	<b>52</b>
<b>Other BC</b>	<b>56</b>	<b>48</b>
<b>Total</b>	<b>52</b>	<b>43</b>

The overall response rate of 52 percent is in the 40 to 60 percent range that most CVM surveys fall into [Ministries of Forests and Environment 1994; Ministry of Forests 1991; Hagen et al 1992; Mitchell and Carson 1989]. The lower response rate for the Lower Mainland is expected because it is an urban area where residents receive unsolicited calls from time to time and there is less tolerance for them here.

There is a large academic literature on the subject of maximizing the effectiveness of mail surveys [Dillman 1978; Fox et al 1988] and a comprehensive survey on conducting CVM surveys [Mitchell and Carson 1989]. The five factors found to be most effective in increasing response rates are saliency, sponsorship, follow-up contacts, incentives and personalization.

- ⊙ Saliency refers to the level of interest that the potential respondent has in the topic
- ⊙ Sponsorship can influence a person to respond because of a perceived obligation to or heightened legitimacy of the sponsor
- ⊙ Follow-ups increase response rates and a telephone reminder is more effective than a mailed reminder
- ⊙ Incentives such as money or coupons can increase participation
- ⊙ Personalization of addressed materials is more effective than a general mail out

The non-response problem in mail surveys is largely ascribed to a problem of lack of respondent interest [Dillman 1978]. This survey's subject matter had little or no emotional appeal and was not a topical item. Therefore it was expected that the response rate would be lower.

## **SAMPLE ERROR**

The percentage sample errors at the 95 percent confidence range<sup>30</sup> are the following.

- ⊙ B.C. sample of 1,980:  $\pm 2.2\%$
- ⊙ Lower Mainland sample of 775:  $\pm 3.4\%$
- ⊙ Interior sample of 722:  $\pm 3.6\%$
- ⊙ Other B.C. sample of 483:  $\pm 4.4\%$

Sub-samples with fewer data points have larger sample errors.

## **SURVEY MATERIALS**

The survey material consisted of the following.

- ⊙ introductory letter
- ⊙ map and explanation of Fraser River Basin
- ⊙ questionnaire
- ⊙ diary

There are many prescriptions in the academic literature about how to maximize response rates and quality. The key to a successful survey is to do all the little things correctly. Not every prescription can be accommodated in a survey. For example, it is difficult to include a response incentive, such as a contest, when carrying out a survey on behalf of a public sector organization. Within budgetary and client limits, the survey material was prepared in accordance with current thinking on the subject.

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<sup>30</sup> The 95 percent confidence range signifies that the difference between the actual percentage value and the reported sample estimate will be no greater than  $\pm$  a certain percentage,  $\pm 2.2\%$  in the BC sample case, 19 times out of 20.

A map was included because “Fraser River Basin” is an unfamiliar term to most people. On the back of the map there was a text description of the area.

The questionnaire was divided into three parts. Part I had two general questions to rank respondents on attitude towards environment preservation and recreation activity level. Part II was the study’s centrepiece. It introduced a diary for recording 1993 water based recreation in the Basin and explained how to complete the diary’s 10 columns. The defining characteristic of the activity in the diary was location or site. For each location respondents were asked to provide the following information.

- ⊙ place name of location
- ⊙ region of location
- ⊙ recreational setting
- ⊙ primary activity
- ⊙ secondary activities
- ⊙ seasons
- ⊙ number of visits
- ⊙ average duration
- ⊙ per day economic value

Five hundred plus place names were reported so to facilitate data analysis, the place names were later grouped by the Basin’s 13 watersheds.

Part III contained eight profile questions to provide information to validate the sample and to compare differences between respondents. The questions covered the following areas.

- ⊙ community size
- ⊙ gender
- ⊙ occupation
- ⊙ age
- ⊙ education
- ⊙ household size
- ⊙ income
- ⊙ heritage

The survey materials appear in Appendix III.

## APPENDIX II ESTIMATION OF ECONOMIC VALUE

The survey was designed to obtain a willingness to pay (WTP) amount from respondents for a day of recreation. A dichotomous choice question was used to obtain WTP responses. Econometric analysis yielded an estimate of the mean amount that the sample would be willing to pay for a day of recreation in the Fraser River Basin.

Respondents were asked if they would be willing to pay \$X per day above and beyond their actual expenditures for undertaking a day of recreation in the Basin. The format has the respondent choose yes or no for a single stated cost. Ten different dollar amounts, from \$5 through to \$150, were randomly inserted in the diaries.

To determine the upper limit for yes respondents, they were asked if they would be willing to pay more than the stated amount in the diary. To determine the lower limit for no respondents they were asked if they would be willing to pay less.

The econometric approach was to treat the probability of a no response as a function of the willingness to pay the stated amount. A binary logistic regression model was used to estimate the function [Hagen et al 1992; Patterson and Duffield 1991]. The calculation was done within SPSS software.

The equation is, where  $P_i$  is the probability of a no response and  $v_i$ , the stated value to the respondent.

$$\ln[p_i/(1-p_i)] = \alpha + \beta v_i$$

Because there is only one explanatory variable, the willingness to pay amount, the mean and median for the logistic distribution are readily calculated as  $-\alpha/\beta$ . The willingness to pay data for the activities was grouped into eight categories. One included all the activities. Another included all the boating activities. The grouping was taken for a few reasons: to ensure that there were sufficient data points for each equation; to ease computation requirements; and to facilitate comparison with the 1991 Ministry of Forests study. Eight equations were estimated to provide means for the respondents who attached an economic value of greater than zero to their recreation experiences. The following list shows the categories, their activities and their code number

### **Boating**

1. canoeing
2. water-skiing
3. kayaking
4. motor-boat cruising
5. river rafting
6. sailing
7. windsurfing



### Fishing

8. fishing for salmon
9. fishing for steelhead
10. fishing for other species, such as trout

### Beach / Cabin

11. swimming / sunbathing
12. picnicking beside a river, lake or creek
13. camping beside a river, lake or creek
14. relaxing at a rented or owned cabin or at a waterside hotel/motel

### Hunting

15. waterfowl hunting
16. big game hunting (deer, bear, moose, etc.)
17. small game and bird hunting

### Hiking

18. hiking / backpacking / walking
20. horseback riding

### Nature Study

19. wildlife viewing / bird watching

### Biking / Driving

21. mountain biking on dirt or mountain trails
22. motor biking on dirt or mountain trails
23. driving a 4 wheel drive on dirt or mountain trails
24. highway driving for pleasure

For each equation, Table A2 shows the constant, the  $\beta$  value, the mean, the model chi-square confidence level and the no percentage that the equation correctly predicts. The stated economic values of amounts above zero dollars from all the respondents were used in the calculations. The above zero values came from those who answered yes to the stated amount in the diary and those who answered no but gave another amount above zero.

Table A2: Logistic Regression Results By Activity					
	Constant	B Value	Mean	Model Chi-square	Percent correct
<b>All Activities</b>	<b>-1.4351</b>	<b>.0234</b>	<b>61.26</b>	<b>186</b>	<b>67.63 %</b>
<b>Boating</b>	<b>-2.0378</b>	<b>.0265</b>	<b>76.90</b>	<b>45.512</b>	<b>70.87</b>
<b>Fishing</b>	<b>-1.2091</b>	<b>.0195</b>	<b>62.01</b>	<b>29.845</b>	<b>63.72</b>
<b>Beach/ Cabin</b>	<b>-1.6742</b>	<b>.0296</b>	<b>56.56</b>	<b>88.482</b>	<b>73.52</b>
<b>Hunting</b>	<b>-</b>	<b>.0267</b>	<b>43.84</b>	<b>,109</b>	<b>45.83</b>
<b>Hiking</b>	<b>-1.1706</b>	<b>.0267</b>	<b>43.84</b>	<b>18.999</b>	<b>57.73</b>
<b>Nature Study</b>	<b>-3.9480</b>	<b>.0839</b>	<b>47.06</b>	<b>11.203</b>	<b>78.95</b>
<b>Biking/ driving</b>	<b>-1.2096</b>	<b>.0197</b>	<b>61.40</b>	<b>11.383</b>	<b>69.49</b>

Table A3 shows the mean economic values by region of residence, Lower Mainland, Thompson, and Interior. Calculations on the Other B.C. data was not performed because there were too few Basin users in this group.

Table A3: Logistic Regression Results By Activity and By Region						
Activity	Residence	Constant	$\beta$ Value	Mean	Model Chi-Square	Percent Correct
<b>All Activities</b>	Lower Mainland	-1.2906	.0230	56.11	<b>56.160</b>	71.11
	Thompson	-1.4308	.0245	58.40	<b>27.202</b>	71.97
	Interior	-1.6259	.0260	62.53	<b>36.579</b>	72.3 1
<b>Boating</b>	Lower Mainland	-1.1062	.0199	55.59	<b>9.606</b>	70.00
	Thompson	-2.8201	.0321	87.85	<b>18.590</b>	76.74
	Interior	-2.5571	.0326	78.44	<b>17.116</b>	83.33
<b>Fishing</b>	Lower Mainland	-.9654	.0157	61.49	<b>7.188</b>	62.50
	Thompson	-1.0343	.0226	45.77	<b>6.773</b>	65.67
	Interior	-1.6826	.0268	62.78	<b>15.570</b>	68.85
<b>Beach</b>	Lower Mainland	-2.1186	.0331	64.01	<b>48.920</b>	74.81
	Thompson	-1.0813	.0172	62.87	<b>9.142</b>	64.38
	Interior	-1.7385	.0371	46.86	<b>25.873</b>	78.87
<b>Hunting</b>	Lower Mainland	-2.7418	.0479	57.24	<b>1.304</b>	80.00
	Thompson				<b>,074</b>	60.00
	Interior	-1.4555	.0249	58.45	<b>.724</b>	66.67
<b>Hiking</b>	Lower Mainland	-1.0744	.0246	43.67	<b>11.753</b>	53.85
	Thompson	-1.2386	.0319	38.83	<b>2.234</b>	55.00
	Interior	-19.9171	.4122	48.32	<b>9.641</b>	90.00
<b>Nature Study</b>	Lower Mainland					
	Thompson	-60.5 147	1.0090	59.97	<b>5.603</b>	85.71
	Interior	-4.2 145	.0788	53.48	<b>1.362</b>	50.00

<b>Biking</b>	Lower Mainland	-1.4181	.0184	77.07	6.919	71.43
	Thompson	-2.4105	,0898	26.84	3.544	75.00
	Interior					

The open-ended valuation question distinguished between those who would be willing to pay some amount, whether the stated amount or a lower amount, and those who would not pay anything. In the former case, there is a non-zero economic value and in the latter, the economic value is zero. Where the economic value is zero, the probability of a no response is not a function of the stated willingness to pay amount so they were not used in the logistic regression calculations. The respondents were separated into two groups, those who indicated a non-zero economic value and those who did not do so. The preceding two tables gave the mean economic values for the former. The mean willingness to pay for the latter group is zero. Averaging the mean WTP of both groups together provides a weighted average for the sample.

Table A4 shows the mean WTP values for the whole sample. They are the net economic values used in the report's text. The previous two tables reported the mean WTP for only those who stated they would be willing to pay an above zero amount.

<b>Table A4: Mean WTP Values for Non-Zero and Zero Responses (1993\$)</b>				
<b>Activity</b>	<b>B.C.</b>	<b>Lower Mainland</b>	<b>Thompson</b>	<b>Interior</b>
All	\$26.39	\$33.44	\$22.61	\$23.63
Boating	33.45	31.23	37.77	25.58
Fishing	27.21	37.84	17.22	21.88
Cabin	27.89	40.71	24.16	20.04
Hunting		17.88		11.31
Hiking	15.35	19.18	10.64	9.86
Nature Study	17.19		19.08	26.74
Biking	24.48	41.49	6.51	

## APPENDIX III QUESTIONNAIRE

February 28. 1994

<<Name>>

<<Address 1>>

<<cityprov>>

<<postal>>

Under contract to Environment Canada, Crane Management Consultants Ltd. is conducting a survey on recreation use of water resources in the Fraser River Basin. ***Whether or not you have an interest in this area, we would like you to take a few minutes to complete the enclosed questionnaire. In a few days, a Crane Management representative will phone you to record your responses.*** Do not mail your answers to us; we'll phone you to obtain them. Your participation will help to form environment policy in the Federal Government. The survey results will also be used by many other organizations, local governments, B.C. Government, environmental groups, businesses. etc..

***It is important that you participate in this survey; no matter what your feelings about the subject may be. We want to obtain the full range of experiences.*** We are striving to make your participation convenient; we provide the questionnaire in advance and phone you to record your responses. If you are not available the first time we call, we'll probably try again.

Only one person in your household should complete the questionnaire. We would like the adult, defined as the person 18 and over, who last had a birthday to fill out the questionnaire. We make this request to assist in obtaining a representative sample of adult British Columbians.

The individual responses will remain confidential to Crane Management Consultants. ***Your name will not be connected to your answers in any way.***

If at all possible, take some time and complete the questionnaire right now so you have your answers ready when we phone. Thank you for your interest and cooperation on this important project.

Yours Sincerely,

Derek DeBiasio, CMC

## FRASER RIVER BASIN MAP

The Fraser River Basin is a large area. The attached map shows that the Basin stretches from the Rocky Mountain Trench, along the B.C.-Alberta border to the Lower Mainland of south-west B.C. and from Bulkley House in north-central B.C. to the Skagit River Valley, below the Canada-U.S. border. It drains one-quarter of the province but three-quarters of the Basin's population is concentrated in the Lower Mainland.

It does not have legislated boundaries as does a political jurisdiction. The University of British Columbia's Westwater Research Institute has defined its borders from an ecological perspective, watershed boundaries. Probably the key feature of Westwater's definition of the Fraser River Basin is the inclusion of watersheds of several major tributary river systems. The Fraser's drainage catchment includes:

- ⊙ the Nechako River and Stuart River sub-basins in the north
- ⊙ the West Road River, Quesnel River and Chilcotin River sub-basins in the mid- region
- ⊙ the Thompson Rivers from the east
- ⊙ the Harrison-Lillooet sub-basins; the Chilliwack, Pitt, Coquitlam and Sumas Rivers

There is always some question about what is included and what is not included at the boundaries of a large area. The Fraser River Basin includes the Shuswap system but it does not include the Okanagan Valley lakes and rivers. Its southeast border runs along the peaks of the Cascade Mountains. In the Lower Mainland, it includes the south arm of the Fraser in Ladner but it neither includes Boundary Bay nor the Nicomekl and Serpentine Rivers. The Lower Mainland's North Shore is not included, neither Burrard Inlet nor the Capilano and Seymour River systems. The northern boundary in Greater Vancouver runs through Burnaby and Vancouver along King Edward Avenue to UBC. The Basin includes Sea Island at the mouth of the North Arm and Westham Island at the mouth of the South Arm and through Ladner. The Whistler area is also near a Basin boundary. Pemberton lies within the Basin. Emerald and Green Lakes are in but Alta Lake and the Cheakamus River are not. The Basin's western boundary follows the peaks of the Coast Mountains.

For purposes of analyzing the responses, we have divided the Fraser River Basin into three regions. The boundaries appear on the map in dotted lines. In column 2 of the diary you put the number of the region where the location of the recreation activity is found. The three regions are as follows.

1. *Lower Mainland*; including Greater Vancouver, Pemberton, the Fraser Valley out to Hope. Whistler is on the boundary and is included.
2. *Thompson*; including Cache Creek, Merritt, Kamloops, Armstrong, Salmon Arm and 100 Mile House. Spallumcheen is on the boundary and is included.
3. *Fraser Canyon/Upper Fraser*; including Yale, Lytton, Williams Lake, Prince George, Burns Lake, and McBride



QUESTIONNAIRE  
OUTDOOR RECREATION ACTIVITIES  
IN THE FRASER RIVER BASIN

Prepared by: **Crane Management Consultants Ltd.**

Prepared for: **Federal Department of Environment**

**Participate**, have a say in the management of the Fraser River Basin, by completing this questionnaire. Try to answer every question; missing answers will limit the usefulness of this study. A few days after you receive this questionnaire in the mail, a representative of Crane Management will phone you to write down your responses. Prepare your answers in advance of the phone call.

February, 1994



## Outdoor Recreation Activity in the Fraser River Basin

**INSTRUCTIONS:** Circle the letter which best corresponds to your answer, or fill in the blanks as indicated.

### Part I            YOU AND OUTDOOR RECREATION

At the outset, we would like to know some of your general opinions about the environment and outdoor recreation.

(1) In general, how important is protection of the environment to you? (circle the letter)

- a.        Very Important
- b.        Somewhat Important
- c.        Not Very Important
- d.        Not Important At All

(2) In general, how would you rank yourself in terms of the amount of outdoor recreation that you engage in? (circle the letter)

- a.        Very Active
- b.        Somewhat Active
- c.        Not Very Active
- d.        Not Active At All

## PART II      ACTIVITY AND VALUE

***Enclosed with this survey is a map of the Fraser River Basin.*** It is a large area and includes not only the area in and around the Fraser River but so too its many tributaries. Refer to the map when answering the Part II questions.

We do not want to know about all of your recreation or tourism activities in this large area. ***The water based activities are our concern.*** They are the activities where water has a critical role. Various governments and outside organizations have been studying and undertaking projects to sustain the well-being of the water bodies within the Fraser River Basin for many years and this survey is part of that on-going effort.

Please answer EVERY question which applies to your situation. It's important from the perspective of obtaining a complete picture.

### **Outdoor Recreation Activity Diary**

Instead of asking several questions we have tried to simplify the reporting of activities for you. The questionnaire was pre-tested to make this questionnaire as easy as possible to complete given its scope. It is set up as a ***simplified diary***. If you want, you can go get your calendar if you use one and flip through it, just to jog your memory. We do not want you to go to a lot of effort to answer the questions. You do not have to come up with the date of the activity. Simply remember your activities as best you can.

If you did not undertake water-based outdoor recreation activities in the Fraser River Basin in 1993, YOU can skip to Part III. Respondent Profile. Before deciding on whether or not you participated in these activities, read the list on page six of this questionnaire. It is important to complete Part III even if you did not undertake water-based recreation activities in the Fraser River Basin in 1993.

Our diary is set up so that the defining characteristic of your activity is its location. As you can appreciate it is important to know where activities occur, at least in a general sense. People usually have favourite spots where they make repeat visits so the reporting in our diary should not be daunting.

You only need to remember what you did during 1993. We ask for the activities over the year because we want to know about the complete range of them.

The diary is provided separately. Complete it according to the following instructions.

The following instructions briefly explain how to complete the diary. The best approach is to read all the instructions first then complete the diary.

### ***1st Column***

The **first column** asks you to list the locations of your water based recreation activities in the Fraser River Basin. You need only define the locations in a general sense, eg. Lake Francois, Vedder River, Fraser River near Yale, etc., but it is important to the study to identify them. Use the map to better understand the borders of the Fraser River Basin and what it includes. You do not need to list locations outside of the Fraser River Basin where you undertook outdoor recreation activities.

### ***2nd Column***

We have divided the Basin into three regions as you can see on the map. Our map shows you the borders of the three regions. In the **second column**, place the number of the region, within the Fraser River Basin, where the location is situated.

### Activities List

(Note - In some instances, more than one activity may be undertaken during the course of a day. Select only one activity for column four, the primary activity, from the following list. In most instances, it is clear that water is an important part of the recreation experience. In a few instances, you will need to use your own judgement but we are interested in your opinion about whether or not water was a factor in the overall recreation experience. If you think it was a factor, then include the experience in the diary, if you think it was not, do not include it.)

#### Boating

1. canoeing
2. water-skiing
3. kayaking
4. motor-boat cruising
5. river rafting
6. sailing
7. windsurfing

#### Fishing

8. fishing for salmon
9. fishing for steelhead
10. fishing for other other species, such as trout

#### Beach / Cabin

11. swimming / sunbathing
12. picnicking beside a river, lake or creek
13. camping beside a river, lake or creek
14. relaxing at a rented or owned cabin or at a waterside hotel/motel

#### Hunting

15. waterfowl hunting
16. big game hunting (deer, bear, moose, etc.)
17. small game and bird hunting

#### Hiking / Viewing

18. hiking / backpacking / walking
19. wildlife viewing / bird watching
20. horseback riding

#### Biking / Driving

21. mountainbiking on dirt or mountain trails
22. motorbiking on dirt or mountain trails
23. driving a 4 wheel drive on dii or mountain trails
24. highway driving for pleasure
25. Other \_\_\_\_\_

### 3rd Column

In the **third** column place the letter from the following list of recreational settings which best describes this location.

- a. **Primitive:** a natural environment, minimal evidence of human use, no motorized access, access is by trails; basic recreational facilities, if any
- b. **Semi-Primitive:** a natural appearing environment, some evidence of human use, may or may not have motorized access; may occasionally meet people; minimal recreation facilities.
- c. **Roaded Resource Land:** accessible by a highway vehicle but with a natural environment; you will meet others in cars, trucks and on motorbikes; landscape may be altered by logging, farming, mining or grazing; recreation facilities such as remote camp spots.
- d. **Rural:** accessible by a highway vehicle, a substantially modified environment and extensive evidence of human use; recreational facilities such as developed campgrounds.
- e. **Urban:** cities, towns, large resorts and major ski areas with buildings, paved roads and lots of people. Many developed recreational facilities and easy vehicle access.

### 4th Column

The **fourth** column asks for activity. Select the appropriate number from the list on the opposite page and place it in this column. If you happen to undertake more than one activity at a location, select what you consider to be the primary activity. We want to avoid double-counting days, so select one primary activity. For example, if you undertook salmon fishing and photography on a two day week-end trip. Select the primary activity. If it is salmon fishing, mark 9 in this column. If you happen to have visited a site on separate occasions and undertook different primary activities on each occasion then write down a complete entry in the diary for each occasion.

***5th Column***

If you undertook one or more secondary activities at this location select the appropriate number(s) from the activities list and write them in the **fifth column**.

***6th Column***

In the **sixth column**, state the number of trips that you took to this location in 1993 in order to carry out the stated primary activity.

***7th Column***

In the **seventh column**, state the average duration in days of the visit at this location. Simply provide an estimate of the overall average per trip or visit. Maybe there was only one trip which simplifies giving an answer. Perhaps there were a few trips of the same duration. If the trips varied in length, try to add the total number of days up in your mind and come up with an estimate of the average.

***8th Column***

In the **eighth column** write down the letter(s) which corresponds to the season(s) that you visited the location.

- a. Summer
- b. Fall
- c. Winter
- d. Spring

***9th Column***

The **ninth column** focuses on the economic values that you attach to your outdoor recreation activities. At the top of the column, there is a dollar amount. Circle yes or no as to your willingness to pay this amount per day above and beyond what you daily paid to participate in this activity at this site. You probably spent some money on gas, license fees, equipment, etc., to undertake the activities. Try to think of an average per day cost to you for the activities at the sites that you have listed. Would you have paid the amount, per day, at the top of this column, in addition to your actual operating and capital expenses, to participate in these activities at these locations? (Note - The question is structured this way to simplify your job. There is a range of dollar values distributed throughout all of the questionnaires. We'll determine the average value from all of the yes/no responses.)

You can say yes to the dollar amount for one location and activity, such as Vedder River and salmon fishing, and no for another location and activity, such as Pitt River and waterfowl hunting. Keep in mind a few factors as you answer this question.

- ☉ it is NOT an attempt to gain a better idea of what people would be willing to pay as a license fee; we want to know what you would be willing to pay above and beyond all of the other expenditures you must now make to enjoy these activities.
- ☉ your own ability to pay and how this payment fits in with the others you must make
- ☉ the availability and quality of alternative sites; how does this site compare to others that you might use for the same activity

### *10th Column*

If your answer was yes in column nine, is there a higher per day amount that you would have paid to participate in this activity at this site? If yes, please state the amount in **column ten**. If no, leave this column blank. If your answer was no in column nine, is there a lower per day amount that you would have paid to participate in this activity at this site? If yes, please state the amount in **column ten**. If no, leave this column blank.

### PART III      RESPONDENT PROFILE

The following questions serve to develop a profile of the respondents to the questionnaire. Your answers will help to ensure that we have a representative sample of the B.C. population. They will be kept confidential. Please circle your response or fill in the blank, where appropriate.

(1) What is the approximate size of the community where you reside?

- a.        rural area or a town of less than 2,500
- b.        town or small city of 2,500-25,000
- c.        city of 25,000-1 00,000
- d.        city of 100,000-250,000
- e.        large city of more than 250,000

(2) Are you..

- a.        female
- b.        male

(3) What is your age? years.

(4) What is your occupation? (use homemaker or retired if they are suitable descriptions)

\_\_\_\_\_

(5) What is the highest level of education that you reached?

- a.        less than high school diploma
- b.        high school diploma
- c.        some college or university
- d.        college diploma or university bachelor's degree
- e.        more than a university bachelor's degree

(6) How many people (including yourself) live in your household?

\_\_\_\_\_ adults    \_\_\_\_\_ children



(7) Which of the following categories best describes the total amount of income received by all members of your household during 1993?

- a. less than \$15,000
- b. \$15,000-\$30,000
- c. \$30,000-\$45,000
- d. \$45,000-\$60,000
- e. \$60,000-\$75,000
- f. \$75,000-\$90,000
- g. \$90,000-\$105,000
- h. greater than \$105,000

(8) What race or ethnic origin do you consider yourself to be?

- a. Asian
- b. Black or Afro-Canadian
- c. East Indian or Indo-Pakistani
- d. Native Indian or Aboriginal North American
- e. White or Caucasian
- f. Other \_\_\_\_\_

**Fraser River Basin  
Water-Based Outdoor Recreation Diary  
January 1, 1993 to December 31, 1993.**

[illegible]