HARVESTING CROPS BETWEEN THE TREES:
A Study Of Recreation Valuation

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M.Sc., The University of British Columbia, 1988

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE

in

THE FACULTY OF GRADUATE STUDIES
Parks and Recreation Resources Programme
Department of Forestry

We accept this thesis as conforming
to the required standard

THE UNIVERSITY OF BRITISH COLUMBIA
April 1988
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ABSTRACT

A non-market valuation of recreation activities on private forest land is undertaken to provide information for integrated forest management decision making. The Contingent Valuation Method is applied, through the use of a mailed questionnaire to a random sample of the households within the Capital Regional District on Vancouver Island, to estimate willingness-to-pay values and derive potential gross benefits for hunting, fishing and camping on the study area. Recreation activity participation levels and socio-economic characteristics of participants are discussed for each activity on the landbase. Recreation activities, in particular fishing, have a good potential for producing substantial benefits on the study area.
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ACKNOWLEDGEMENTS

I would like to acknowledge the guidance and assistance provided me by my supervisor, Dr. Peter J. Dooling and by my committee members: Dr. Roger Reid; Bruce Devitt, RPF; and Dr. Julien Demaerschalk. Appreciation is also extended to Dr. Roger Reid, Mr. Dan Gardiner, and CIP Inc. for additional professional and technical support.

Gratitude is expressed for the financial support of this research: a Graduate Research Engineering and Technology award from the B.C. Science Council with support of CIP Inc., Tahsis Pacific Region and the University of British Columbia; a summer research stipend awarded by UBC Faculty of Forestry through the Canadian Forestry Service Block Grant; and through three summers of employment with CIP Inc., Tahsis Pacific Region.

My admiration, love and thanks are proffered to my dear wife Katherine and to each of my children: Jenny, Naomi, Michael and Krystal; in recognition of the great sacrifice they have made on my behalf and the support they have been to me throughout this endeavor.
Chapter 1. INTRODUCTION

1.1. BACKGROUND

Forest recreation has been occurring for centuries but it is only in the past three decades that it has surged forward as a product of the forest resource to be utilized, protected and enjoyed in the minds of the North American public (Meis, 1979). An increase in man's discretionary time and income has heightened his awareness of the forest resource and has stimulated greater participation in, and demand for, forest recreation.

Forest land owners have timber crops that generally can be harvested only once every 60 - 150 years. Though the financial returns may be great at harvest time the carrying charges for the intervening years can also be very high (Harrison, 1983; Rosebrough, 1986). What are the possibilities of simultaneously producing revenues from other forest resources on the same landbase? This thesis studies that question for selected recreation activities on a specific landbase.

Contrary to some opinions, recreation opportunities do not necessarily reduce timber production. Though some recreation experiences, such as those associated with wilderness or roadless areas, do affect potential timber harvest, most recreation activities have little impact on Annual Allowable Cut though they do impact on timber management strategies (Gibbs et al., 1979).
The potential for deriving additional income from that landbase, on a seasonal or annual basis while each timber crop is maturing, should be examined if optimum productivity, utilization and economic returns are to occur.

The difficulty in accurately valuing non-marketed forest resources has been the greatest stumbling block in the integration process. This leads one to question how one can determine the potential value of recreational use of forest lands. The art and science of estimating such values has been the object of a substantial amount of research, primarily in the U.S.A. (Cummings et al., 1986).

The major non-market valuation techniques presently in use are the Contingent Valuation Method (CVM), the Travel Cost Method (TCM), and the Hedonic Price Method (HPM) (Bishop and Heberlein, 1979; Kealy, 1982; Knetsch and Davis, 1966). Each of these will be discussed in greater depth in the literature review in the next chapter.

1.2. PROBLEM

1.2.1. Physical setting

The 18,000 ha. case study area is identified on the map in Figure 1. It is located in the southwestern corner of Vancouver Island approximately 40 km. west of Victoria, just north of Sooke, B.C. It includes a CIP landbase within the total study
area landbase. The delineation of the two landbases is shown in Figure 2. Two recreation features and the general landscape of the study area are depicted in the photographs in Figure 3. CIP's Crown granted landbase is approximately 10,000 ha. of Forest Management Unit #7.¹ The remaining 8000 ha. of the study area is also fee simple land primarily owned by two other forest companies; British Columbia Forest Products and Western Forest Products, though included are a few small parcels of privately owned non-commercial forest land.

The study area lies primarily within the Coastal Western Hemlock biogeoclimatic zone, in the Drier Maritime subzone with a Vancouver Island variant (CWHa1). A small area in the northern central portion of the study area lies in the Wetter subzone with a Leeward Montane variant (CWHb4). The climate in this area is characterized by warm summers, mild winters, an annual precipitation of 2123 mm (7% snow) and 35 mm precipitation in the driest month (Klinka et al, 1984).

Most of the study area has previously been harvested and is presently stocked with immature plantations (0-20 yrs. old). The predominant species present is Pseudostuga menzesii (Mirb.) Franco. Other major species noted are: Tsuga heterophylla (Raf.) Sarg., Pinus contorta Douglas ex Loud., Thuja plicata Donn ex

¹Taxation Tree Farms were rolled over into Managed Forest classifications with an amendment to the B.C. Assessment Act effective January 1, 1987.
D.Don in Lamb. Due to the climate and the pockets of productive soil amidst the numerous rock outcrops, the area is suited to long rotations of high quality timber.

The study area is presently used by a wide variety of recreationists engaged in a number of recreation activities, ranging from hunting, fishing, swimming and camping to mountain biking, apiaries, and gold panning. As no recreation use or user data has previously been obtained for this area the acquisition of such is included as an objective of this work. To date, CIP Inc. has permitted the public to use this area free of charge, except for firewood and apiary permits.

One negative aspect of resource use integration is that the increase in recreational use also increases the risk of fire. This increased risk would be partially offset by an increase in surveillance and available fire fighting manpower plus a reduction in forest fuels. The physical features of the area and CIP's current juvenile spacing program provide additional opportunities for recreation inputs that are compatible with timber management. For example, the rocky outcrops provide natural viewpoints for hikers and horseback riders. When thinnings are removed the spaced forest improves recreational accessibility, increases viewing distance and enhances the

2A more complete list of the recreation activities presently participated in on the landbase may be found in Appendix A.
appearance of the area. The longer rotations provide longer periods of time between the visual impacts of harvesting. The Sooke River provides the primary water/forest interface and supports swimming, sunbathing, fishing and camping as well as a variety of wildlife. Other small lakes such as Ranger, Tugwell, and Macdonald, also provide similar opportunities. The area is well suited to integrated use forest management.

FIGURE 1
LOCATION MAPS OF STUDY AREA
FIGURE 3

PHOTOGRAPHS OF THE STUDY AREA

Ranger Lake

Tugwell Lake area

Sooke River
1.2.2. Reasons for the study

A market analysis should be conducted to determine the feasibility and economic potential of recreation use on a particular landbase. Such an analysis would include an assessment to estimate the amount and type of recreation use and users, the recreation users' willingness-to-pay (WTP) for that use, and the cost of provision of present and potential recreation resources (Dyer and Hof, 1979; Dwyer and Bowes, 1979).

Six of the major factors for conducting such a market analysis for this case study area are:

1. The need for recreation use and user data to assist in making integrated forest management decisions.

2. The need for alternative sources of income to offset the costs of maintaining the land, roads and timber, plus paying the taxes, over the next timber crop rotation (60-150 years). As the land is largely stocked with age class 0-20 trees there is little means of income for the duration of the rotation.

3. The expected user demand on the study area generated from the construction of Deer Trail Development. This is a private hotel/conference and recreation facility of international magnitude and calibre, which is surrounded by CIP Inc. forestland within the study area.3

4. The user demand generated due to the proximity of this area to the populace of Victoria (256,311) with its high annual volume of

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3This development is situated on a cliff overlooking the Sooke River. It lies within a 5 km narrow corridor along the river. The project was originally supported with TIDSA funding. Further funding for completion is still being sought.
tourist traffic (1,500,000 visitor days). The restricted supply of forest oriented outdoor recreation services due to very few public and private overnight use recreation facilities in the area. This study area is the closest available forest landbase to the CRD population. There is very little Crown land available in the CRD for adding to either the Provincial or Regional parks system, or for the Forest Service recreation program.

6. The perceived level of present recreational use of the area.

The above factors indicate that there is considerable potential for increased recreation demand for, and use of, the landbase beyond the present levels.

1.3. STUDY OBJECTIVES

In line with the above reasons for conducting this study, the following objectives are identified:

1. To estimate the present use by those persons who have engaged in outdoor recreation activities on CIP lands and on the study area, who live within the Capital Regional District (CRD), excluding the Gulf Islands.

2. To identify household and personal socio-economic characteristics of CIP land and study area users.

3. To identify the preferred recreation activities of CIP land and study area users.

4. To estimate the user's willingness-to-pay for hunting, fishing and camping on CIP land and the study area.

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4The first figure is the population estimate for the Capital Regional District (CRD), excluding the Gulf Islands and Outer Islands as provided by the 1986 Census. The second figure is taken from 1985 statistics provided by the B.C. Ministry of Tourism.
5. To estimate the current annual potential gross benefits from hunting, fishing and camping on both landbases.

6. To compare the willingness to pay values obtained using the CVM with values obtained from other studies.

These objectives will be attained through the implementation of the methods and procedures presented in the remainder of this work.

A literature review of non-market valuation techniques is presented in Chapter 2. It is followed by a description of the study design in Chapter 3. Chapter 4 reports the use of all activities on the area and respondent characteristics. The use and characteristics of households intending to participate in the selected activities on the study area are described in Chapter 5. Chapter 6 outlines the derived WTP values and estimated annual gross benefits. Concluding remarks and recommendations are presented in Chapter 7.
Chapter 2. LITERATURE REVIEW

In this section recreation use and user data and the valuation of specific recreation activities on a private forest landbase are placed within a broad private forest recreation planning framework. The need for non-market valuation of goods and services is discussed. The valuation methods available are identified and compared. A discussion of the major issues in the use and applications of the methods is undertaken, with particular emphasis on the CVM. The acceptability of the CVM as a non-market valuation technique is addressed.

2.1. PRIVATE-SECTOR FOREST RECREATION PLANNING

For effective private-sector forest recreation planning to be undertaken, and as an integral part of the planning process, ten important steps should be taken (see Figure 3). These steps require certain information on which to base decisions. They include:

1. The identification of a particular landbase or land unit for planning purposes.
2. A complete resource inventory of that landbase.
3. Consideration of environmental attractions, problems, hazards and/or restrictions.
4. The collection of social and economic data of those who use the area (present use assessment) and those who would use the area (demand assessment).
5. Public policies regarding the use of that land for each activity.
6. Private/company policies regarding the use of that land for each activity.

7. An assessment of the area to determine it's capability and suitability for supporting particular activities; physically, economically, environmentally, culturally, and aesthetically.

8. The 'value' of providing such an opportunity or facility to the company and to the public.

9. The cost of provision, operation, maintenance, and liability of those facilities or opportunities.

10. The identification of those activities with revenue producing potential and the determination of that potential revenue.

This study provides information for the social and economic components of the above planning framework for the study area.

FIGURE 3
PRIVATE-SECTOR FOREST RECREATION PLANNING MODEL

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1The conceptualization of the schematic for this framework is the work of Dr. P.J. Dooling.
2.2. THE NEED FOR THE VALUATION OF NON-MARKET GOODS AND SERVICES

Because of law and tradition, recreation activities and opportunities are frequently provided on a basis which does not reveal how much they are worth to us (Crutchfield, 1962). In other words they are not priced in the market. The mere existence of the forest resource permits people to participate in recreation activities which produce varying amounts of satisfaction or utility. This satisfaction or utility received by an individual represents a primary benefit. We need a 'cardinal index of satisfaction' to serve as a measure of value. In the consumer's surplus concept, i.e. the difference between the price a consumer is willing to pay and the price actually paid for a commodity (Gibbs et al., 1979), money can be an acceptable cardinal index of satisfaction or utility (Langford and Cocheba, 1978). Though it may have its drawbacks, money is the medium of exchange in our society, therefore economists use it as a measure of value. This index (money) is particularly useful when management decisions must be made between a number of different and competing commodities.

As market prices do not exist or are not available for many goods and services, other methods must be used to obtain monetary values. Such methods are collectively referred to as 'non-market valuation techniques' and include among others the Hedonic Price Method, the Travel Cost Method and the Contingent Valuation Method. The purpose of using a non-market valuation technique in
this study is to value goods which, though not presently marketed, may be marketed in the future.

According to Cummings et al. (1986) non-market valuation techniques developed in the following way: The HPM was developed for the most part by Rosen (1974) for the valuation of certain classes of non-market goods. The TCM was proposed by Hotelling (1949) and later refined by Clawson and Knetsch (1966). The CVM involved the use of surveys and was introduced by Davis (1963), Knetsch and Davis (1965), Bohm (1972), and Randall et al. (1974). The structure set out by Randall et al., (1974) provides the basis for what we now refer to as the Contingent Valuation Method (Cummings et al., 1986).

A description and comparison of these techniques will now be undertaken to provide a brief overview of their theory and applications.

2.3. COMPARISON OF THREE METHODS OF NON-MARKET GOODS VALUATION

2.3.1. Hedonic Price Method

The Hedonic Price Method is the most recently developed and least frequently used of the three valuation methods. It is a technique for estimating the implicit prices of the characteristics of a good or service, i.e. it uses attributes or characteristics as inputs to arrive at a certain value of the unpriced activity (Freeman, 1979). For example, values for a day of fishing
are derived from inputs of site characteristics, quality aspects of the experience, number of fish caught, etc. (Adamowicz and Phillips, 1983). Air quality values may also be derived from residential housing prices. Such prices may include premiums and discounts for locations in clean or dirty areas. The resulting price differential between two otherwise similar areas could represent the value placed on a certain level of air quality (Freeman, 1979). The total expenditure on an activity or amenity is expressed as a function of the various characteristics used in the production of that good (Adamowicz and Phillips, 1983). The range of applicability of the HPM is limited to amenities for which related goods-markets convey adequate information, and is restricted to the experienced range of provision levels (Randall et al., 1983).

2.3.2. Travel Cost Method

The TCM is a more commonly used technique of non-market valuation. It estimates the total net value of a flow of goods and services produced by a given site and attributes this value to the site. This is accomplished by using transportation plus other user cost data to estimate a demand function for the site. An integral of this demand function is then taken as an estimate of total consumer's surplus of the site (Langford and Cocheba, 1978). It is important to emphasize that the TCM is a site valuation technique and not merely a valuation of the cost of travel itself. Probably the most troublesome issue with this
method is valuing travel time (Rosenthal et al., 1984). Bishop and Heberlein (1979) indicated that travel time is valued in the range of 25-50% of regular hourly wages. They have since refined those values further, suggesting an average of 33% as the most appropriate estimate (Bishop and Heberlein, 1980).

The main assumptions of the TCM are that:

1. There is sufficient variation in prices (travel cost) to statistically identify the demand function

2. All the relevant variables that affect demand are properly represented in the TCM model (i.e. the functional form is correct)

3. There is no shortage of the good in question resulting in unsatisfied demand (Rosenthal et al., 1984, p.3)

2.3.3. Contingent Valuation Method

Over the past two decades numerous works have utilized the CVM but the most thorough and comprehensive assessment of the CVM has been presented by Cummings et al. (1986).

The CVM is a survey method, defined by Randall et al. as follows:

"Contingent valuation devices involve asking individuals, in survey or experimental settings, to reveal their personal valuations of increments (or decrements) in unpriced goods by using contingent markets. These markets define the good or amenity of interest, the status quo level of provision and the offered increment or decrement therein, the institutional structure under which the good is provided, the method of payment, and (implicitly or explicitly) the decision rule which determines whether to implement the offered program."
Contingent markets are highly structured to confront respondents with a well-defined situation and to elicit a circumstantial choice contingent upon the occurrence of the posited situation. Contingent markets elicit contingent choices" (Randall et al., 1983, p.637).

The CVM asks individuals about their contingent valuation rather than their attitudes or opinions, i.e. their willingness-to-pay (WTP) for a given benefit or their willingness-to-accept compensation (WTA) for a benefit foregone.

The CVM involves some of the most difficult measurement problems faced by economists (Bishop et al., 1983). Though encumbered by the issues that follow, it is purported to have the ability to isolate the value of an individual activity or component from the values of other activities or components (Hammack and Brown, 1974). It can distinguish between private, public, option and existence values (Cocheba and Langford, 1981) as well as be used to determine the benefits of mobile resources such as animals or fish (Adamowicz and Phillips, 1983). It also has advantages over the TCM for the valuation of areas where distances travelled by users do not show sufficient variation (Dwyer et al., 1977).

It should be noted that none of the above methods are directly capable of 'netting out' the costs of provision of activities or facilities (Rosenthal et al., 1984). Those costs of provision are essential in complete financial analysis calculations and must be obtained separately and incorporated into the overall
model to determine the net value.

2.4. MAJOR ISSUES IN THE USE AND/OR APPLICATIONS OF THE METHODS

2.4.1. Hedonic Price Method

This method creates a problem in finding a 'quality' variable that is common to all consumers, i.e. a variable that indicates the quality of an experience such as the aesthetics of the setting. This method is indirect, thus implicit rather than explicit in its valuation of a particular good or service. It also has difficulty dealing with the compound effects of multiple inputs on each other; for example, where fishing and camping occur in the same trip. Also, it does not handle the valuation of time very easily (Adamowicz and Phillips, 1983).

2.4.2. Travel Cost Method

The TCM has difficulty in quantifying trip making behavior because:

1. Travel must be incurred exclusively for one site
2. There must be few benefits to travel itself
3. The opportunity cost of travel must be known

Binkley (1980), a proponent of the TCM, argues that transportation is a larger fraction of the total costs of recreation than it is of many other goods, and thus provides the reason why consumer's surplus is needed and why travel costs can be used to obtain it. Johnson (1980) says that it is not the travel cost
itself that measures site value (or more properly, the value of the "recreation experience" at a given site) but that the WTP for site access is reflected in the observed travel distance-decay pattern of visits.

Though many accept Johnson's (1980) statement, it can be argued that those participants living closest to the recreation site may value that site as much as or more than those living further away. The very proximity of their home to such a site may be indicative of the people's value of that resource, i.e. their value of the resource may be the reason for choosing to live nearby. Thus, travel costs for these persons do not reflect well the value of that at-hand recreation site (P.J. Dooling 1986, personal communication).

2.4.3. Contingent Valuation Method

The major issues found in the CVM arise primarily from the use of mail questionnaires and their hypothetical nature. The problems identified by Cummings et al. (1986), are: strategic bias, understanding the commodity, starting point bias, vehicle bias, information bias, discrepancy between WTP and WTA values, hypothetical bias, and accuracy. After working through each of the above issues with the input from 12 economists, Cummings et al. (1986) have offered the following definitions and summaries of the 'leanings' of those involved for each concern identified. These comments are not intended to represent conclu-
sive evidence or total agreement by all CVM researchers, but rather, Cummings et al.'s view and summary of the information presented to them. Comments regarding the extent to which each bias is found in this study are noted, where applicable, following each of Cummings et al.'s statements.

**Strategic bias**

Strategic bias is also known as 'free rider' behavior. This involves the respondent overstating or understating his true willingness-to-pay to impose his own preference on the other participants.

Strategic bias does not appear to be a major problem in applications of the method. There is an absence of strong empirical evidence for 'free riding' behavior. Neither theoretical arguments nor empirical evidence are compelling in terms of strategic behavior by CVM participants. A trade-off is suggested between strategic bias and hypothetical bias.

**Understanding the commodity**

Understanding the commodity refers to the degree to which those persons interviewed know and understand the commodity in question.

Results from the literature offer little that would support the notion that subjects, during the relatively brief period of the CVM interview, could define their preferences for a new, unfamiliar commodity in any meaningful way. Thus, an understanding of the commodity should be a prerequisite or condition upon which the question may be asked.

All of the subjects answering the WTP questions in this thesis would have had prior experience with the commodity and thus met the conditions to minimize this bias.

**Starting point bias**

Starting point bias is a problem in 'bidding game' methods of deriving WTP values. It is concerned with the opening bid presented to the subject. This bias arises if respondents either attempt to minimize their effort or if they are unfamiliar with the value of the
commodity in question. If this is so the respondents tend to be guided by the bids suggested by the interviewer. Thus, the higher the starting point value the larger the mean bid will be (Reid, 1987).

Two methods are suggested for minimizing starting point bias. They are: the use of a payment card and 'bracket and halving'. Payment cards can be structured so as to eliminate the potential for 'entering biases'.

This thesis used the payment card in a mail questionnaire to circumvent this bias.

Vehicle bias

Vehicle bias refers to the means of payment or 'payment vehicle'. Differences in the WTP values obtained are evident when various payment vehicles are used. This has been evident in studies comparing the use of taxes with entrance fees as payment vehicles.

There is little to distinguish between vehicle bias and information bias but vehicle bias, broadly defined, is not substantiated.

In this study, payments for hunting and camping were considered user fees with no other purpose stated, while fishing was a user fee intended to alleviate fishery enhancement costs.

Information bias

Information bias is difficult to define precisely but a broad definition can be stated as: "A potential set of biases induced by the test instrument, interviewee, or process, and their effects on the individual's responses." (cited by Cummings et al., 1986). It also includes concerns of starting point, order of collecting information (also known as 'sequencing bias') and the quantity and quality of information given to the subjects in the CVM.

Information is required in some cases to improve the understanding of the commodity. Pre-tests of questionnaires may be used to balance information needs with information processing capacities for familiar commodities.

No additional information was offered in this study as the participants were familiar with the commodities in question. Deer population densities on the study area were compared to those on the Greater Victoria Water
District (GVWD), but a comparison of values was not provided or suggested. This bias then, was likely minimized.

**Willingness-to-pay vs Willingness-to-accept**

The discrepancy between WTP and WTA values refers to the differences noted between the theoretical values and those found in case studies. In practice, empirical studies have shown a wide divergence between WTP and WTA values for the same commodity.

WTP generally underestimates 'true' values while WTA overestimates them. Cummings et al. (1986) rejected WTA measures derived with the CVM based on the argument that they are less 'stable' than WTP measures, though they acknowledge that there may be separate uses for WTP and WTA, i.e. WTP for gains and WTA for losses.

In this study only WTP values are estimated.

**Hypothetical bias**

The potential for hypothetical bias in the CVM enters through the hypothetical nature of the payment as well as the hypothetical commodity and the institution within which the commodity is exchanged—the contingent market. This is reflected in the statement, "A hypothetical question will always produce a hypothetical answer." The commodity is considered hypothetical in that often the participants have had no experience in valuing the goods and/or services in question and thus have difficulty in doing so.

In terms of hypothetical to real payment differences there may not be as many serious biases as one might fear: well designed survey instruments, wherein there are similar marketed goods and services, may indeed elicit real-like results. CVM instruments can be structured in ways that mitigate, if not eliminate, the magnitude of payment bias. The most prominent source of hypothetical bias arises wherein the CVM commodity is largely unfamiliar to the participant.

Iterative bidding consistently results in higher CVM valuations than use of the payment cards. That difference is not able to be explained at this time, though one argument is that the bidding procedure 'bullies' subjects into bidding more. For the reduction in hypothetical bias the CVM participants must understand the commodity being valued and have had prior valuation and experiences with respect to consumption levels of the
commodity.

The familiarity of the participants with the commodities in this study would reduce this bias.

Accuracy

Accuracy refers to the degree to which the estimated value of the commodity reflects its 'true' value.

If we had a 'true' value, assessments regarding the accuracy of CVM measures against this standard would obviously be straightforward. Aside from laboratory and field experiments involving private goods, these measures are not available. Though not substantiated by experimental studies, the suggestion of an accuracy within the range of ± 50%, indicates that the CVM estimates are as accurate as those derived from indirect methods (for those commodities that are amenable to the application of indirect market methods). They conclude that any specification of the magnitude of errors associated with the use of the CVM is premature at this time.

2.5. ACCEPTABILITY OF THE CONTINGENT VALUATION METHOD

Randall and others argue that the research to date has established the acceptability of the CVM as a method for non-market goods benefit estimation. Randall et al. (1983) state:

"At the outset, the research agenda in contingent valuation sought to establish, in the face of considerable skepticism, contingent valuation as an acceptable method of non-market benefit estimation (acceptable in the sense that it works about as well as available alternative techniques and is adaptable to at least some valuation tasks that alternative methods cannot handle). That objective has been attained. In addition, the experimental work of others has blunted traditional fears that strategic responses would inevitably dominate data sets of stated personal valuations" (Randall et al., 1983. p.642).

Others, such as Rowe and Chestnut (1983), are more cautious in their optimism. They reason: as stated by Cummings et. al;
"CVM studies are a promising approach for the estimation of non-market environmental values. There has been a steady progress in minimizing biases...nevertheless, we are far from being out of the woods" (Cummings et al., 1986. p.4).

Feenburg and Mills (1980) feel that, "economists are biased against such (CVM) surveys because they believe crucial contrary-to-fact questions are unlikely to be answered accurately" (cited by Cummings et al., 1986. p.5). Bishop and Heberlein's comments, in the same work, put the acceptability of the CVM in a better perspective:

"Our position on the CVM is interesting in the light of where we started. In 1978, when we first began our own research on CVM, we were among the most cynical. It would not have surprised us to learn that CVM produces totally meaningless results...while CVM is inaccurate even under the best of circumstances, it is still quite capable of producing policy-relevant values when competently applied in suitable situations." (Cummings et al., 1986. p.124).

"Hypothetical bias does appear to be an inherent weakness of CVM. Still we have been surprised at how well CVM does work." (Cummings et al., 1986. p.146).

"While CVM appears to be biased even under the best of circumstances, the degree of bias does not appear to be sufficiently high to rule out the use of the results in public decision making."(Cummings et al., 1986. p.146).

"CVM has shown itself sufficiently promising to warrant a major research effort.... Enough positive evidence has accumulated to warrant a major investment in (the) full development of the contingent valuation method." (Cummings et al., 1986. p.147).

From this review of the literature we now move into a discussion of the study design.
Chapter 3. STUDY DESIGN

This chapter first discusses the reasons for the choice of the CVM for this study. Thereafter, it outlines the design of the survey, including the formulation and pre-testing of the questionnaire, the derivation of the appropriate sample size, the sampling method utilized and the means of dealing with survey non-response. Survey implementation and administration are discussed. Limitations of the survey are identified. Data processing and analytical procedures are outlined. The survey response rate is tabulated. Individual variables of the economic model are defined and explained. A non-response factor is calculated for each activity. A weighting of each type of camping is also incorporated into the calculations of the participation rate for that activity prior to being applied to the population of the CRD. This expansion from sample to CRD is facilitated through the calculation of an expansion factor. The derived values and others taken directly from the survey data are then incorporated into the first part of the model to derive the amount of participation or intended participation in a particular activity on the landbase. Present participation is measured in activity days.\(^1\)

\(^1\)An activity day refers to participation by any member of a household in a recreation activity on the landbase for any portion of a day. It does not equate to a calendar day of activity, nor to a visitor day, a technical term in recreation use measurement.
and future participation is measured in intended activity days.\(^2\)

The model is designed to estimate the annual potential gross revenue of selected recreation activities on the landbase by multiplying the intended activity days by the WTP for a particular activity.

3.1. CHOICE OF THE CONTINGENT VALUATION METHOD

The major reasons the CVM was chosen for this study are:

1. It is well suited to the mail questionnaire format.

2. The location of the landbase limits the travel time and minimizes travel costs for the majority of the users of this area. This factor alone eliminates the TCM from the list of potential choices.

3. The CVM is better able to address specific individual activities and sites with multiple activities than are the other methods.

On the whole, the CVM is the technique most suited to the task of obtaining non-market values for the selected recreation activities identified on this landbase. The use of a mail questionnaire approach to data collection in this study was necessitated due to a combination of the need for a map, a large amount

\(^2\)This refers to the reported intention of any member of a household to participate in a selected activity for any portion of a day on the landbase under the conditions specified in the questionnaire.
of detail, least possible costs, less personal time and less manpower required to obtain the data (Kinnear and Taylor, 1983).

The realization that the best-known alternative methods are themselves subject to limitations and criticisms is essential to a balanced evaluation of the use of the contingent valuation method. The comparison is not between contingent valuation and a perfect alternative. Rather, it is among techniques which are all imperfect, but in different ways (Randall et al., 1983).

3.2. SURVEY DESIGN

This section first deals with questionnaire formulation, then the determination of WTP value ranges. Next it discusses pre-testing, including the sampling method used and the results of the pre-test. The method used to determine sample size is explained as is the procedure for handling survey non-response.

Standard demographic characteristics questions were included at the beginning and at the end of the questionnaire. A list of 26 recreation activities was developed to measure the types of recreational use of the area. This list was formulated after exploratory research of various government agencies, local clubs, public and private organizations and personal experience, and is

1A copy of the questionnaire may be found in Appendix A.
supported by Meis (1979). The identification of activity participation location was attempted through the use of a map. One survey question asked for the preferred activities of the participants. More specific information was requested regarding participation in, and willingness-to-pay for, the selected activities of big game hunting, fishing, and five types of camping.

The lower end of the range of WTP values for hunting and camping were determined by using average market prices for similar facilities or opportunities in the Regional District. It was felt that persons already participating in those types of activities would at least be willing to pay the present average user fee for that type of activity. These 'market values' were obtained through telephone inquiries to seven private camping enterprises, two park agencies and one each of private and public 'restricted hunting' organizations. Each WTP question also provided the opportunity to indicate values other than those listed. The range for daily fishing values was estimated and supported through the results of the pilot survey. Hunting and camping values were also supported by the pilot survey.

Personal interviews were conducted during the summer of 1985 with a representative from most public and private organizations.

A list of the organizations interviewed may be found in Appendix B.

A list of these enterprises, agencies and organizations may be found in Appendix B.
or agencies involved in recreational concerns or administration of resources in or near the study area. These interviews provided a good overview and a basic understanding of the types and amount of recreational activity taking place there. The following summer (1986) a questionnaire was drafted and examined by several sources. A pilot study was undertaken using that survey.

A one hundred household random sample was taken from all households lying within the Capital Regional District (CRD), excluding the Gulf Islands, that were listed in the 1985 Victoria City Directory. This was done to include those households with no phones or ones with unlisted numbers. Page numbers were obtained from random number tables (Rohlf and Sokal, 1969; Steel and Torrie, 1980). A Wang PC computer was used to derive random numbers for each possible line on a page. The three columns were alternated after the first column was procured randomly. The numbers were then sorted into ascending order to simplify the extraction of names from the directory. Names, addresses and phone numbers were recorded adjacent to the corresponding random number. The postal code for each name was obtained from the postal code book and recorded with the address. Names of commercial businesses or professional offices were ignored. If the random number fell on such a listing the next personal listing

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4 An outline of the questions used in interviewing these organizations may be found in appendix B.
following that business was selected.

A 70% response rate of deliverable questionnaires was obtained in the pilot survey. From the pilot survey, a number of problems became evident. The two of prime importance were:

1. The huge sample size that would have been required if one retained the dichotomous choice WTP questions that had been included; and

2. the high percentage (25%) of non-deliverable questionnaires.

The others involved alterations of format and clarification of wording.

The dichotomous choice format would have required a minimum sample size of 4000 to obtain sufficient responses to achieve the goal of 90% precision and 10% error for each of the five values presented in each question. The use of a payment card with a range of values was then instituted in the place of the dichotomous choice questions. This reduced the necessary sample size of the main survey to less than one fifth the size otherwise required.

In an attempt to reduce the non-deliverable percentage in the main sample, a shift from the 1986 Victoria City Directory to the January 1987 edition of the Victoria telephone book was made. This proved useful as only 3% of the questionnaires in the main survey were non-deliverable.
The sample size determined for the pretest was solely a judgmental decision, while that of the main survey was determined by using the number of responses to the most critical question in the pilot survey. The most conservative proportion (0.5) for a particular response occurring in that question was then applied to the following formula from Walpole (1968), to determine the number of required questionnaires:

\[ n = \frac{t^2 \times p \times q}{e^2} \]

where \( n \) = the required number in the sample,
\( t \) = the value of the t-test at a given level of significance,
\( p \) = the proportion of respondents that answered a particular question with a 'YES',
\( q \) = the proportion of respondents that answered a particular question with a 'NO',
\( e \) = the allowable error.

To illustrate the derivation of 'n' (for \( p = 0.5 \) and \( e = 0.1 \))

\[ n = \frac{1.645^2 \times 0.5 \times 0.5}{0.1^2} = 67.5 \]

Once the value for 'n' was obtained it was necessary to multiply it by the pilot survey sample size, then divide it by the number of persons responding to that question in the pilot survey. This was undertaken to determine the mail survey sample size required, as seen in this formula:
where, \( MS = n \times \frac{PS}{PA} \)

- \( MS \) = the mail survey sample size,
- \( n \) = the number of respondents required for that particular question,
- \( PS \) = the pilot survey sample size,
- \( PA \) = the number of respondents to the most critical question from the pilot sample (i.e., the question with the lowest number of valid responses).

As cost, manpower and time were the limiting factors of the sample size, trade-offs were made between each. The resulting sample size was taken to ensure a 90% confidence at 10% error.

In the critical question in the pilot survey (the WTP value for hunting on CIP land), one of five possible dichotomous choice questions with different WTP values had been asked. The main survey, on the other hand, offered the same question with a choice of five values, or a statement of a chosen value. With the above limits set, and the proportion of 'YES'/ 'NO' answers left at a conservative 0.5, due to the change in question structure, the sample size calculation was made for the most critical question. These computations are shown in Table 1.

### Table 1

**DERIVATION OF SAMPLE SIZE**

<table>
<thead>
<tr>
<th>56% response</th>
<th>70% response</th>
</tr>
</thead>
<tbody>
<tr>
<td>( MS = 67.5 \times \frac{100}{9} = 750 )</td>
<td>( MS = 67.5 \times \frac{100}{11.25} = 600 )</td>
</tr>
</tbody>
</table>
A 70% response rate had been obtained from the delivered questionnaires in the pilot survey. To be conservative, a 56% response rate for determining the size of the main survey was chosen because that was the response rate obtained from the pilot study when the 25 percent 'non-deliverable' were included. On these grounds the survey sample size chosen was 750.

The greatest drawback for mail surveys, noted by Kinnear and Taylor (1983), is the usual high proportion of non-respondents which can result in a large non-response error. Non-response bias can occur if those who responded to the survey in all or in part, differ in behavior and characteristics from those who did not respond at all, or from those who failed to respond to a particular question. The bias surfaces if the respondent's behavior and/or characteristics do not fully represent the population. It can be divided into survey and item non-response bias categories. Survey non-response bias develops when the answers of the respondents to the survey differ from the answers of those who failed to respond and estimates are based on the answers of the respondents only. Item non-response bias arises when respondents to a particular question in the survey differ from those who failed to answer that specific question but have answered other parts of the questionnaire (Reid, 1986).

To accomplish the study objectives, the survey was sent to both users and non-users of the study area. Thus, many question-
naires though fully completed for non-users of the study area, were not able to be considered in the calculation of item non-response bias. Due to time constraints in procuring a large non-response category of interviews, only survey non-response bias was tested for its presence or not.

A small random sample of the non-respondents (n=16) was selected and interviewed. Each received a minimum of three call backs in person or until they were found home, whichever occurred first. Those still not at home were contacted by telephone.

Respondent data for the households that had used the study area in 1986 were compared with those of the non-respondents subsequently interviewed. Following this initial comparison, it was found that a larger sample of interviews was deemed necessary to more accurately determine the significance of difference between the two sub-samples. A further 14 households were interviewed by telephone to bring the total valid interviews to 30. The resulting interviews were as follows: 11 households were interviewed in person, 19 by telephone, 1 unable to contact and 3 had moved with no forwarding address or phone number. It is acknowledged that these different methods of interviewing the households could produce different responses to the questions than the mail responses or than each other. There was insufficient information to test for any response differences between personal and telephone interview methods.
The comparison of individual activity participation rates for those households that had used the area was not conducted due to the small sample size of non-respondents. This was also true for the WTP questions, although when considering those households which would use the area if facilities or opportunities were provided, there was a very interesting difference. In the mailed sample there was always a very large percentage of respondents (41-71% depending on the activity) who expressed an unwillingness to pay anything for provision of recreation opportunities, facilities or services. Of the non-respondents interviewed none expressed an unwillingness to pay for services rendered — all felt that they should pay something. This difference in the responses of those interviewed from those of the mailed questionnaires is likely primarily due to the interview method used rather than the attitudes of householders. The differences may be due to the social stigma attached to personal interactions that make people desire to provide a socially acceptable answer (Kinnear and Taylor, 1983).

3.3. SURVEY IMPLEMENTATION AND ADMINISTRATION

This section explains the process of administering the survey and displays and discusses the survey response rate.

The same sampling method used in the pre-test was used in the main survey, except the sample was taken from the Victoria phone directory instead of the city directory. In January 1987,
the 750 sample households were sent a questionnaire and covering letter by first class postage with a self-addressed, postage-paid return envelope enclosed. A major effort was made to minimize the survey non-response by implementing the following tactics. One week after the first mailing a reminder postcard was sent to every sampled household. Three weeks following the mailing of the postcards a second questionnaire with a new covering letter was sent to each of the 273 non-respondents with the same postage and return arrangements as the original mailing.

As shown in Table 2, 498 of the 750 questionnaires mailed were returned completed. An additional 69 were returned with written comments indicating that they did not use the area for various reasons. These were coded as such and included with the completed surveys, bringing the total returned and valid to 567. A further 12 were deceased, 2 had moved, 24 were not deliverable (moved with no forwarding address) and 21 were returned totally blank. This left 124 surveys unaccounted for. The surveys of deceased, moved or non-deliverable households were removed from the sample while the blank returns were included in the non-response group. The new sample size thus became 712 (750-38) in total, with 567 respondents and 145 (124+21) non-respondents. This represents an 80% response rate to the delivered questionnaires. This is quite respectable considering Kinnear and Taylor's (1983) statement that mail surveys conducted by experienced researchers should achieve response rates of over 50% and
some surveys reach as high as 80%, though in practice most fall substantially below this level. They also indicate that a mail survey that achieves an 80% return rate is comparable to many personal and telephone interview studies in proportion of completed interviews.

### Table 2

**Survey Response Rate**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total households attempted to sample</td>
<td>750</td>
</tr>
<tr>
<td>Non-deliverable</td>
<td>24</td>
</tr>
<tr>
<td>Deceased</td>
<td>12</td>
</tr>
<tr>
<td>Moved</td>
<td>2</td>
</tr>
<tr>
<td><strong>Actual sample size</strong></td>
<td><strong>712</strong></td>
</tr>
<tr>
<td>Blank questionnaires (no explanation)</td>
<td>21</td>
</tr>
<tr>
<td>Non-response</td>
<td>124</td>
</tr>
<tr>
<td><strong>Total non-response</strong></td>
<td><strong>145</strong></td>
</tr>
<tr>
<td><strong>Actual valid response rate</strong></td>
<td><strong>567</strong></td>
</tr>
</tbody>
</table>

**3.4. Study Limitations**

This section identifies the major limitations of this study in scope, methodology, administration of the survey, and in the survey instrument itself.

Thesis results apply to the study area alone and should not be extrapolated to other forest lands. This thesis estimates values for recreation users living only within the CRD, excluding the Gulf Islands. It does not include participation or value estimates for tourists or for recreation users living outside the
boundaries of the CRD. It estimates the 1986 recreation use for each activity listed in the survey. It estimates intended recreation use and user demographic characteristics for hunting, fishing and camping. It estimates WTP values and potential annual gross benefits for those selected activities. It does not estimate those values for the other recreation activities listed in the survey. It does not estimate total recreation values nor land valuation figures. Neither does it provide cost of provision data for recreation activities or facilities.

The primary consideration that must be kept in mind in this study is that it is not a complete market analysis. The potential gross benefits estimated in this study are not net benefits. To estimate net benefits, further research would be necessary to determine the costs associated with providing each recreation opportunity.

This work is descriptive in nature and is not intended to infer causal relationships. Due to the relatively new and complex nature of the CVM, there has not been sufficient experimentation to date to put reliable confidence limits on the values derived.

This survey required respondents to recall participation in

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1Potential annual gross benefit - the dollar value that a given activity would generate in one year, assuming the reported intended participation level was attained and that all values could be collected.
recreation activities on the study area over a one year period. This may have influenced the accuracy of their reporting. Such loss of accuracy could be due to: forgetting activities engaged in within the year and/or reporting activities engaged in over a longer period into the one year time frame. This is referred to as recall bias. Collection of data by having respondents keep diaries, or by surveying on a quarterly basis would mitigate this problem, but the latter would require the aggregation and analysis of four data sets instead of one.

Users of CIP land likely used other parts of the study area but the degree of occurrence is not known. The converse may also have happened, though to a much lesser extent. Participation in one activity on CIP land classified that household as a CIP land user for all activities. This was done to alleviate the complexity of identifying on the map, the location of participation in each activity. Use of a single landbase in the study would eliminate this problem. The intent of using two landbases in this study was to disguise the private property ownership, and thus minimize strategic biases.

Heads of households were identified by gender but each household participant was not. Therefore, male/female ratios of use could not be estimated accurately. Seventy percent of heads of households in the CRD are male whereas 75% of participant heads of households reporting were male. This indicates a higher
probability of male participants than female but the level is unknown.

Starting point bias may have arisen from the range of values presented in each question and be reflected in the WTP values obtained for each activity. Information bias may also have inadvertently entered the question regarding WTP values for deer hunting. The reference to the GVWD in terms of deer population density may have encouraged hunters to also use, as their value figure, the permit fees that were levied to hunt on those lands. This comparison would have likely been a natural tendency as the GVWD is the only location that most hunters would be familiar with, in terms of paying user fees. There were no comments or suggestions of this reported in the questionnaire, but it could well have been a subconcious comparison. The influence of the framing of that question is not deemed to be too serious in this case.

The survey instrument had questions that may have been confusing or caused inaccurate answering, such as:

Question 6: see Appendix A.

- it looked 'ominous', thus may not have been completed

- the average number of days per activity were occasionally reported as total days

- reporting of the number of trips on weekdays or weekends was confusing, inconsistent, and about 40% of the time did not correlate with the total number of trips taken. It should
have been left off. These data were not essential for the model and were not used in any participation rate calculations or in the determination of WTP values.

reporting the season of participation was unnecessary

**Question 7:** "Considering all of the outdoor recreation activities in which you participate, list your preference in order from 1 to 5."

most preferred 1.
2.
3.
4.
least preferred 5.

- the term 'most preferred' should have read 'preferred' and 'least preferred' should have read 'less preferred' as some respondents hated hunting and indicated it in position five rather than their fifth preferred activity.

**Question 9:** "Examine the map on facing page, then carefully draw on that map an 'X' on each of the areas your household has used in 1986. Be as precise as possible. See example below."

- some persons may have had difficulty reading and understanding maps well enough to place themselves accurately thereon, or were not sure exactly where they were on the ground when they were there.

**Question 17:** see Appendix A.

- many WTP values were reported as $0.00's which may indicate a reluctance to pay for something that they have not paid for in the past; also known as free rider behavior.
**Question 20:** Check the category which best describes your total annual household income, before taxes.

- under $10,000
- 10,000-19,999
- 20,000-30,000
- 30,000-40,000
- 40,000-50,000
- 50,000-60,000
- over $60,000

- from personal observation during the interviewing of the non-respondent sample income appears to be biased downward somewhat for upper income earners, but the degree is unknown.

Even with these limitations this study has been able to produce values that reflect 'market' or other external prices. It has also overcome, to a large extent, a number of biases that traditionally affect the accuracy of mail surveys, i.e. survey non-response bias and sampling bias.

3.5. DATA PROCESSING

This section discusses questionnaire coding, keypunching and the method of checking the data.

The returned questionnaires were coded then entered on an IBM PC and retained on diskette. They were then transferred to MTS on the U.B.C. mainframe before any manipulation of the data took place.

Data for each variable were checked for values beyond the

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Data were entered by Quantum Research Ltd. Vancouver, B.C.
possible parameters of the question, as well as for outliers and inconsistencies. Key punching errors were corrected to match the given number in the questionnaire.

All outliers (those responses greater than 3 standard deviations away from the mean) were checked to verify their validity. This was accomplished by separating them from the main data set on the computer then examining the applicable questionnaire by hand. Some questions were not answered by all respondents. These non-responses were also entered as missing values and were not included in the calculation of the statistics or the analysis of each question. Recoding of certain variables was necessary to accurately represent the values in a format that could be used for analysis (eg. differentiating between a blank and an answer of $0.00 for WTP questions).

3.6. ANALYSIS

This section outlines the procedures and statistical tests undertaken in the analysis and a chi-square comparison of the response groups. It shows a list of the potentially significant variables in tabular form.

Statistical analyses were run on the UBC mainframe using the Statistical Package For the Social Sciences (SPSS:X) program. Frequency analyses were run on both mail survey respondent and subsequent interviewed non-respondent sample data. Chi-square
comparisons were made of respondent and non-respondent use of the study area. Two additional frequency analyses were run on the respondent data, one selecting for only those that said they had used the area and the second selecting for only those that indicated use of CIP land. Another frequency run was compiled for each selected activity on each of the landbases above, selecting for willingness to participate in each activity. The frequency runs provided estimates regarding the recreational use of the area, including: the participation rates for each recreation activity, the activity preferences of users, user demographics and the WTP values for the opportunity to participate in those selected recreation activities.

A chi-square statistical test for differences between proportions was used to determine if the behavior of the mail respondent sample differed significantly from that of the interviewed non-respondent sample. The characteristics of behavior tested on a proportion basis were:

- duration of residence in the community (COMM)
- duration of residence in the Capital Regional District (RD)
- participation rate (whether the respondent household had used the area or not) (HVUSED)
- age of respondent (AGE)
- household income before taxes (INCOME)
- number of household members living at home (MEMBERS)
The tests for the differences between the mail respondents and the subsequently interviewed non-respondents on each selected variable were based on the null and alternative hypotheses:

\[ H_0: P_1 = P_2 \]

\[ H_1: P_1 \neq P_2 \]

where \( P_1 \) and \( P_2 \) are the proportions of the answers of the mail respondents and interviewed non-respondents respectively. In this case, the most important variable upon which we are basing our comparison is that of whether households had used the area in 1986 or not. Thus, we are testing the specific alternative that the amount of use of the area by the mail respondents was different than the use of the area by the interviewed non-respondents. To conduct the chi-square test, expected frequencies must be calculated for every cell of each contingency table using the following formula:

\[ e = \frac{R \times C}{T} \]

where \( e \) = the expected frequency,
\( R \) = the sum of the row frequencies,
\( C \) = the sum of the column frequencies,
\( T \) = the total frequency.

The expected frequencies are shown in parentheses beside the observed frequencies in Table 3.
The chi-square statistic is calculated by:

$$\chi^2 = \sum_{i=1}^{k} \frac{(o-e)^2}{e}$$

OR, for 2 X 2 contingency tables,

$$\chi^2 = \sum_{i=1}^{k} \frac{(lo-el - 0.5)^2}{e}$$

where, o = the observed frequencies  
e = the expected frequencies  
k = number of rows (r) X number of columns (c)

The calculated chi-square ($\chi^2$) is then compared to the critical chi-square ($\chi^2_C$), using $\chi^2$ at (r-1) X (c-1) degrees of freedom.

Chi-square tests were performed on the respondent and non-respondent data for those persons who had used the study area, as depicted in Table 3.

**TABLE 3**

CHI-SQUARE COMPARISON OF RESPONSE GROUPS

<table>
<thead>
<tr>
<th>YES/NO</th>
<th>INTERVIEWED</th>
<th>MAIL</th>
<th>ROW TOTALS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NON-RESPONDENTS</td>
<td>RESPONDENTS</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2 (7.76)</td>
<td>150 (144.24)</td>
<td>152</td>
</tr>
<tr>
<td>2</td>
<td>28 (22.24)</td>
<td>408 (413.76)</td>
<td>436</td>
</tr>
<tr>
<td>COLUMN TOTALS</td>
<td>30</td>
<td>558</td>
<td>588</td>
</tr>
</tbody>
</table>

The chi-square value is obtained by summing the chi-square
of each box in the contingency table as shown for the example above. The critical chi-square value for each variable, at the degrees of freedom noted for each, was taken from the chi-square percentage point tables (Walpole, 1968 and Zar, 1974).

\[ \chi^2 = \chi^2_1 + \chi^2_2 + \chi^2_3 + \chi^2_4 \]

thus, \( \chi^2 = 3.57 + 1.24 + 0.19 + 0.08 = 5.08 \)

The critical Chi-square value for one degree of freedom at the 0.95 level of significance is 3.841. The absolute value of the \( \chi^2 \) for those households that stated they had used the area was much greater than the critical \( \chi^2 \) at the 0.95 level of significance. Therefore, we reject the null hypothesis and conclude that there is a difference between the participation rate of respondents from that of the non-respondents to this survey.

A comparison is given in Table 4 of each selected variable tested for significant differences between the mail and interview response groups.\(^3\) These variables were selected following initial frequency runs of the data sets to identify those most likely to be significant. The only variable tested that was significant at the 0.95 level was participation rate (HVUSED), which identified those respondents that had used the study area. This variable remained significant at the 0.975 level. The five variables with no significant difference were: duration of residence in the

\(^3\)See Appendix C for each Chi-square calculation.
community, duration of residence in the CRD, age, household income, and number of family members living in the household. At the 0.90 level of significance, duration of residence in the community (COMM) became significant. This was primarily due to three interviewed non-respondent households reporting four years residence in the community, whereas only 13 mail respondents were in that category. This anomaly cannot be attributed to this variable as a whole but must be compartmentalized into each of the eight categories of the variable. Thus, the four year residence value of the non-respondents was not considered to be a significant factor in the use or user characteristics on the study area.

**TABLE 4**

**CHI-SQUARE STATISTIC OF POTENTIALLY SIGNIFICANT VARIABLES**

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>DEGREES OF FREEDOM</th>
<th>( \chi^2 ) (0.90)</th>
<th>( \chi^2 ) (0.95)</th>
<th>CALCULATED ( \chi^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVUSED</td>
<td>1</td>
<td>2.706</td>
<td>3.841</td>
<td>5.08</td>
</tr>
<tr>
<td>COMM</td>
<td>7</td>
<td>12.017</td>
<td>14.067</td>
<td>13.00</td>
</tr>
<tr>
<td>RD</td>
<td>7</td>
<td>12.017</td>
<td>14.067</td>
<td>8.25</td>
</tr>
<tr>
<td>AGE</td>
<td>6</td>
<td>10.645</td>
<td>12.592</td>
<td>8.78</td>
</tr>
<tr>
<td>INCOME</td>
<td>6</td>
<td>10.645</td>
<td>12.592</td>
<td>2.92</td>
</tr>
<tr>
<td>MEMBERS</td>
<td>7</td>
<td>12.017</td>
<td>14.067</td>
<td>4.81</td>
</tr>
</tbody>
</table>

**3.7. COMPONENTS OF THE MODEL**

The components of the model are outlined as a process in Figure 5, followed by a detailed explanation of their function. The two part model first derives the number of activity days
and/or intended activity days, then multiplies this derived value by the willingness-to-pay value per activity day to estimate the potential gross benefit. This is shown here:

\[ A \times B \times C \times D \times E = F \]

and

\[ F \times G = H \]

Example: Fishing in the Sooke River on CIP land

\[ F = 49.94 \times 9.39 \times 2.63 \times 1.41 \times 148.79 = 258,739 \text{ activity days} \]

\[ H = 258,739 \times \$2.49 = \$644,260 \]

FIGURE 5
MODEL COMPONENTS

<table>
<thead>
<tr>
<th>A. Total households in sample</th>
<th>B. Average trips per household for a particular activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>HHP - reported activity</td>
<td>C. Average number of members per household participating in an activity</td>
</tr>
<tr>
<td>participant households</td>
<td>D. Average days spent per trip participating in activity</td>
</tr>
<tr>
<td>or activity intended</td>
<td>E. Expansion factor</td>
</tr>
<tr>
<td>participant households</td>
<td>F. Intended activity days</td>
</tr>
<tr>
<td>in sample</td>
<td>G. Willingness-to-pay value per activity day</td>
</tr>
<tr>
<td>SNR - proportion of non-</td>
<td>H. Potential gross revenues</td>
</tr>
<tr>
<td>respondent users in sample</td>
<td></td>
</tr>
<tr>
<td>NRF - non-response factor</td>
<td></td>
</tr>
<tr>
<td>CT - number of campers</td>
<td></td>
</tr>
<tr>
<td>participating in each</td>
<td></td>
</tr>
<tr>
<td>type of camping</td>
<td></td>
</tr>
</tbody>
</table>
3.7.1. Participant households in sample

The total number of participant households for each activity is derived from the number of respondent participant households in the sample and a non-response factor. A weighting of activity trips per household is applied for each type of camping.

As noted above, a significant difference between the mail respondents and interviewed non-respondents was found in the amount of recreational use of the study area. Thus, a non-response factor is required to weight the projected usage rates of the population as a whole. This non-response factor is derived and applied to each activity using the following steps:

1. Calculation of the total number of households in the sample that participated in the activity on the area.  

2. Calculation of the estimate of the proportionate number of users of the area from the non-respondent portion of the sample.

3. Calculation of the estimate of the non-response factor or the number of non-respondents in the

4The term 'area' will be used in these steps, except where noted, to represent both CIP crown granted land and all the land within the study area. Two separate analyses and calculations have been made using the same formulae for each activity on the respective landbases to provide a comparison of use and values.
survey sample that would have participated in a particular activity, (assuming the same proportions of activity participation by all households, whether respondent or non-respondent, from only among those households that use the area).

4. Estimation of the total number of households in the entire sample which would have participated in each activity.

5. Calculation of the weighting factor for estimating participation in each type of camping activity.

Each step with it's accompanying formula is outlined below:

**Step 1. Calculation of household activity participation**

This value is obtained directly from the frequency runs of the compiled data; for example, 45 households from among users of CIP land reported an intent to fish the Sooke River.

**Step 2. Estimation of non-respondent use**

To estimate the number of non-respondents that would have used any part of the case study area, the following formula applies:

\[
SNR = \frac{HVUSED_I}{HH_I} \times NR
\]
where, \( SNR \) = the estimated number of non-respondents from the total survey sample that would have used the area,

\( HVUSED_I \) = the number of interviewed households that have used the area,

\( HH_I \) = the number of households interviewed.

\( NR \) = the number of non-respondents to the mail survey,

\[
SNR = \frac{\text{2}}{\text{30}} \times 145 = 9.67
\]

This calculation indicates that 10 of 145, or 7% of the non-respondent households would have indicated use of the area. This value is then applied in compilation of the formula in step 3.

**Step 3. Derivation of the non-response factor**

The following formula is used to estimate the non-response factor for the particular activity:

\[
NRF = \frac{PA}{HVUSED_M} \times SNR
\]

where, \( NRF \) = the non-response factor (the value will change for each recreation activity),

\( PA \) = the number of households in the mail survey that participated in that activity,

\( HVUSED_M \) = the number of households in the mail survey indicating that they had used the area in 1986,

\( SNR \) = the number of non-respondents that would have indicated use of the area.

Below, fishing in the Sooke River is used as an example:
Therefore, 5 of the 145 non-response households would have indicated fishing in the Sooke River. From this, we proceed to step 4.

**Step 4. Estimation of participant households**

To estimate the total number of households in the entire valid sample that would have indicated use of the area for a particular activity, the following formula is used:

\[
HHP = PA + NRF
\]

where, \( HHP \) = the estimated number of households in the sample that used the area, or intended to use it, for a particular recreation activity,

\( PA \) = the number of households of the mail respondents that indicated participation or intent to participate in that activity,

\( NRF \) = the non-response factor for that activity.

The application of this formula is expressed using fishing by CIP land users as an example:

5This same formula is used to estimate two different values. Initially it is used to derive the number of households that used the area for each of the activities. Later it is used to estimate the number of households that intended to use the area for only those selected activities under the conditions stated in the questionnaire.
\[ \text{HHP} = 22 + 4.94 = 26.94 \]

Thus, 27 of the 712 households surveyed, are estimated to have fished on CIP land in the study year. Using this formula but inserting willing Sooke River anglers in the place of reported CIP anglers generated 50 willing angler households from the same group of CIP land users. Reported participation was used to derive present use and willing participation to derive potential use in the model.

**Step 5. The weighting of camping participation rates**

As the number of camping trips taken were reported as a total rather than by each type of camping, it was necessary to derive the number for each type. Each value was calculated by dividing the number of responses of participation in each of the five types of camping by the total participation in all types of camping. This value was then multiplied by the actual number of camping trips taken on the area. The calculation is shown using the participation rate formula:

\[ \text{CT} = \frac{\text{CH} \times \text{TT}}{\text{AT}} \]

where,
- \( \text{CT} \) = number of household trips by type of camping,
- \( \text{CH} \) = the number of households using a particular type of camping,
- \( \text{AT} \) = the total number of camper households using any type of camping,
- \( \text{TT} \) = the total number of camping trips taken on the study area.
Primitive style camping on CIP land is used to illustrate this calculation.

$$CT_p = \frac{185}{246} \times 88 = 66$$

This value (66) must be placed in the formula in Step 3 (as a value for variable PA, i.e. the number of sample households that participated in primitive style camping) to determine the non-response factor for primitive camping. The same is also true for the other four types of camping studied. This is best expressed by using primitive camping in another example:

$$NRF = \frac{66}{88} \times 9.67 = 7.25$$

This non-response factor must be added to the mail response value to give a more accurate indication of the area users participation in that activity. Therefore, 66 + 7 = 73 of the 712 households sampled are users of CIP land and would participate in primitive style camping on the area.

The resultant values for each type of camping are similarly treated as in the process above, as are calculations of deer hunting and fishing values.

3.7.2. Participant use values

Implementation of the model requires the calculation of
average values for each of the following variables: number of household activity trips, number of household members per trip and the number of activity days participation per household per trip. The values for the average number of activity trips taken per household were calculated as outlined below. The average number of household members per trip and the average number of days spent participating in an activity per trip were calculated directly from the respondent data.

The average number of activity trips taken per household is calculated by dividing the total number of trips recorded, of only those mail respondents who had indicated use of the area, by the number of households of the mail respondents which had indicated participation in the activity. This assumes the average number of trips taken would be the same for both respondent and non-respondent participants in the activity. This is shown here:

\[
HHTR = \frac{TT}{PA}
\]

where, \( HHTR \) = the average number of household trips of those participating in the activity on the area,
\( TT \) = the total number of trips reported by participants in that activity on the area, from the mail respondents,
\( PA \) = the number of households of the mail respondents indicating participation in the activity on the area.
Using fishing in the Sooke River again as an example, the following value is derived.

\[
HHTR = \frac{169}{45} = 3.76
\]

Thus, an average of 4 fishing trips were taken by each household that fished in the Sooke River on CIP land.

Still required, is the calculation of the household expansion factor to expand these sample-derived figures to the relevant population, ie. the number of households located within the Capital Regional District (CRD), excluding the Gulf Islands.

This factor is calculated by dividing the total number of households in the study area by the respondent sample size:

\[
EF = \frac{NH}{SR}
\]

where, \( EF \) = expansion factor (for expansion of the sample values to produce figures for the number of households in the CRD),

\( NH \) = number of households in the population (CRD),

\( SR \) = number of household survey respondents.

ie. \( EF = \frac{105,937}{712} = 148.79 \)
Using each of the variables discussed above it is possible to estimate the number of intended activity days for each selected activity. This is accomplished by using the following formula as the first part of the model:

\[
IAD = HHP \times T/HH \times AVGM \times AVGD \times EF
\]

where,

- \( IAD \) = the number of activity days generated by households intending to participate in a particular activity on the study area
- \( HHP \) = the number of households intending to participate in the selected activity on the study area (including the non-response factor for that activity)
- \( T/HH \) = the number of trips taken per household for that activity
- \( AVGM \) = the average number of household members participating in that activity on the study area
- \( AVGD \) = the average number of days per trip that households spent engaging in the activity on the study area
- \( EF \) = the expansion factor used to expand from the sample to the CRD population, excluding the Gulf Islands,

Using fishing in the Sooke River by CIP land users as an example:

\[
IAD = 49.94 \times 9.39 \times 2.63 \times 1.41 \times 148.79 = 258,739 \] intended activity days

\[^6\text{For the calculation of all CAMPING potential gross revenues, the value for the average number of household members participating (AVGM) will have to be dropped from this equation.}\]
3.7.3. Willingness-to-pay and potential gross benefit values

The average willingness-to-pay values for the seven chosen activities were derived from only those households indicating participation in a recreation activity on the landbase in 1986 plus expressing an intention to participate in the given activity on the landbase in the future. These values were obtained directly from the compilation of the data.

The potential annual gross benefit for a specified recreation activity can be estimated by inserting the applicable reported and calculated values into the model below. This assumes that adults would pay the stated fee for hunting or fishing for each person in their family including children.7

POTENTIAL ANNUAL GROSS BENEFIT MODEL

\[ PGB = IAD \times WTP \]

where,

- \( PGB \) = potential annual gross benefit,
- \( IAD \) = number of intended activity days generated by the activity
- \( WTP \) = average willingness-to-pay value per activity day for participation in the activity

7Camping fees have traditionally been, and continue to be, paid for in terms of families, camping spaces used or carloads while hunting and fishing fees are paid for on an individual user basis.
Fishing in the Sooke River on CIP land is used to illustrate the potential annual gross benefit using this model.

\[ \text{PGB} = 258,739 \times 2.49 = 644,260 \]

The above explanations of the process and components in the model simplify and assist the understanding and application of the results discussed in the next chapter.
Chapter 4. SURVEY RESPONDENT CHARACTERISTICS AND USE

This chapter discusses the survey response rate in general and by community. Non-response factors are depicted for selected activities on each landbase. Estimates of activity participation are then presented. Highest-use and preferred activities are identified. Finally, respondent characteristics and concerns are discussed.

4.1. SURVEY RESPONSE RATE

From the values obtained in the pilot survey an 80% response rate in the main survey would have been sufficient to obtain the goal of 90% probability of 10% error on the most crucial WTP questions. However, respondents to the main survey were less frequent users of the study area than were respondents to the pilot survey. Non-response factors for selected activities on both landbases are presented in Table 5. These values will be used in the compilation of the number of activity days generated for each selected activity.

A comparison of the percentage distribution of survey respondents by community for each landbase is shown in Table 6. From this table it is also noted that response rates conform to the household populations of each community. This would indicate that the sample was representative of the household distribution in the CRD.
### TABLE 5
NON-RESPONSE FACTORS FOR SELECTED ACTIVITIES

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>CIP LAND</th>
<th>STUDY AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>HUNTING</td>
<td>1.98</td>
<td>1.48</td>
</tr>
<tr>
<td>FISHING</td>
<td>4.94</td>
<td>4.51</td>
</tr>
<tr>
<td>CAMPING:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primitive</td>
<td>7.25</td>
<td>6.12</td>
</tr>
<tr>
<td>Semi-primitive</td>
<td>5.60</td>
<td>5.48</td>
</tr>
<tr>
<td>Modified</td>
<td>1.24</td>
<td>2.97</td>
</tr>
<tr>
<td>Rural</td>
<td>0.77</td>
<td>1.87</td>
</tr>
<tr>
<td>Cabin</td>
<td>1.10</td>
<td>2.26</td>
</tr>
</tbody>
</table>

### TABLE 6
DISTRIBUTION OF SURVEY RESPONDENTS BY COMMUNITY (percentage)

<table>
<thead>
<tr>
<th>Community</th>
<th>Households in Population n=105,937</th>
<th>Households in Sample n=497</th>
<th>Population/Sample Difference</th>
<th>Used CIP Area n=88</th>
<th>Used Area n=150</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Saanich</td>
<td>4.6</td>
<td>6.8</td>
<td>2.2</td>
<td>5.8</td>
<td>5.4</td>
</tr>
<tr>
<td>Colwood</td>
<td>4.6</td>
<td>2.2</td>
<td>-2.4</td>
<td>4.7</td>
<td>4.8</td>
</tr>
<tr>
<td>Esquimalt</td>
<td>6.0</td>
<td>5.4</td>
<td>-0.6</td>
<td>4.7</td>
<td>5.4</td>
</tr>
<tr>
<td>Langford</td>
<td>6.1</td>
<td>4.6</td>
<td>-1.5</td>
<td>4.7</td>
<td>6.1</td>
</tr>
<tr>
<td>Metchosin</td>
<td>1.4</td>
<td>0.4</td>
<td>-1.0</td>
<td>0.0</td>
<td>1.4</td>
</tr>
<tr>
<td>North Saanich</td>
<td>2.8</td>
<td>2.8</td>
<td>0.0</td>
<td>1.2</td>
<td>0.7</td>
</tr>
<tr>
<td>Oak Bay</td>
<td>6.7</td>
<td>8.5</td>
<td>1.8</td>
<td>4.7</td>
<td>7.5</td>
</tr>
<tr>
<td>Saanich</td>
<td>32.5</td>
<td>32.5</td>
<td>0.0</td>
<td>38.3</td>
<td>32.7</td>
</tr>
<tr>
<td>Sidney</td>
<td>3.4</td>
<td>5.2</td>
<td>1.8</td>
<td>1.2</td>
<td>2.0</td>
</tr>
<tr>
<td>Victoria</td>
<td>26.0</td>
<td>28.2</td>
<td>2.2</td>
<td>24.3</td>
<td>26.5</td>
</tr>
<tr>
<td>View Royal</td>
<td>2.4</td>
<td>2.0</td>
<td>-0.4</td>
<td>3.4</td>
<td>3.4</td>
</tr>
<tr>
<td>Sooke</td>
<td>3.5</td>
<td>1.4</td>
<td>-2.1</td>
<td>7.0</td>
<td>4.1</td>
</tr>
</tbody>
</table>

Totals 100.0 100.0 100.0 100.0
Sooke stands out as having the highest rate of use per household in the study area. Sooke residents produced four times the activity on CIP land and twice the activity on the whole study area as the percentage of Sooke households in the sample. This higher participation rate/household by Sooke residents was expected due to their close proximity to the study area. Also as anticipated, the two largest population centers of Saanich and Victoria produced the largest percentage of users, and taken together account for nearly 2 of every 3 user households.

In general, the percentage of use per community noted in Table 6 reflects the population distribution across the regional district, with those lying closer to the study area generating a slightly heavier proportion of use. The only exception to this is Metchosin, situated near the study area but indicating no use of CIP land, though it did account for 1.4% of the use on the study area. Metchosin represents 0.4% of the sample population.

4.2. ACTIVITY PARTICIPATION

For the CRD population, excluding those persons living on the Gulf Islands, the total estimated number of recreation activity days on CIP land was 947,114 in 1986 and on the study area 1,148,583. Table 7 presents summaries of the respondent household participation in each recreation activity on CIP land and the study area in 1986.
## TABLE 7
### RECREATION ACTIVITY PARTICIPATION CHART
#### FOR HOUSEHOLDS USING CIP LAND AND/OR THE STUDY AREA

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>NUMBER OF SAMPLE HOUSEHOLDS</th>
<th>AVERAGE TRIPS PER HOUSEHOLD</th>
<th>AVERAGE # HOUSEHOLD MEMBERS</th>
<th>AVERAGE DAYS/TRIP</th>
<th>CRD HH EXPANSION FACTOR</th>
<th>NUMBER OF ACTIVITY DAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CIP AREA</td>
<td>CIP AREA</td>
<td>CIP AREA</td>
<td>CIP AREA</td>
<td></td>
<td>CIP AREA</td>
</tr>
<tr>
<td>Hunting—upland birds</td>
<td>12.2 12.2</td>
<td>4.5 4.5</td>
<td>1.40 1.40</td>
<td>1.55 1.55</td>
<td>148.79</td>
<td>17,725</td>
</tr>
<tr>
<td>Hunting—big game</td>
<td>14.4 14.4</td>
<td>5.2 5.2</td>
<td>1.42 1.42</td>
<td>1.27 1.27</td>
<td>148.79</td>
<td>20,092</td>
</tr>
<tr>
<td>Camping</td>
<td>28.9 41.1</td>
<td>5.0 4.2</td>
<td>2.68 2.45</td>
<td>2.04 2.71</td>
<td>148.79</td>
<td>117,545</td>
</tr>
<tr>
<td>Fishing</td>
<td>24.4 27.7</td>
<td>9.0 8.6</td>
<td>2.70 2.62</td>
<td>1.38 1.38</td>
<td>148.79</td>
<td>121,745</td>
</tr>
<tr>
<td>ACTIVE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hiking</td>
<td>58.8 87.7</td>
<td>5.6 4.6</td>
<td>2.51 2.37</td>
<td>1.14 1.21</td>
<td>148.79</td>
<td>140,190</td>
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<td>1.00 1.00</td>
<td>148.79</td>
<td>6,874</td>
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<td>Survival games</td>
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<td>1.00 1.00</td>
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<td>491</td>
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<td>X-country skiing</td>
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<td>0.0 0.0</td>
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<td>0.00 0.00</td>
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<td>1.00 1.00</td>
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<td>491</td>
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<td>PASSIVE</td>
<td></td>
<td></td>
<td></td>
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<td>Picnicking</td>
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<td>4.3 3.6</td>
<td>3.00 2.79</td>
<td>1.05 1.09</td>
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<td>89,482</td>
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<tr>
<td>Sightseeing/viewing</td>
<td>46.6 81.0</td>
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<td>107,582</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Wheeling/touring</td>
<td>24.4 28.9</td>
<td>8.4 7.4</td>
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<td>83,254</td>
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<td>Trail biking</td>
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<td>4.8 4.8</td>
<td>1.75 1.75</td>
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<td>5,499</td>
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<td>ATV's</td>
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<td>4.5 4.5</td>
<td>1.50 1.50</td>
<td>1.33 1.33</td>
<td>148.79</td>
<td>5,877</td>
</tr>
<tr>
<td>Snowmobiling</td>
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<td>0.0 0.0</td>
<td>0.00 0.00</td>
<td>0.00 0.00</td>
<td>148.79</td>
<td>0</td>
</tr>
<tr>
<td>GATHERING</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Firewood</td>
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<td>3.0 1.7</td>
<td>2.25 2.07</td>
<td>1.08 1.20</td>
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<td>18,005</td>
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<td>Honey</td>
<td>2.2 3.3</td>
<td>2.5 2.0</td>
<td>1.00 1.00</td>
<td>1.00 1.00</td>
<td>148.79</td>
<td>818</td>
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<td>Rocks</td>
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<td>10.8 8.0</td>
<td>3.00 2.83</td>
<td>1.00 1.00</td>
<td>148.79</td>
<td>26,514</td>
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<td>Edible foods</td>
<td>7.7 11.1</td>
<td>2.0 1.8</td>
<td>2.17 2.00</td>
<td>1.00 1.10</td>
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<td>5,877</td>
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<td></td>
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<tr>
<td>Swimming</td>
<td>41.1 65.5</td>
<td>5.2 4.6</td>
<td>3.12 2.91</td>
<td>1.12 1.13</td>
<td>148.79</td>
<td>111,120</td>
</tr>
<tr>
<td>Canoeing</td>
<td>6.6 6.6</td>
<td>2.7 2.7</td>
<td>2.71 2.71</td>
<td>1.20 1.20</td>
<td>148.79</td>
<td>8,623</td>
</tr>
<tr>
<td>Kayaking</td>
<td>1.1 1.1</td>
<td>6.0 6.0</td>
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<td>1.00 1.00</td>
<td>148.79</td>
<td>1,964</td>
</tr>
<tr>
<td>Tubing</td>
<td>3.3 5.5</td>
<td>3.7 2.8</td>
<td>1.50 1.50</td>
<td>1.00 1.00</td>
<td>148.79</td>
<td>2,725</td>
</tr>
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<td>Wind surfing</td>
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<td>0.0 20.0</td>
<td>0.00 3.00</td>
<td>0.00 1.00</td>
<td>148.79</td>
<td>0</td>
</tr>
<tr>
<td>OTHER</td>
<td>6.6 12.1</td>
<td>7.7 4.7</td>
<td>1.83 1.55</td>
<td>1.33 1.91</td>
<td>148.79</td>
<td>18,404</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>947,114</strong></td>
<td><strong>1,148,583</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.3. HIGHEST-USE AND PREFERRED ACTIVITIES

The top five activities on CIP land, in activity days of participation, are compared in descending order with those of the study area in Table 8.

### TABLE 8
HIGHEST USE RECREATION ACTIVITIES

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>CIP USE</th>
<th>STUDY AREA USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>hiking</td>
<td>140,190</td>
<td>172,133</td>
</tr>
<tr>
<td>fishing</td>
<td>121,745</td>
<td>128,155</td>
</tr>
<tr>
<td>camping</td>
<td>117,545</td>
<td>170,529</td>
</tr>
<tr>
<td>swimming</td>
<td>111,120</td>
<td>147,416</td>
</tr>
<tr>
<td>sightseeing/viewing</td>
<td>107,582</td>
<td>141,245</td>
</tr>
</tbody>
</table>

Hiking on CIP land produced 81% of all the hiking reported on the study area, while fishing on CIP land accounted for 95% of all reported fishing occasions within the study area. The top five activities remain the same for the study area as for CIP land, except that fishing drops to fifth place on the study area from second on CIP land. Camping, the second most popular recreation activity for the study area declines in popularity on CIP lands: the decline being more pronounced than for any other activity.

The indicated preferences of recreation activities by both CIP land and study area users correspond closely with those of
highest use in Table 8. The only exceptions are that fishing is rated third by the study area users and picnicking is rated slightly higher than sightseeing and/or viewing in the fifth position on both landbases.

Both areas compare fairly well with the findings of Meis (1979) who noted that traditionally forest recreation centered on camping, hunting and fishing. He then identified the top five recreation activities in Canada in order of demand [use]: pleasure driving, picnicking, hiking/walking, sightseeing and swimming.

4.4. USER CHARACTERISTICS AND COMMENTS

Mail survey respondent characteristics are compared for both CIP land and study area users. The characteristics chosen for comparison are duration of residence in the community, duration of residence in the CRD, and age. A comparison of CIP land and study area users for selected recreation activities is discussed in chapter 5.

Two of every three recreation users of CIP land have lived in the same community for more than five years (see Table 9). This relationship would seem reasonable due to the fact that new residents would not likely be as familiar with the area as long time residents.
Eighty percent of the respondents and 86% of CIP land users have resided in the CRD for more than 5 years. This is indicative of a very stable user population (in terms of residence location) and demonstrates that familiarity with the area is an important factor in area choice.

Three of every four users are between 25 and 54 years of age, though roughly only two of four respondents were in the same age categories. Few respondent head of households using the study area were under 20 years of age, but that was expected as they represent only 1% of the sample (see Table 10).

\(^{1}\)The sample sizes differ from those previously identified due to the different number of responses to each individual question.
TABLE 10

AGE OF RESPONDENTS
(percentage)

<table>
<thead>
<tr>
<th>AGE</th>
<th>RESPONDENTS n=501</th>
<th>USED CIP n=87</th>
<th>USED AREA n=149</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20</td>
<td>1.1</td>
<td>0.0</td>
<td>0.7</td>
</tr>
<tr>
<td>20-24</td>
<td>6.0</td>
<td>8.0</td>
<td>7.4</td>
</tr>
<tr>
<td>25-34</td>
<td>20.4</td>
<td>26.5</td>
<td>24.8</td>
</tr>
<tr>
<td>35-44</td>
<td>22.4</td>
<td>26.5</td>
<td>28.8</td>
</tr>
<tr>
<td>45-54</td>
<td>13.8</td>
<td>21.8</td>
<td>18.8</td>
</tr>
<tr>
<td>55-64</td>
<td>11.6</td>
<td>8.0</td>
<td>6.7</td>
</tr>
<tr>
<td>&gt;64</td>
<td>24.7</td>
<td>9.2</td>
<td>12.8</td>
</tr>
<tr>
<td>Totals</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The three comments reported most often dealt with:

1. Keeping the area natural or primitive.
2. The specific activities themselves.
3. Improving access to the area.

A few non-hunter respondents specifically identified hunting as an activity that they were opposed to and suggested that hunters be required to pay to hunt anywhere. One such person proposed a fee of $1000.00 per day for participation in hunting.
Chapter 5. SELECTED SOCIO-ECONOMIC CHARACTERISTICS OF INTENDED PARTICIPANTS IN SELECTED ACTIVITIES

The activities selected for detailed study are: deer hunting, river fishing, and for camping: primitive, semi-primitive, modified, rural and cabin types of camping. Intended participation levels and characteristics of intended participants in the above activities are discussed for both landbases.\(^1\)

The estimates of annual intended activity days for hunting, fishing and camping by CIP land users are shown in Table 11\(^2\) and Figure 6. Similar information is provided for intended users of the study area in Table 12 and Figure 6. The derived values shown in these tables are used in Chapter 6 to estimate potential annual gross benefits.

Fishing in the Sooke River produces more than twice as many intended activity days as all other selected activities put together and six times as many as any other single selected activity. Primitive and semi-primitive camping and hunting rank as the second, third and fourth greatest generators of intended activity days respectively.

\(^1\)Intended activity participation refers to those users of the landbase that indicated an intention to participate in the activity on the landbase in the future.

\(^2\)Due to the inclusion of the non-response factor in the number of intended participant households in the sample, those values shown in Tables 10 & 11 are not whole numbers.
### TABLE 11
ANNUAL INTENDED ACTIVITY DAYS FROM HOUSEHOLDS USING CIP LAND

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>SAMPLE HOUSEHOLDS*</th>
<th>CRD HH EXPANSION FACTOR</th>
<th>AVG. # TRIPS/HH</th>
<th>AVG. # MEMBERS</th>
<th>AVG # DAYS</th>
<th>ACTIVITY DAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>HUNTING</td>
<td>19.98</td>
<td>148.79</td>
<td>4.67</td>
<td>1.33</td>
<td>1.38</td>
<td>25481</td>
</tr>
<tr>
<td>FISHING</td>
<td>49.94</td>
<td>148.79</td>
<td>9.39</td>
<td>2.63</td>
<td>1.41</td>
<td>258739</td>
</tr>
<tr>
<td>CAMPING</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primitive</td>
<td>73.25</td>
<td>148.79</td>
<td>1.71</td>
<td>2.14</td>
<td></td>
<td>39883</td>
</tr>
<tr>
<td>Semi-primitive</td>
<td>56.60</td>
<td>148.79</td>
<td>1.70</td>
<td>2.06</td>
<td></td>
<td>29492</td>
</tr>
<tr>
<td>Modified</td>
<td>23.42</td>
<td>148.79</td>
<td>0.95</td>
<td>1.33</td>
<td></td>
<td>4402</td>
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<tr>
<td>Rural</td>
<td>12.77</td>
<td>148.79</td>
<td>0.33</td>
<td>2.50</td>
<td></td>
<td>1568</td>
</tr>
<tr>
<td>Cabins</td>
<td>18.10</td>
<td>148.79</td>
<td>0.47</td>
<td>2.00</td>
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<td>2531</td>
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</tbody>
</table>

### TABLE 12
ANNUAL INTENDED ACTIVITY DAYS FROM HOUSEHOLDS USING STUDY AREA

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>SAMPLE HOUSEHOLDS*</th>
<th>CRD HH EXPANSION FACTOR</th>
<th>AVG. # TRIPS/HH</th>
<th>AVG. # MEMBERS</th>
<th>AVG # DAYS</th>
<th>ACTIVITY DAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>HUNTING</td>
<td>24.48</td>
<td>148.79</td>
<td>4.67</td>
<td>1.33</td>
<td>1.38</td>
<td>31,220</td>
</tr>
<tr>
<td>FISHING</td>
<td>74.51</td>
<td>148.79</td>
<td>9.16</td>
<td>2.55</td>
<td>1.39</td>
<td>359,947</td>
</tr>
<tr>
<td>CAMPING</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primitive</td>
<td>101.12</td>
<td>148.79</td>
<td>1.34</td>
<td>2.93</td>
<td></td>
<td>59,072</td>
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<tr>
<td>Semi-primitive</td>
<td>90.48</td>
<td>148.79</td>
<td>1.26</td>
<td>2.21</td>
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<td>37,488</td>
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<tr>
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<td>0.80</td>
<td>2.10</td>
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<td>12,241</td>
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<td>30.87</td>
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<td>0.34</td>
<td>2.43</td>
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<td>3,795</td>
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<tr>
<td>Cabins</td>
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<td>148.79</td>
<td>0.26</td>
<td>2.20</td>
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<td>3,171</td>
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</table>

*These values include the non-response factor for each activity
FIGURE 6
ANNUAL INTENDED ACTIVITY DAYS

ACTIVITY DAYS

Hunting Fishing Primitive* Semi-prim.* Modified* Rural* Cabins*<br>
* Type of camping
Demographic characteristics of those persons who participated in recreation activities on CIP land and the study area in 1986, and who intended to hunt, fish and/or camp on those lands, under the conditions described in the questionnaire, are displayed in Table 13.

5.1. HUNTING

CIP land users expressing an intention to hunt deer would produce 25,481 intended activity days of hunting, while study area users would generate 31,220 intended activity days.

Nearly one third of all intended hunters using CIP land live in Saanich, followed by Colwood and Victoria (each with 19%), View Royal and Sooke (each with 12.5%) and the remaining 6% in Esquimalt. The western communities have the highest rates of intended hunting per household. The nearness of these communities to the study area seemingly account for the higher intended participation rates.

Almost twice as many intended hunters as the general population had lived in the same community for greater than 10 years. Over 88% of intended hunters lived in the Regional District for more than 10 years as compared with 60% of the CRD population. The duration of residence in the community compared to that of the CRD implies a significant amount of residential mobility.

3See Appendix A for conditions identified in each question.
### TABLE 13

**INTENDED ACTIVITY USER CHARACTERISTICS**  
(Percentage)

<table>
<thead>
<tr>
<th>PLACE OF RESIDENCE</th>
<th>HUNTERS CIP</th>
<th>HUNTERS AREA</th>
<th>ANGLERS CIP</th>
<th>ANGLERS AREA</th>
<th>PRIMITIVE CAMPER CIP</th>
<th>PRIMITIVE CAMPER AREA</th>
<th>SEMI-PRIMITIVE CAMPER CIP</th>
<th>SEMI-PRIMITIVE CAMPER AREA</th>
<th>MODIFIED CAMPER CIP</th>
<th>MODIFIED CAMPER AREA</th>
<th>RURAL CAMPER CIP</th>
<th>RURAL CAMPER AREA</th>
<th>CABIN CAMPER CIP</th>
<th>CABIN CAMPER AREA</th>
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<tr>
<td>Central Saanich</td>
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<td>4.5</td>
<td>4.3</td>
<td>6.3</td>
<td>5.4</td>
<td>4.0</td>
<td>4.8</td>
<td>0.0</td>
<td>6.7</td>
<td>8.3</td>
<td>7.1</td>
<td>0.0</td>
<td>5.9</td>
</tr>
<tr>
<td>Colwood</td>
<td>16.7</td>
<td>14.3</td>
<td>4.7</td>
<td>4.5</td>
<td>4.7</td>
<td>4.3</td>
<td>4.0</td>
<td>4.8</td>
<td>0.0</td>
<td>6.7</td>
<td>8.3</td>
<td>7.1</td>
<td>0.0</td>
<td>5.9</td>
</tr>
<tr>
<td>Esquimalt</td>
<td>6.3</td>
<td>4.8</td>
<td>4.5</td>
<td>5.8</td>
<td>4.1</td>
<td>6.5</td>
<td>8.0</td>
<td>6.5</td>
<td>0.0</td>
<td>6.7</td>
<td>8.3</td>
<td>7.1</td>
<td>0.0</td>
<td>5.9</td>
</tr>
<tr>
<td>Langford</td>
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<td>6.8</td>
<td>8.7</td>
<td>6.3</td>
<td>6.5</td>
<td>2.0</td>
<td>3.6</td>
<td>0.0</td>
<td>6.7</td>
<td>8.3</td>
<td>7.1</td>
<td>0.0</td>
<td>5.9</td>
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<td>0.0</td>
<td>1.4</td>
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<td>0.0</td>
<td>0.0</td>
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<td>0.0</td>
<td>0.0</td>
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</tr>
<tr>
<td>North Saanich</td>
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<td>2.3</td>
<td>1.4</td>
<td>1.6</td>
<td>1.1</td>
<td>2.0</td>
<td>1.2</td>
<td>0.0</td>
<td>6.7</td>
<td>8.3</td>
<td>7.1</td>
<td>0.0</td>
<td>5.9</td>
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<tr>
<td>Oak Bay</td>
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<td>0.0</td>
<td>2.3</td>
<td>4.3</td>
<td>6.3</td>
<td>8.7</td>
<td>8.0</td>
<td>10.8</td>
<td>0.0</td>
<td>6.7</td>
<td>8.3</td>
<td>7.1</td>
<td>11.8</td>
<td>11.8</td>
</tr>
<tr>
<td>Saanich</td>
<td>31.2</td>
<td>25.8</td>
<td>35.8</td>
<td>30.5</td>
<td>38.0</td>
<td>36.2</td>
<td>50.1</td>
<td>37.9</td>
<td>58.6</td>
<td>35.8</td>
<td>41.2</td>
<td>26.6</td>
<td>11.8</td>
<td>11.8</td>
</tr>
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<td>Sidney</td>
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<td>2.9</td>
<td>0.0</td>
<td>1.4</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
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**YEARS IN COMMUNITY** (percentage by years)

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**INCOME (thousands of dollars)**

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within the CRD over the past 10-20 years.

Over one third of intended hunters using CIP land are 45 to 54 years old and slightly less than one third are in the 25-34 year age category. This bimodal distribution is created by a marked gap in the 35-44 year age class. The same relationship held true for intended hunters using the study area. In contrast, the 35-44 age group accounts for 22% of the population, which in turn generates the greatest overall use of CIP land, equalling the 26% use by the 25-34 age group. This deviation may possibly be explained by the focus and involvement of the 25-34 year age group in more 'young family' oriented activities due to their family situations.

Half of all intended hunter participation by users of both CIP land and the study area was generated by households with an annual income in the $10-30,000 range. This also reflects the income of a similar proportion of intended participants in other activities and of the sample population.

The GVWD offers a greater likelihood of hunter success than does CIP land due to its denser deer populations. The high hunter success rate would reduce the average number of annual trips per hunter in the GVWD compared with that on CIP land as bag limits would be reached more quickly. The limited access and shorter hunting season would also reduce the number of trips per hunter.
5.2. FISHING

CIP land users intending to fish the Sooke River represent 258,739 days of fishing, while study area users intending to fish the Sooke River produce 359,947 days (see Tables 11 & 12). The demographic characteristics of intended anglers are shown in Table 13. Place of angler residence held closely to CRD household distributions, ie. 61% of all anglers intending to fish the Sooke River were either from Saanich or Victoria.

Over one-half of the fishermen intending to fish the Sooke River lived in their community for 6 or more years. On the other hand, 40% of them had lived in the community two years or less. This high proportion of intended users as short term community residents may be explained by the young age distribution of anglers. On the other hand, four of every five intended anglers lived in the Regional District for 6 or more years, but only one of every two lived in the same community for that duration of time. These findings support the statement made above regarding the mobility of residents within the CRD.

There is relatively uniform intended participation throughout the 25-54 age ranges. The combination of long time residence in the CRD and younger age categories of users indicates that many of these anglers likely grew up in the CRD. These younger persons may tend to be more mobile due to such things as marriage, new jobs and leaving home after finishing their education.
5.3. CAMPING

The percentages of different camper types are shown in Figure 7, while the demographic characteristics of intended campers for each type of camping are depicted in Table 13. The findings indicate that most CIP land users intending to camp would use either primitive (75%) or semi-primitive (58%) style camping. Among present users only 25% intend to use modified, 14% rural and 19% cabin types of camping. The values for camping by study area users are slightly lower but with a similar trend. They are: 63% primitive, 57% semi-primitive, 31% modified, 19% rural and 23% cabin.

Figure 8 shows a breakdown of camping accommodation use for both CIP land and study area intended users. Of those households which use CIP land, 68% use tents, 63% use vehicular accommodation and 14% use cabins. Similarly for the study area, 61% use tents, 53% use vehicular accommodation and 17% use cabins. Two thirds of vehicular camping is by campers and campervans with motorhomes, tent-trailers and trailers accounting for the remainder.

---

4Percentages exceed 100% as multiple responses per respondent were permitted for the type of camping participated in (Question 16) and type of camping accommodation used (Question 15).
FIGURE 7
CAMPER TYPES: CIP LAND AND STUDY AREA INTENDED USERS

CAMPING USAGE (%)

- CIP, N=88
- STUDY AREA, N=150

TYPE OF CAMPING

- Primitive
- Semi-prim.
- Modified
- Rural
- Cabin
FIGURE 8
CAMPER ACCOMMODATION: CIP LAND AND STUDY AREA INTENDED USERS
The community of residence of intended primitive and semi-primitive style campers generally followed the population distribution. More significant inter-community variations in camping use were evidenced with the Modified, Rural and Cabin types of camping. Higher percentages of intended use of these types of camping came from the more populated urban centers.

Primitive and semi-primitive camping dominate the styles of camping use and should be the focus of any further study. Camping activities are dominated by long time residents of the community and CRD as shown by the percentage of residents living there for 6 or more years. Though these long term residents make up a greater proportion of the community, the low numbers intending to use the modified, rural and cabin types of camping indicate a limited clientele for such activities, at least within the CRD.

Campers also show a lengthy term of residence in the CRD, as would be expected from their time in the community. The length of residence for intended campers of each camping type are indicated in Table 12. The intended camping figures closely reflect the general recreation participation on the area.

Three of every four intended campers for all types of camping except cabin camping are between 25 and 54 years old. The 65yrs and older age class show 10% more participation in cabin type camping than in other types of camping. Younger people tend
to participate in more primitive types of camping, though almost half of rural camping by CIP land users is dominated by the 25-34 age category. This could be due to increased ease and opportunities in caring for and/or amusing children in the more developed types of camping situations.

One third to one half of each type of camping participation was by households within the $20-30,000 annual income range. Regardless of type of camping the second most frequent household annual income was $10-20,000 except for modified camping, wherein intended users were more likely from the $30-40,000 annual income level.

5.4. COMPARISON OF STUDY RESULTS

Fishing produced more than twice as many intended activity days as all other activities put together. Fishing in the Sooke River would produce six times as many intended activity days as would primitive camping, which was the next most intended activity. Semi-primitive camping and hunting were quite similar in their potential user generating ability, while modified, rural and cabin types of camping were lower potential producers.

Most householders reporting an intention to participate in an activity were long time residents of the community and even longer time residents of the CRD. The heads of those households tended to be male and be between 25 - 54 years of age.
5.5. COMPARISON OF RESULTS WITH OTHER SELECTED STUDIES IN BRITISH COLUMBIA

5.5.1. Hunting

According to Reid (1985) the Vancouver Island Region had the highest overall participation in deer hunting in the province in 1981, accounting for 22.6% of total hunter days. A remarkable 54% of the hunters in that region were successful in bagging game. They also claimed 33.5% of the provincial deer harvest.

Hunting in B.C. in general has dropped off 32% since the fee increases of 1982 (B.C. Ministry of Environment and Parks, 1987). Reid (1985) found that active deer hunters represent 88% of those hunters who purchase deer tags. The deer tags sold for the 1985-86 season represented 3% of B.C.'s population. Thus, 2.7% of the population of this province were deer hunters in 1986, which compares well with the 2.8% of the CRD population found as deer hunters in this study.

Reid (1985) estimated the annual average number of days per hunter spent deer hunting for the Vancouver Island Region to be 12.9 hunter days, whereas, in this study, the average hunter spent 4.67 days hunting. The lower number of hunter days per hunter for this study area may be due to this study's inability

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to account for hunter days spent in other areas.

This study found results similar to Reid (1985) in regards to hunter household income. Both this study and that by Reid found the largest percentage of hunters, 29% and 38% respectively, were in the $20-30,000 income bracket (1981 dollars).6

5.5.2. Fishing

According to Reid (1986) the number of active resident anglers on Vancouver Island increased 73% from 1977 to 1981. Similar to the hunting situation, the number of resident anglers has decreased by approximately 32%, since the increase in licence fees.

Reid (1986) found that 29% of anglers had annual household incomes in the $20-30,000 range (1981 dollars) and 24% had less than $10,000. This compares with the findings of this study, wherein 33% of intended anglers were in the $20-30,000 range but only 9% reporting incomes of less than $10,000.

Recent camping studies applicable to B.C. were not available for comparison with this study.

The present use, the intention to participate in selected

6Though consumer price indices rose substantially between 1981 and 1986, salaries did not follow suit.
activities and the demographic characteristics of those users have been estimated. It now becomes necessary to estimate the willingness-to-pay for those opportunities and derive the potential gross benefits attributable to those activities on each of the two landbases.
Chapter 6. WILLINGNESS-TO-PAY VALUES AND POTENTIAL GROSS BENEFITS

This chapter first addresses the willingness-to-pay values per activity day derived from the survey. It then discusses the subsequent calculations of potential annual gross benefit for each selected activity. Comparisons of these derived values with other studies and markets are presented and discussed. The utility of this study to other users is outlined.

6.1. WILLINGNESS-TO-PAY VALUES

The average WTP values for hunting, fishing and camping were derived from the responses, of only those households that had used either CIP land or the study area for recreational pursuits in 1986, to the contingent valuation questions in the questionnaire. The values obtained are displayed in Table 14.

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>CIP LAND ($)</th>
<th>STUDY AREA ($)</th>
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<tbody>
<tr>
<td>Hunting</td>
<td>8.53</td>
<td>9.40</td>
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<tr>
<td>Fishing</td>
<td>2.49</td>
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<tr>
<td>Primitive</td>
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<tr>
<td>Cabins</td>
<td>43.41</td>
<td>39.42</td>
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These values are consistently lower than those found in other studies. A comparison of those values is undertaken following a discussion of the potential annual gross benefits.

6.2. POTENTIAL ANNUAL GROSS BENEFITS

The potential annual gross benefits for each of the selected activities on both CIP land and on the study area are depicted in Tables 15 and 16 respectively and in Figure 9. These values were derived from the model identified in Chapter 3. It involves multiplying the number of intended activity days for each activity by the average daily willingness-to-pay for that activity.

### TABLE 15

**POTENTIAL ANNUAL GROSS BENEFITS FOR CIP LAND FROM CRD HOUSEHOLDS**

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>NUMBER OF INTENDED ACTIVITY DAYS</th>
<th>AVG. WTP/ACTIVITY DAY ($)</th>
<th>POTENTIAL ANNUAL GROSS BENEFITS ($)</th>
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<tr>
<td>HUNTING</td>
<td>25,481</td>
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<td>FISHING</td>
<td>258,739</td>
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<td><strong>TOTAL</strong></td>
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TABLE 16

POTENTIAL ANNUAL GROSS BENEFITS FOR STUDY AREA FROM CRD HOUSEHOLDS

<table>
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<tr>
<th>ACTIVITY</th>
<th>NUMBER OF INTENDED ACTIVITY DAYS</th>
<th>AVG. WTP/ACTIVITY DAY ($)</th>
<th>POTENTIAL ANNUAL GROSS BENEFITS ($)</th>
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<td>Fishing</td>
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<td><strong>TOTAL</strong></td>
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<td><strong>$2,286,935</strong></td>
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The average WTP value for hunting in 1986 was found to be $8.53 and $9.40 per hunter day for CIP land and study area users respectively. These figures yield potential annual gross benefits for hunting of $217,353 on CIP land or $293,468 for the entire study area.

The reported WTP values of $2.49 and $3.39 per angler day for CIP land users and for study area users respectively, were lower than expected for salmon fishing. These values seem to reflect fresh water fishing values as presently experienced on the area rather than the hypothetical situation presented in the questionnaire. The range of payments offered may have affected these values in a downward direction. Based on these findings, anglers using CIP land would annually produce $644,260 and for
those using the study area $1,220,220 (see Tables 15 & 16). Sport fishing alone produced over one-half of the total potential annual gross benefit from the seven activities estimated in this study. On this basis alone, it ought to receive a first priority position for further investigation towards implementing revenue producing recreation management functions on forest lands.

Though 75% of campers use primitive style camping, their willingness-to-pay for it is much lower than the 58% who use semi-primitive camping. The potential gross benefit from intending semi-primitive campers who had used CIP lands amounted to $108,750 and from those who had used the study area $248,169. By the same token, primitive camping would have produced $120,845 by CIP land users and $186,077 by study area users. The 14-25% range of intending campers using the other three camping types does not diminish their potential gross benefits to the same extent, as their WTP values are higher. But, because costs of providing modified, rural and cabin types of camping opportunities and facilities are greater than the more primitive types, the net benefits would likely be much lower. This would have to be verified through additional research. If so, this would provide even stronger reasoning for further research of the more primitive types of camping.
FIGURE 9

POTENTIAL ANNUAL GROSS BENEFITS

POTENTIAL GROSS BENEFITS
(hundred thousands of dollars)

ACTIVITY

Hunting
Fishing
Primitive*
Semi-prim.*
Modified*
Rural*
Cabin*

*Type of camping

CIP
STUDY AREA
6.3 COMPARISON OF DERIVED VALUES WITH OTHER SELECTED CONTINGENT VALUATION STUDIES

Table 17 displays a comparison of various CVM studies and their derived values for big game hunting, fishing and camping in B.C. and the Pacific Northwest. All values have been adjusted to reflect 1986 Canadian dollar values.¹

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<td></td>
<td></td>
<td></td>
<td>17.75</td>
</tr>
<tr>
<td>Camping</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Primitive</td>
<td>3.03</td>
<td>3.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>18.37</td>
</tr>
<tr>
<td>Semi-primitive</td>
<td>8.04</td>
<td>7.59</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12.28</td>
</tr>
<tr>
<td>Modified</td>
<td>10.30</td>
<td>10.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8.58</td>
</tr>
</tbody>
</table>

The values derived in this study are significantly lower than the values obtained by other researchers. This may have been a result of the payment card ranges presented in the survey. Also, the discrepancy between the derived camping values with those in the USA is largely due to differences in the physical features present and market factors involved, i.e. the USA studies.

¹See Appendix E for USA exchange rate and consumer price index changes for the years in question.
were on high altitude lakes near well developed high class resorts in Colorado.

6.4. COMPARISON OF DERIVED VALUES WITH SELECTED MARKET VALUES

Table 18 displays a comparison of the values derived in this study with other available market prices and set prices for hunting and camping. No fishing values were available for comparison.

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>HUNTING</td>
<td>8.53</td>
<td>9.40</td>
<td>7.49</td>
<td>9.64 D-60.00</td>
<td>70.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>B-80.00</td>
<td>90.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>T-(400.00-600.00)</td>
<td></td>
</tr>
<tr>
<td>CAMPING</td>
<td></td>
<td></td>
<td>16.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semi-prim</td>
<td>8.04</td>
<td>7.59</td>
<td>7.50</td>
<td>12.30</td>
<td>20.75</td>
</tr>
<tr>
<td>Modified</td>
<td>10.30</td>
<td>10.23</td>
<td>13.89</td>
<td>13.90</td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>12.82</td>
<td>13.89</td>
<td>13.90</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

No conclusive statements can be made with these comparisons but it appears that the camping values derived in this study reflect well the average market values found in the CRD. The CVM in this study has produced values that are approximately one-half that of USA markets.

2An explanation of these 'market' values is found in Appendix E.
6.5. UTILITY OF STUDY TO OTHERS

This study was a site specific application of the CVM for a non-market estimation of the recreation activity values on that specified landbase. Though this work is directly applicable to forest management on the study area, it does have some benefit for other applications. The results contained herein could be utilized by government agencies such as the Ministries of Tourism, Environment and Parks, Forests and Lands, Fisheries and Oceans, and the planning component of the CRD. It may also be utilized by forest companies, recreation entrepreneurs and recreation organizations to facilitate planning.

The strongest component in this study worth adapting to other areas is the development and application of the methodology for non-market valuation of similar or diverse activities and/or amenities. This valuation technique may be applied to either private or public lands. The questionnaire and methodology would require refining for each particular situation but the steps and process as laid out could be readily adapted.

The accuracy of the estimated dollar values derived in this study are limited by the range of values offered in the WTP questions and by the small sample size for certain activities. In particular, hunting, modified camping, rural camping and cabin camping would be more accurate and reliable with an increased response rate to those questions. Present and intended use is
estimated and relative use can be shown.

The applicability of this study to other situations is dependent upon the goals and objectives of such studies. This study is not without flaws, but a good portion of it could be used in other non-market valuations of recreation goods and services.
Chapter 7. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This final section will provide a summary of the major findings then present conclusions and recommendations regarding the study results and design. It will address the objectives and related questions embodied in this thesis.

7.1. SUMMARY OF MAJOR FINDINGS

In 1986, 14% of the CRD population participated in recreational use of CIP land and 22% participated in recreational use of the study area. These areas generated 947,114 and 1,148,583 recreation activity days respectively, inferring that CIP land users accounted for 82% of the recreation participation on the study area in 1986.

Three of every four area-user heads of households are male and between 25 – 54 years old. Almost half of the users resided in the same community for more than 10 years and three quarters have lived in the CRD for greater than 10 years. These figures indicate a very stable community though there is a large portion of the population, particularly in the older age groups, that do not participate in outdoor recreation activities.

Lack of transportation and lower incomes could account for the old and young not using the area as much as middle-aged groups. Many of the more elderly may also be less physically
able to participate in such activities. Longer terms of residence in the community and/or CRD seems to indicate a greater likelihood of knowledge of or familiarity with the area. Advertising could increase the number of users through increasing the awareness of the CRD population as to the opportunities available. One should focus on those who have moved into the CRD in the last five years. Such information might be available from house sale records of the Victoria Real Estate Board or through the City Directory which identifies new owners and tenants.

The preferred activities noted by CIP land users also directly reflect those activities with the highest participation rates. This is not always the case as there are often mitigating circumstances that preclude a person participating in their preferred activity, such as: discretionary time or income, health, transportation, proximity to the location of the activity, weather, family responsibilities, and lack of provision of the preferred activity. The preferred activities identified were:

1. hiking
2. fishing
3. camping
4. swimming
5. sightseeing/viewing

The activity preferences for the study area produced the same activities, except fishing dropped to fifth place from second in both preference and participation, while the other activities remained in the same order.
The intention to participate in the selected activities on CIP lands over a one year period totalled 336,615 activity days and on the study area to be 506,904. The intention to fish in the Sooke River generated 71% and 77% of those figures from CIP land and study area users respectively.

Anglers accounted for eleven times the number of intended activity days as hunters and three times the number as campers. Fishing does not seem to have the same opposition to the sport as does hunting, though it still entails the killing of prey.

The total potential gross benefits for 1986 from households intending to participate in the selected activities on CIP land was $1,402,388. For households intending to use the study area that figure rose to $2,286,935. Fishing was found to be the most promising benefit generator on both areas, followed by semi-primitive camping and deer hunting. On CIP lands, their respective 1986 potential gross benefits were: $644,261, $237,116, and $217,353. Within the study area $1,220,220 was derived for fishing, $284,230 for semi-primitive camping and $293,468 for deer hunting.

Reported deer hunting participation on CIP land is very close to Reid's (1985) figures for that same activity province wide. The WTP values for hunting on CIP land compare well with the hunting fees set on GVWD lands, though they fall well short
of the fees charged on Sidney Island and of the values derived in
other CVM studies.

Derived fishing values were much lower than those found in
other CVM studies and comparative 'market' values for fishing
were not found. Even with the low WTP values reported, fishing
remains the greatest gross benefit producer of all activities
analysed.

The derived camping values in this study correspond quite
well with values obtained from the local market, though they are
substantially lower than average camping values for the USA. Con­
servative estimates of market prices are the norm found in most
CVM studies.

The 80 percent response rate to the survey is indicative of
a high interest in outdoor recreation by the Greater Victoria
population. The use of covering letters, reminder cards and a
second questionnaire to initial non-respondents proved very
worthwhile in producing more returns. The visual quality of the
survey instrument and the auspices of the University of British
Columbia and the B.C. Science Council undoubtedly had a positive
influence on the rate of return as well. The use of a 'fresh'
edition of the telephone directory substantially reduced the
number of non-deliverable questionnaires. The personal inter­
views of a sub-sample of the non-respondents was invaluable in
calculating more accurate measurements of the use of the area and
in estimating participation rates in activities by the surveyed
households.

This work has overcome, to a large extent, a number of the
biases that traditionally affect the accuracy of mail surveys,
such as non-response and sampling biases. A high survey response
rate and the application of a non-response factor calculated from
the interviewed non-response mail questionnaire group, should
lend credibility to the accuracy of the study results.

Although Sooke had less than half the number of respondents
to the survey than its' population indicates, it provided four
times its response rate in terms of use of CIP land, ie. 1.4% of
the respondents produced 7% of the users. This higher use per
capita was expected in Sooke due to its closer proximity to the
study area than the other communities. Otherwise, the rates of
use by other communities in the CRD generally adhered propor­
tionately to their population.

7.2. CONCLUSIONS

There are numerous 'crops' of recreation activity days that
could be harvested annually, with little impact on timber pro­
duction, on these two landbases. Fishing should be the primary
focus of any further recreation benefit generating research on
this landbase followed by semi-primitive camping, hunting and
primitive camping respectively. More work is required to develop potential net revenues obtainable from these activities and to determine possible fee schedules for them.

Continued research into sources of income from recreation activities on this landbase, in addition to timber harvesting, will enhance the ability of forest land owners to more effectively manage forest lands on an integrated basis. A well planned, well managed recreation program, based in part on the evidence secured in this study, has the potential to generate significant benefits on CIP lands and on the study area.

7.3. RECOMMENDATIONS

Further research should be undertaken regarding fishing, camping and hunting as well as alternative activities on the landbase to determine the net potential benefits of those activities. Such a study should address the costs of provision of these activities, and should include costs of planning, construction, operation, maintenance, liability insurance, taxation rates and risks such as fire and theft, as well as the opportunity costs forgone by undertaking a particular project.

Methods of implementing a fee collection scheme should be investigated. As the above activities can be pursued in numerous locations throughout the study area they are difficult to monitor and administer. The most efficient means of procuring user fees
would be through the implementation of an annual entry permit or a season pass. Such an undertaking would also require the involvement and co-operation of all land owners in the area due to the land ownership patterns and the numerous access points.

Much has been accomplished in this study yet the greater portion of the 'mountain' remains to be climbed. Press forward in this endeavour.
REFERENCES CITED


A SURVEY OF YOUR OUTDOOR RECREATION USE
OF SELECTED FOREST LANDS
IN THE CAPITAL REGIONAL DISTRICT

YOU ARE IMPORTANT!!
Your COMPLETION and RETURN of this questionnaire is ESSENTIAL whether
any member of your household has used this property for recreation
purposes or not.
If you object to answering these questions please return the question­
naire in the stamped, self-addressed envelope, stating the reasons for
your objection.
1. Where do you live?

- Central Saanich
- Colwood
- Esquimalt
- Langford
- Metchosin
- North Saanich
- Oak Bay
- Saanich
- Sidney
- Victoria
- View Royal
- Sooke -
  (electoral area)

2. How long have you lived in that community?

- less than 1 year
- 1 year
- 2 years
- 3 years
- 4 years
- 5 years
- 6-10 years
- 11 or more years

3. How many years have you lived in the Capital Regional District in total?

- less than 1 year
- 1 year
- 2 years
- 3 years
- 4 years
- 5 years
- 6-10 years
- 11 or more years

4. Look at the enclosed map on the facing page. During the twelve months of 1986 has any member of your household participated in any outdoor recreation activities within the area outlined?

**Note:** household refers to the head(s) of the home plus all dependants living in that home during 1986.

- Yes
- No

5. Would you or any member of your household use that area in the future if recreation facilities were provided?

- Yes
- No

If you answered NO to both questions 4 & 5 please go to question 18.)
6. Again, considering only the area outlined on the attached map, look at the list of activities in the chart on the facing page. For those individual outdoor recreation activities in which any member of your household participated in 1986, fill in that chart with the following information: (see the example below)

a. mark the total number of trips that were made in 1986 for each activity.
   
   Note: -a trip is any excursion to the area for recreation purposes.
   -seasons are: W = Winter (Dec. to Feb.)
   Sp = Spring (Mar. to May)
   Su = Summer (Jun. to Aug.)
   F = Fall (Sep. to Nov.)

b. mark the average length of stay for those trips. Indicate the length in number of days.
   
   Note: a day is considered to be all or a part of any calendar day.

c. mark the number of trips that were taken on weekdays and the number taken on weekends.
   
   Note: -weekday = Monday to Friday morning
   -weekend = Friday afternoon to Sunday

d. state the average number of household members that participated in each activity.

EXAMPLE:

Remember: report the combined participation of all household members for each activity.

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>SEASON</th>
<th>TOTAL #TRIPS</th>
<th>AVERAGE #DAYS</th>
<th>WEEK DAY</th>
<th>WEEK END</th>
<th>HOUSEHOLD MEMBERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passive:</td>
<td>W</td>
<td>Sp Su F</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>picnicking</td>
<td>X</td>
<td>X X X</td>
<td>5</td>
<td>1</td>
<td>3 2</td>
<td>4</td>
</tr>
<tr>
<td>sightseeing/viewing</td>
<td>X</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1 5</td>
<td></td>
</tr>
<tr>
<td>photography</td>
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<td>X</td>
<td>3</td>
<td>1</td>
<td>2 1</td>
<td>1</td>
</tr>
<tr>
<td>OTHER - specify name</td>
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<td>2</td>
<td>1</td>
<td>2</td>
<td>0 2</td>
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</table>
## Activity Participation Chart

<table>
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<th>Activity</th>
<th>Season</th>
<th>Total #Trips</th>
<th>Average #Days</th>
<th>Week Day</th>
<th>Week End</th>
<th>House-Hold Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hunting:</td>
<td>W SP SU F</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
</tr>
<tr>
<td>Upland birds</td>
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<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
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<tr>
<td>Big game</td>
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<td></td>
</tr>
<tr>
<td>Active:</td>
<td>W SP SU F</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
</tr>
<tr>
<td>Hiking</td>
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<td>XXX</td>
<td>XXX</td>
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<td>XXX</td>
</tr>
<tr>
<td>Horse back riding</td>
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<tr>
<td>Mountain biking</td>
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<td>Survival games</td>
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<tr>
<td>X-country skiing</td>
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<td>Sledding</td>
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<td></td>
</tr>
<tr>
<td>Passive:</td>
<td>W SP SU F</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
</tr>
<tr>
<td>Picnicking</td>
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<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
</tr>
<tr>
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<td>Photography</td>
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<tr>
<td>Motorized:</td>
<td>W SP SU F</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
</tr>
<tr>
<td>Four wheeling/back-road touring</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Trail biking</td>
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<tr>
<td>Snowmobiling</td>
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<td></td>
</tr>
<tr>
<td>Gathering:</td>
<td>W SP SU F</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
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<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
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<tr>
<td>Honey</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Rocks</td>
<td></td>
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<td></td>
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<tr>
<td>Edible foods</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>(Berries/mushrooms)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water based:</td>
<td>W SP SU F</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
</tr>
<tr>
<td>Swimming</td>
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<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
</tr>
<tr>
<td>Canoeing</td>
<td></td>
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<td></td>
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<tr>
<td>Kayaking</td>
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<tr>
<td>Tubing</td>
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<tr>
<td>Wind surfing</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Other: (specify)</td>
<td>W SP SU F</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
</tr>
</tbody>
</table>
7. Considering all of the outdoor recreation activities in which you participate, list your preference in order from 1 to 5.

   most preferred 1.  
   2.  
   3.  
   4.  
   least preferred 5.  

8. Considering the twelve month period just reported (1986), would your household's use of the area be more or less than in:

<table>
<thead>
<tr>
<th>1985</th>
<th>1984</th>
<th>1983</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Same as</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

LOCATION OF ACTIVITY

9. Examine the map on facing page, then carefully draw on that map an 'X' on each of the areas your household has used in 1986. Be as precise as possible. See example below.

EXAMPLE:
10. In the last 5 years, have you hunted for deer:

   a. anywhere in B.C.?
      Yes ___  No ___

   b. in the Greater Victoria Water District?
      Yes ___  No ___

   c. on Sidney Island?
      Yes ___  No ___

11. Suppose limited entry hunting was prescribed for the area outlined on the map (excluding the areas where hunting is presently prohibited) to maintain a higher deer/hunter ratio. Would you hunt there?
      Yes ___  No ___

      (If you said NO, go to question 13.)

12. Assuming the number of deer/hunter were maintained at a ratio similar to those found in the Greater Victoria Water District, circle below the daily fee which you would be willing to pay to hunt there.

      $10  $20  $30  $40  $50  other(specify) $___

13. The Sooke River is being re-stocked with salmon. Would you fish there when it is re-opened for salmon fishing?
      Yes ___  No ___

      (If you answered NO, go to question 15.)
14. Suppose a fee was levied to offset the costs of re-stocking and enhancement of the habitat. Circle the daily fee you would be willing to pay to fish in that river.

$2 $4 $6 $8 $10 other (specify) $____

15. Check all the types of camping accommodation that you currently use?

motorhome ____ camper ____ trailer ____ cabin ____
camper-van ____ tent ____ tent-trailer ____ other ____

16. Given the following descriptions, mark below all the types of camping that you currently participate in.

a. **PRIMITIVE**: predominantly natural appearing, reasonably good road access, some evidence of and contact with people, potential isolation experience, picnic table, fire ring, levelled tent or camper site, pit toilet, no running water.

b. **SEMI-PRIMITIVE**: as in (a) above, but with good road access, greater evidence of and contact with people, built up tent or camper pad, firewood provided, garbage collection, pit or flush toilet, and cold running water to central camp area.

c. **MODIFIED**: as in (b) above, but with substantial evidence of and contact with people, flush toilet, hot and cold running water, showers.

d. **RURAL**: as in (c) above but with substantially modified environment, very high evidence of and contact with people, level grassy camper pad, electrical and sewer hookups, laundry, store.

e. **CABINS**: with beds, cooking facilities, hot and cold running water, flush toilet and showers in any of the above settings.
17. Again, thinking of the area outlined on the map on page 7, and using the descriptions in question 16 for the types of camping that you participate in, circle the daily fee you would be willing to pay for the use of:

a. PRIMITIVE facilities.

   $5 $7 $9 $11 $13 other(specify) $ __________

b. SEMI-PRIMITIVE facilities.

   $8 $11 $14 $17 $20 other(specify) $ __________

c. MODIFIED facilities.

   $12 $16 $20 $24 $28 other(specify) $ __________

d. RURAL facilities.

   $16 $20 $24 $28 $32 other(specify) $ __________

e. CABIN facilities.

   $50 $60 $70 $80 $90 other(specify) $ __________
PERSONAL CHARACTERISTICS

18. Your current age is?
   
   under 20 years of age __
   20-24 years __
   25-34 years __
   35-44 years __
   45-54 years __
   55-64 years __
   65 years and older __

19. What is your gender?
   Male __
   Female __

20. Check the category which best describes your total annual household income, before taxes.
   
   under $10,000 __
   10,000-19,999 __
   20,000-29,999 __
   30,000-39,999 __
   40,000-49,999 __
   50,000-59,999 __
   over $60,000 __

21. Total number of household members currently living at home (including yourself)?
   Number __
22. Any additional comments?
APPENDIX B
ORGANIZATIONS

PUBLIC and GOVERNMENT

Alpine Club of Canada
B.C. Four Wheel Drive Association
B.C. Hydro
B.C. Outdoor Recreation Council
B.C. Parks, Outdoor Recreation Division
B.C. Wildlife Federation
Camp Bernard (Boy Scouts)
Camp Thunderbird (YMCA)
Capital Regional District, Parks
Capital Regional District, Planning
Conservation Society Amalgamated
Department of Fisheries and Oceans
Department of National Defence
Ecological Reserves
Environmental Studies, University of Victoria
Eliminators 4 x 4 Club
Explorers Recreational Vehicle Club
Federation of B.C. Naturalists
Federation of Mountain Clubs
Fish and Wildlife Branch
Garden City Horsemens Club
Greater Victoria Water Board
Independent Hikers Association
Island Mountain Ramblers
Land Rover Owners Club
Ministry of Forests
Ministry of Tourism
Metchosin Pony Club
Nature Conservancy of Canada
Outdoor Club of Victoria
Salmonoid Enhancement Program
Sierra Club
South Vancouver Island Recreation Committee
Trails Society
University of Victoria Outdoors Club
Vancouver Island Appaloosa Horse Club
Vancouver Island Cave Exploration Group
Vancouver Island Rock Society
Victoria Bowmen
Victoria Caving Group
Victoria Fish and Game Club
Victoria Hang Gliding Association
Victoria Lapidary and Mineral Society
Victoria Motor Sport Club
Victoria Motorcycle Club
Victoria Natural History Society
Victoria Wheelers Cycling Club
Victorienteers
PRIVATE FORESTRY

B.C. Forest Products
CIP Inc., Tahsis Pacific Region
MacMillan Bloedel
Western Forest Products

COMMERCIAL RECREATION

Blue Gables Resort
Cheanuh Campground
Deer Trail Development
Greater Victoria Water Board
J&M Enterprises - Sidney Island
KOA - Victoria West
Pacific Playground
Sooke Harbour Marina
Sunny Shores Campground
Weir's Beach Resort
Please consider each question in terms of "at present" and "in ten years".

1) What resources does your organization own, manage, or utilize within the area of the attached map?

2) Would you identify the unit number on the map in which your areas of interest lie and list the activities pursued there?

3) Please identify the unit numbers of any additional areas that you would like to use and list the activities you would pursue there.

4) How many user days* does your organization use the area annually?

5) Please note any activities which you feel are incompatible with the activities of your organization?

6) Why are they incompatible?

7) How could this be overcome?

8) What kinds of recreation do you feel should be happening in this area?

9) Do you feel there is a need for implementing voluntary regulations or a code of ethics to manage this area?

10) What regulations do you see as important or necessary?

11) What are your organization's plans for development or involvement in this area?

12) How would you compare the recreation potential of the Sooke River area as compared with other outdoor recreation areas in the Capital Regional District, using a scale of 1 to 20 where: 1 = least potential, 10 = equal potential, 20 = most potential?

13) If capital expenditures were incurred to provide recreational facilities and opportunities would you be willing to pay a user fee for the use of them?

14) Who in your organization knows this area particularly well?

15) Do you have any further suggestions concerning the recreational use of the described lands?

*user-day - use of the area for one day or part thereof by each person
eg. 3 user days = 1 person x 3 days
or = 3 people x 1 day
or = 3 people x 1/2 day
GENERAL AREA

Unit #

1. Greater Victoria Water District
2. Sooke Mountain Provincial Park
3. Glinz Lake/Saseenos
4. East Sooke
5. Lower Sooke River
6. Sooke Potholes Park
7. Mid Sooke River
8. Upper Sooke River/Leechtown
9. Old Wolf Creek
10. Survey Mountain
11. Butler Main
12. Young Lake
13. Muir Main
14. Bear Creek Reservoir
15. San Juan Ridge
16. Jordan River
### CHI-SQUARE CALCULATIONS*

**COMM** (duration of residence in community)

<table>
<thead>
<tr>
<th>YEARS OF RESIDENCE</th>
<th>NON-RESPONDENTS</th>
<th>RESPONDENTS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>5 (2.91)</td>
<td>58 (60.09)</td>
<td>63</td>
</tr>
<tr>
<td>1</td>
<td>0 (1.38)</td>
<td>30 (28.61)</td>
<td>30</td>
</tr>
<tr>
<td>2</td>
<td>0 (2.40)</td>
<td>52 (49.60)</td>
<td>52</td>
</tr>
<tr>
<td>3</td>
<td>1 (1.57)</td>
<td>33 (32.43)</td>
<td>34</td>
</tr>
<tr>
<td>4</td>
<td>3 (0.74)</td>
<td>13 (15.26)</td>
<td>16</td>
</tr>
<tr>
<td>5</td>
<td>1 (0.97)</td>
<td>20 (20.03)</td>
<td>21</td>
</tr>
<tr>
<td>6-10</td>
<td>4 (4.20)</td>
<td>87 (86.80)</td>
<td>91</td>
</tr>
<tr>
<td>&gt;10</td>
<td>10 (9.83)</td>
<td>203 (203.17)</td>
<td>213</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>24</strong></td>
<td><strong>496</strong></td>
<td><strong>520</strong></td>
</tr>
</tbody>
</table>

\[ \chi^2 = 13.0 \quad \chi^2_{0.90} = 12.017 \quad \chi^2_{0.95} = 14.067 \]

**RD** (duration of residence in regional district)

<table>
<thead>
<tr>
<th>YEARS OF RESIDENCE</th>
<th>NON-RESPONDENTS</th>
<th>RESPONDENTS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>4 (1.64)</td>
<td>31 (33.36)</td>
<td>35</td>
</tr>
<tr>
<td>1</td>
<td>0 (0.56)</td>
<td>12 (11.44)</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>0 (1.26)</td>
<td>27 (25.74)</td>
<td>27</td>
</tr>
<tr>
<td>3</td>
<td>0 (0.75)</td>
<td>16 (15.25)</td>
<td>16</td>
</tr>
<tr>
<td>4</td>
<td>1 (0.37)</td>
<td>7 (7.63)</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>0 (0.70)</td>
<td>15 (14.30)</td>
<td>15</td>
</tr>
<tr>
<td>6-10</td>
<td>5 (4.30)</td>
<td>87 (87.70)</td>
<td>92</td>
</tr>
<tr>
<td>&gt;10</td>
<td>14 (14.41)</td>
<td>294 (293.54)</td>
<td>308</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>24</strong></td>
<td><strong>489</strong></td>
<td><strong>513</strong></td>
</tr>
</tbody>
</table>

\[ \chi^2 = 8.25 \quad \chi^2_{0.90} = 12.017 \quad \chi^2_{0.95} = 14.067 \]

*These tests are very weak due to the number of cells that contain less than 5 frequencies.*
AGE (age of respondent)

<table>
<thead>
<tr>
<th>AGE RANGE</th>
<th>NON-RESPONDENTS</th>
<th>RESPONDENTS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20</td>
<td>1 (0.31)</td>
<td>6 (6.69)</td>
<td>7</td>
</tr>
<tr>
<td>20-24</td>
<td>4 (1.49)</td>
<td>30 (32.51)</td>
<td>34</td>
</tr>
<tr>
<td>25-34</td>
<td>3 (4.61)</td>
<td>102 (100.39)</td>
<td>105</td>
</tr>
<tr>
<td>35-44</td>
<td>7 (5.22)</td>
<td>112 (113.78)</td>
<td>119</td>
</tr>
<tr>
<td>45-54</td>
<td>2 (3.12)</td>
<td>69 (67.88)</td>
<td>71</td>
</tr>
<tr>
<td>55-64</td>
<td>1 (2.59)</td>
<td>58 (56.41)</td>
<td>59</td>
</tr>
<tr>
<td>&gt;64</td>
<td>5 (5.66)</td>
<td>124 (123.34)</td>
<td>129</td>
</tr>
<tr>
<td>TOTAL</td>
<td>23</td>
<td>501</td>
<td>524</td>
</tr>
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</table>

\[ \chi^2 = 8.78 \quad \chi^2_{C90} = 10.645 \quad \chi^2_{C95} = 12.592 \]

SEX

<table>
<thead>
<tr>
<th></th>
<th>NON-RESPONDENTS</th>
<th>RESPONDENTS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>19 (19.01)</td>
<td>352 (351.99)</td>
<td>371</td>
</tr>
<tr>
<td>Female</td>
<td>8 (7.99)</td>
<td>148 (148.01)</td>
<td>156</td>
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<tr>
<td>TOTAL</td>
<td>27</td>
<td>500</td>
<td>527</td>
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</table>

\[ \chi^2 = 0.04 \quad \chi^2_{C90} = 2.70 \quad \chi^2_{C95} = 3.841 \]
### INCOME (annual income)

<table>
<thead>
<tr>
<th>ANNUAL INCOME</th>
<th>NON-RESPONDENTS</th>
<th>RESPONDENTS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10,000</td>
<td>0 (0.90)</td>
<td>59 (58.10)</td>
<td>59</td>
</tr>
<tr>
<td>10-20,000</td>
<td>1 (1.54)</td>
<td>100 (99.46)</td>
<td>101</td>
</tr>
<tr>
<td>20-30,000</td>
<td>3 (1.71)</td>
<td>109 (110.29)</td>
<td>112</td>
</tr>
<tr>
<td>30-40,000</td>
<td>1 (1.12)</td>
<td>72 (71.88)</td>
<td>73</td>
</tr>
<tr>
<td>40-50,000</td>
<td>1 (0.76)</td>
<td>49 (49.24)</td>
<td>50</td>
</tr>
<tr>
<td>50-60,000</td>
<td>0 (0.40)</td>
<td>26 (25.60)</td>
<td>26</td>
</tr>
<tr>
<td>&gt;60,000</td>
<td>1 (0.57)</td>
<td>36 (36.43)</td>
<td>37</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td>7</td>
<td>451</td>
<td>458</td>
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</tbody>
</table>

\[ \chi^2 = 2.92 \quad \chi^2_{C90} = 10.645 \quad \chi^2_{C95} = 12.592 \]

### MEMBERS (in household)

<table>
<thead>
<tr>
<th>HOUSEHOLD MEMBERS</th>
<th>NON-RESPONDENTS</th>
<th>RESPONDENTS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3 (3.10)</td>
<td>110 (109.89)</td>
<td>113</td>
</tr>
<tr>
<td>2</td>
<td>8 (5.39)</td>
<td>188 (190.61)</td>
<td>196</td>
</tr>
<tr>
<td>3</td>
<td>0 (2.17)</td>
<td>79 (76.83)</td>
<td>79</td>
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<tr>
<td>4</td>
<td>3 (2.31)</td>
<td>81 (81.69)</td>
<td>84</td>
</tr>
<tr>
<td>5</td>
<td>0 (0.72)</td>
<td>26 (25.28)</td>
<td>26</td>
</tr>
<tr>
<td>6</td>
<td>0 (0.22)</td>
<td>8 (7.78)</td>
<td>8</td>
</tr>
<tr>
<td>7-10</td>
<td>0 (0.06)</td>
<td>2 (1.94)</td>
<td>2</td>
</tr>
<tr>
<td>&gt;10</td>
<td>0 (0.03)</td>
<td>1 (0.97)</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>14</td>
<td>495</td>
<td>509</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 4.81 \quad \chi^2_{C90} = 12.017 \quad \chi^2_{C95} = 14.067 \]
APPENDIX D
DEFINITIONS

CIP land - that portion of Forest Management area #7, owned by CIP Inc., that lies south of northerly height of land of Diversion and Bear Creek Reservoirs and lies west of the Greater Victoria Water District.

Study area - all lands lying within the boundaries of the E&N land grant that are south of the northerly height of land of Diversion and Bear Creek watersheds and west of the Greater Victoria Water District, plus lands lying north of a line running from the south-east corner of Sooke Mountain Park to the mouth of the Sooke River, thence to the E&N boundary due west of Young Lake. The study area encompasses the CIP land noted above but includes other private and public lands as well. This area is outlined on the map in Figure 1 and in the questionnaire.

Activity day - participation by any member of a household in a recreation activity on the landbase for any portion of a day. It does not equate to a calendar day of activity.

Intended activity day - the reported intention of any member of a household to participate in a selected activity for any portion of a day on the landbase under the conditions specified in the questionnaire.

Non-response factor - the percentage of non-respondents that would have participated in a particular activity on the landbase. This factor must be added to the reported participation to more accurately estimate the total participation in a given activity.

Expansion factor - the factor required to expand the number of sampled households to the total number of households in the CRD, excluding the Gulf Islands.

Willingness-to-pay - the dollar amount a household or person is willing to pay per day to participate in a given activity on the landbase.

Potential annual gross benefit - the dollar value that a given activity would generate in one year, assuming the reported intended participation level was attained and that all values could be collected.
DOLLAR AND MARKET VALUES

Valuation adjustments to reflect 1986 Canadian dollars

The U.S.A. dollar exchange rate plus the annual percentage change in the Canadian Consumer Price Index was used to derive 1986 dollar values. The U.S.A. exchange rate as of Aug 1, 1982 was 1.2341 Canadian dollars. The Canadian inflation rate for each year, as denoted by the Consumer Price Index, was:

1982 - 10.8%
1983 - 5.8%
1984 - 4.4%
1985 - 4.0%
1986 - 4.1%

Thus, a 1982 U.S. dollar became equivalent to $1.64 Canadian in 1986, as shown in the calculation below.

\[ 1.2341 \times 1.108 \times 1.058 \times 1.044 \times 1.040 \times 1.041 = 1.635 \]

The Canadian equivalent merely drops the exchange rate and the years that are not applicable from the formula. For 1981 dollars that became a 32 cent increase on the 1986 dollar.

A description of other 'market' values

Hunting

'Restricted access, user fee' hunting is provided by two organizations near Victoria. One is on a nearby gulf island named, Sidney Island, where a private organization (O & J Enterprises) raises fallow deer, introduced from New Zealand. The fees in 1986 were set by the number and types of animals taken rather than by a daily hunting fee, although the standard trip is for two days duration. Those fees in 1986 were: $60.00 per doe and $80.00 per spike buck (no larger antlered bucks were allowed to be taken that year). Also, it was required that two animals be taken by each person, making it a $120-160.00 fee plus food and transportation. Those fees have each been increased $10.00 for 1987 to $70.00 per doe and $90.00 per spike buck. Trophy animals run $400.00 to $600.00 plus a $100.00 per day stalking fee².

The other restricted hunting area is managed by the GVWB within the fenced perimeter of its Water District surrounding Sooke Lake. A total of 150 permits are made available to the public each year on a first come first serve basis. The demand for such an activity is self-evident from the line-ups the night before permits are issued and that hunters are turned away once the 150

² Information provided by personal communication and brochure.
allotted permits have been issued. The hunting permit entry fee for 1986 was $35.00. This fee was broken down into a $30.00 lab fee for a compulsory stool sample examination plus a $5.00 administration fee. The 1987 fee has been increased to $45.00, with the $10.00 increase reflecting increases in lab costs. Generally, two animals are allowed to be taken, but this allotment is administered by the Wildlife Branch of the Ministry of Environment and Parks and is published in their annual hunting regulations. This permit allowed daytime access only on weekends and statutory holidays during September, October and November for a total of 16 usable days.

Using the average number of hunting trips taken per household on CIP land as a constant (4.67), the daily fees can be derived for hunting in the GVWD. This is accomplished by dividing the annual fee by the average number of hunter days. Thus, the derived values for the GVWB daily hunting fees were: $7.49 and $9.64 in 1986 and 1987 respectively. These compare very closely with the study values of $8.53 and $9.40 obtained for CIP land and the study area respectively in 1986. For private hunting on Sidney Island, they are $70.00 and $80.00 for 1986 and 1987 respectively.

The GVWB correlates most closely with CIP land in terms of location, species and type of operation. The GVWB was used in the questionnaire as a comparison of deer density. Thus, it's
values may have also been used by the respondents for the determination of their own WTP values as evidenced by the correlation noted above. These values cannot be classified as 'true' market prices as they are set and controlled by a municipal government organization, but they do give an indication of minimum values that might be obtained. True market values are likely somewhat higher than these figures but lower than those found for Sidney Island. The Sidney Island values are aimed at a narrow segment of the population and thus reflect a different market than the market price for the general public on this landbase.

Fishing

There were no market prices obtained for fishing to make comparisons with the WTP values derived in the study.

Camping

A comparison of the CVM values derived for three of the noted types of camping can be made with those market values found in the CRD and with the 1982 national averages[^3] for the U.S.A. as cited by Harris and Driver (1987). The CVM produced values of $6.40 and $6.62 for semi-primitive camping on CIP lands and the study area respectively. For the same type of camping the CRD had an average market value of $7.50 and the U.S.A. one of $16.04. For Modified camping, the CVM values were $10.30 and...

[^3]: These values have been adjusted to reflect 1986 Canadian dollars. Exchange rate and consumer index figures are provided in Appendix 5.
$10.23 for CIP lands and the study area respectively. For this type of camping the CRD showed an average market value of $12.30 and the U.S.A. $18.37. For Rural camping, the CVM derived values of $12.82 and $13.89 for CIP land and the study area respectively. The CRD value was $13.90 and the U.S.A. $20.75.

Market values for the CRD just noted show a much more consistent correlation with study findings than does a comparison with other CVM values. In comparing two CVM studies cited by Sorg and Loomis (1983) we see some variation between the values derived. For 'undeveloped' camping they had a value of $23.15. For 'semi-developed', $12.28; and for 'developed', $18.37.