THE PERCEPTION OF CROWDING IN OUTDOOR RECREATION

by

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We accept this thesis as conforming to the required standard

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April, 1972
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Date 3rd May 1972
ABSTRACT

The hypothesis tested in this thesis is that parks in the Lower Fraser Valley are crowded, that visitors perceive this crowding and, as a result, the recreational experience of the visitors has diminished. Cultus Lake and Golden Ears Provincial Parks in the Lower Fraser Valley were chosen as the parks in which the study was to be conducted. Information about perception of crowding and other factors affecting perception was solicited from both campers and day users at the park in the period July-August, 1971. Information was collected through the use of a questionnaire. Several multi-variate data analysis techniques were applied to the resultant data. The object of the analysis was to find out which socio-economic variables were significantly related to perception of crowding and if perception of crowding was related to an objective measure of the environment. The measure was density. In addition, an attempt was made to find out if the traditional concept of user groups is a meaningful way of looking at visitors when perceptions and satisfaction of visitors is the issue being studied. The research analysis revealed that perception of crowding exists to a greater extent among day users than among campers; that perception of crowding was related to density among day users. The analysis further revealed that the traditional concept of user groups, i.e., fishing, hiking, etc., offers little by way of categorizing users when
perception is the object of study, since individuals in the same user group perceive crowding differently. The analysis also revealed that there is a need for more intensive research so as to reveal factors significant in influencing perception of crowding in the recreational environment.
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Chapter 1

INTRODUCTION

"But now the sport is marred,
And wot ye why?
Fishes decrease ---
For fishers multiply."


STATEMENT OF THE PROBLEM

This thesis addresses itself to the problems of empirically determining satisfactory intensities of use of recreational facilities by campers and day users. It asks whether increasing numbers have a deleterious effect on the recreational experience and, if so, to what extent and for whom? Questions such as these become important as the demand for recreation grows. Guidelines for policy formulation are essential as provision of open space for recreation must now be seen in terms of quality accruing to the user, rather than in terms of provision for sheer numbers.

When the question of present and future recreational revenue needs is mentioned one often meets the retort, "Canada is a country with plenty of vast open spaces." There is no doubt about that, but very little of this open land across the country is accessible for public recreational use. Even less is available in and near the burgeoning urban regions that need it most. But the need for recreation does not take account of such factors and the demand for recreational space is increasing beyond expectation.
Increasing mobility, the rapid growth of population and increase in income and leisure time are important factors contributing to the mounting pressures being placed on recreational resources. Since the end of World War II major park use in North America has been climbing at a rate of 10% per year, and each year the gap between active demand and opportunities for outdoor recreation grows wider and the gap between potential demand and opportunity wider still. The use of British Columbia's provincial parks jumped 56% in five years, from 3.1 million visits in 1960 to 4.8 million in 1965, while the province's population has grown only 12%. This trend has been continuing and there was a substantial increase in park attendance for 1970 over 1969. Day use visitations were up by 171,000 and camper use 174,000 showing a 1.9% increase in the former and a 12.3% increase in the latter. On the other hand, land in the Provincial Park system declined from 10.6 million acres in 1948, to 6.48 million acres in 1971.

Previously Quoted Standards

The Lower Mainland Regional Planning Board's study "A Regional Parks Plan for the Lower Mainland" quotes the following figures needed to provide an adequate park system. Based on an anticipated increase in participation (park user's rates) in recreational activity of 22.7% from 1966 to 1981, and 17.4% from 1981 to 2001, the parkland requirement will shift from current standards of 65 acres per 1000 population to a future standard of 80 acres per 1000 population by 1981, and 94 acres per 1000 in 2000. Based on these standards, the Provincial Park system falls short of accepted standards and the system is also inadequate for tomorrow. In 1971 only 2.1% of the 6,485,716 acres of Provincial Parks in British
Columbia was within the Lower Mainland where over 50% of the population lives. While there are 3.4 acres of Provincial Park land per person for the Province as a whole, there are only 0.024 acres per person within the Lower Mainland.

In 1963 the Parks Branch of British Columbia prepared a document for the criteria for selection of Provincial Parks for the Second Federal Provincial Parks Conference held in Ottawa, November 18th, 1963. It quoted the following standards. Wilderness parks should have a minimum size of 100,000 acres while multi-use parks (resource based parks) should have an acreage of 10 - 12 acres per 1,000 of population to be served. And each population centre of 5,000 or more people should have ready access to a multi-use park within 70 miles of the town.

The major drawback in both these standards quoted is that they lack the intensive research necessary for an objective appreciation of the impact of increasing numbers upon the recreational experience.

**Theoretical Framework**

Marion Clawson (1969) defines recreation as, "activity (or planned inactivity) undertaken because one wants to do it... . The distinguishing characteristic of recreation is not the activity itself, but the attitude with which it is undertaken. When there is little or no feeling of compulsion or ought to an activity (or inactivity) is almost surely recreation."

Recreation more than any other activity of life is consciously concerned with people in pursuit of satisfaction. Conventional measures, such as rates of use (including number of visitors and visitor-days), resource supply and capacity, while necessary, tell us very little about how recreational goals are being satisfied.
Estimates of participation rates in selected recreational activities are made, and these are too frequently used in demand projections. Very little attempt is made to measure also the meanings that people attach to their recreational experiences.

One way of determining "meanings" is by looking at the whole concept of urban perception of environment in general, and crowding in particular. Perception of crowding, while not all-embracing, could give some indication of how recreational goals are being satisfied.

HYPOTHESIS OF STUDY

It can now be stated that in the Lower Mainland Area the demand for specific types of recreational activity is rapidly outstripping the effective provision for these needs. This leads to overcrowding and, as a result, the quality of the outdoor recreational experiences of users of parks in the area has diminished.

The hypothesis proposed in this study, therefore, is that parks in the Lower Mainland are crowded, that visitors perceive this crowding and, as a result, the recreational experience of the visitors has diminished.

The parks in the Lower Mainland area were selected because some of the most important key variables are nearly the same -

(1) The proportion of resource types that are present;

(2) The accessibility of this recreation area for users in Greater Vancouver.

The following parks in the Lower Mainland were selected:
(1) Cultus Lake Provincial Park, or Cultus Lake, 55 miles east of Vancouver, and 8 miles southeast of Chilliwack;

(2) Golden Ears Provincial Park, or Alouette Lake, 30 miles east of Vancouver, and 7 miles north of Haney.

Recreational experience, for the purpose of this study, refers to activities and satisfaction experienced on the site and does not refer to prior pleasures such as preparation for the experience. Outdoor recreation is simply recreation that is carried on outdoors and areas of land, bodies of water, forests, swamps and other natural features provide the natural resources for recreation.

There are two major recreational users in the above-defined areas -

(1) day users;

(2) campers.

Day users are classified as people who come for one day to carry on any of the following activities, or a combination of these activities: picnicking, hiking, sightseeing, swimming, boating, water skiing, etc. Campers are defined as those who remain overnight, or longer, in the provided campsites, and who also engage in any of the above activities.

OBJECTIVES OF STUDY

The purpose of this study is to determine if, in the eyes of users, the carrying capacity of the listed parks has been exceeded. Anderson (1959) defines "carrying capacity" as "the emotional and psychological limitation of users".

For many kinds of people and for many kinds of use satisfaction rises with increasing numbers of users. Some people may value solitude more than others,
and some activities may require less people than others, but regardless of how gregarious one might be, there comes a point where intensity of use is so severe that satisfaction from the area or activity begins to decline as crowding begins:

"Not only does overuse adversely effect the resource but it may also destroy the quality and value of may recreational experiences" (Anderson, 1959).

Recreational capacity can be viewed in terms of three parameters.

Anderson sees these as –

(1) Space requirements for given facilities. This is probably the easiest of all parameters to estimate and this is the type of standard so often used in providing recreational space. In practice these spatial standards have been used as a device to induce communities to increase acreage and facilities for outdoor recreation.

(2) Ecological capacity refers to the level of use which can be absorbed without undue harm to the ecosystem. This has been receiving increasing attention as ecological factors are being used in recent studies to provide criteria for selecting and planning regional recreational areas.

(3) Perceptual capacity, the one with which this thesis is concerned. Perceptual capacity is defined by O'Riordan (1969) as the capability of the environment to cater for maximum aggregate user satisfaction, while taking into account the views of the people already there. O'Riordan is of the opinion that excessive pressures of congestion and overcrowding in a recognized and popular recreation area suggests that its environmental capacity is overloaded under present conditions, and that positive planning is requisite. Capacity is therefore seen in this proposal
as a concept closely related to crowding.

Alan Wagar (1964) points out that because the object of recreation is to provide benefit and enjoyment for people, managers of recreation areas must consider how management procedures will affect satisfaction of the needs that motivate recreation. To decide whether it is appropriate to define a carrying capacity and to limit use, they must know how this satisfaction, which determines the quality of recreation, will change with different amounts of crowding.

Shafer (1969) is also aware that outdoor recreation resource planners are seeking better ways to measure people’s perceptions of natural environments and to understand the importance of the different senses involved in perception. He is also of the opinion that such information can provide a better basis for planning, developing and managing natural environments that are needed to meet the demands of outdoor recreationists.

One of the major problems, however, is that very little experimental research has been done on crowding and even less on crowding in the recreational context. Cook (1969) points out that one must be careful in the assumption that density per se is necessarily good or bad. He further points out that high density allows people to interact with each other at a higher rate, and to have a broad range of choices from which to select their preferred interactions. "It is my belief that the distinction between overcrowding and productive density is not simply quantitative; it has to do with a wider qualitative context in which these aspects of densities are seen." Crowding is therefore seen, not as something that is dependent solely upon the number of visitors, but something that is perceived and is experienced
by recreationists and can therefore become the object of study and description.

Perception, for the purpose of this study, is seen in terms of Alport's definition:

"Has something to do with our awareness of the objects or conditions about us. It is dependent to a large extent upon the impressions these objects make upon our senses. It is the way things look to us, or the way they sound, feel, taste or smell. But perception also involves, to some degree, an understanding, a 'meaning' or a 'recognition' of these objects... interpret perception as covering the awareness of complex environmental situations as well as single objects."

Perception can therefore be seen as a function, not only of the stimulus present and the capabilities of the sense organs, but also of past learning and motivation. Individuals are, therefore, more or less sensitive to environments to which they are exposed, depending to a certain extent on the state of their awareness, and the level to which such environments are perceived as having certain goal objectives, in this instance recreational goal objectives. The problem lies in determining what constitutes the environment to which a population is sensitive.

The state of the research on perception of the environment is such that no real body of theory has developed. As Craig (1970) puts it,

"The interplay between human behaviour and the physical environment engages a complex and little understood network of personal, societal, and physical variables. Not surprisingly a growing consensus that this intricate system has gone awry is fostering a scientific examination of its behavioural aspects."

Saarinen (1969) points out that there is no well developed methodology which, as Craig points out, stems from the kind of behaviour being investigated. Instead of the traditional experimental approach to the study of behaviour, with emphasis on
controlled conditions and limited aspects of experience, these studies try to abstract or generalize from total behaviour in real-life situations.

Saarinen (1969) is of the opinion that many more empirical studies must be completed before the state of theory building will be possible. He argues that in dealing with resource management or urban design, environmental behaviouralism has had a strong emphasis on providing information for decisions on public policy.

SCOPE

The research emphasis of this thesis is directed toward:

1. Assessing user evaluation of the carrying capacity of Cultus Lake and Golden Ears Provincial Parks. With this objective in mind a questionnaire was designed to find out if people perceive congestion and overcrowding in their recreational environment. Responses were solicited from both campers and day users, because perception of crowding and needs and desires might vary for these categories of users.

2. To find out the effect crowding has had on the recreational experience of users of these sites. It is hoped that certain insights will be gained as to what levels of crowding recreational users, campers and day users at these parks in the Fraser Valley will tolerate. This information could, hopefully, provide valuable guides to managerial policies so that over-use of resources will not lead to the reduction of the quality of recreational experiences of users of parks in the Fraser Valley. It is therefore hoped that this study could shed some light on the effect...
increased crowding has on the recreational experience and that this information will be of importance for management decisions regarding the use of recreational sites.

GENERAL METHODOLOGY

Lewis Moncrief (1970) points out that definite emphasis is now in the direction of quantitative studies which attempt to establish the relationship among variables using inferential statistical methods.

Therefore, a questionnaire amenable to statistical analysis was designed. It was designed to find out which outdoor recreational activities people most participate in during summer, and this was used as a basis to divide people into user groups. The questionnaire was also designed to find out what resources people find overcrowded and to determine if thresholds of crowding differ for different groups. It was also designed to reveal socio-economic characteristics of the visitors to the park and their preferences on crowding. Questions were also asked to find out how intensely certain activities were pursued by visitors on their last recreational trip. This was used as a measure of past experience.

The strategy of the research was to discover if there is any relationship between (1) perceived crowding, (2) the types of recreational activities, (3) intensity of use, and (4) socio-economic characteristics of users. It has been suggested that people's perception will be conditioned by other factors such as socio-economic variables, intensity of use (or past experience) and activities sought after.

The purpose is to discover if park users are aware of the human impact on recreational quality, and the effect that this will have on problems concerning
management. Visitor attitudes are of extreme importance as aids to resource adminis­
trators in understanding why an area is used or overused, and provide the means by
which an improved recreational experience can be assured. Such information is
important, as already alluded to in planning, for both short and long term use.

The purpose and format of the questionnaire is summarized in the following
flow chart, diagram 1.
SECTION A NO. 1
DIVISION OF
RESPONDENTS
INTO USER GROUPS

SECTION A NOS. 9, 10
SECTION D NOS. 1, 2, 3
SOCIO-ECONOMIC VARIABLES

SECTION B, C.
SECTION D, NOS. 4, 5
VARIABLES ON "CROWDING"
AND USER PREFERENCES

SECTION A NOS. 3, 8, 11, 14
VARIABLES ON INTENSITY
OF USE AND ACTIVITIES
Sought at Site

CORRELATED TO FIND OUT
RELATIONSHIP BETWEEN USER GROUPS
SOCIO-ECONOMIC STATUS, INTENSITY
OF USE, ACTIVITIES SOUGHT AT SITE
AND "CROWDING"

IMPLICATIONS FOR
PLANNING
AND
MANAGEMENT DECISIONS

DIAGRAM 1 - Purpose and Format of Questionnaire
LITERATURE CITED


Government Documents


Lecture given by R. H. Ahrens, Director, Parks Branch, Victoria, on Friday, 22nd October, 1971.

Provincial Parks List 1971, Parks Branch Department of Recreation and Conservation, Provincial Parks Branch - Public Information and Education Office.


Chapter II

THEORY BUILDING IN RECREATION RESEARCH: LITERATURE REVIEW

OVERVIEW

As previously pointed out recreation is a relatively new field of research and knowledge respecting perception of environment; that no real body of theory has yet been developed. Theory building is still in the form of empirical studies, and these have only begun to outline some of the main areas of potential relevance. They are preliminary attempts to comprehend what has happened and to suggest where to go.

Most studies have opted for outlining the significant factors in real human decisions with the hope of developing theory rather than precisely measuring limited and isolated aspects of artificial environments in order to build up a more rigorous methodology and theory which can then be applied to the real world.

The studies being reviewed place emphasis on the use of multivariate techniques. This indicates that definite emphasis is now in the direction of quantitative studies which attempt to establish the relationships among variables using inferential statistical methods. This study is concerned with the use of multivariate techniques, and the works being reviewed were examined in the hope that these studies would offer some important contribution of methods and techniques to the present study. Most of the recent studies in this area of recreation revolve around two major parameters: (1) method; and (2) findings. In reviewing the work accomplished so far, these parameters will be used to group studies for discussion.
1. **Studies Concerned with Methods:**

A number of recent studies have been concerned with the problem of identifying the visual components of the environment contributing to an aesthetically pleasing experience. Most of these studies revolve around the problem of definition and measurement in the recreational environment. Edward S. Neuman and George L. Peterson (1969) attempt to establish a strategy for measuring and analyzing human preferences for the visual recreational environment. The aim of their research is to develop quantitative preference functions which are sensitive both to individual differences and to visual characteristics of the environment.

Environment refers to objective measurements of the physical environment. The objective measurement is a standardization in terms of prescribed instruments and methods, emphasis being such that description is nearly as objective as possible.

Measurement of perceptions is concerned with description of the environment as observed by individuals. The individual preference process is defined as a process that receives information about the environment after a filtering by the perception process. The preference function can be considered as a programmed response that transforms stored data and information about the environment into preferences. The preferences define what is derived and thus would determine behaviour except that they must pass through an implementor. The implementor considers constants, competing desires and other factors before generating behaviour.

The preference function is unique to each individual and is strongly influenced by the physical, cultural, social and experimental characteristics of the
individual and may be determined the following way: It is assumed that the individual characteristics determine the strength of preference stimulated by visual messages from the environment. Assuming that all individuals receive identical information about the visual environment through the perception filter, it is possible to group individuals in terms of their preference function.

Using the hypothesis that individuals can be grouped and clustered according to individual characteristics (socio-economic, past experience, etc.) and since these determine perception and preference, individuals will be grouped according to perceptions.

Once groups have been determined according to perception, discriminant analysis is suggested as the technique that may be used to test the hypothesis that groups are different. If individuals tend to be grouped naturally with respect to their individual differences there will be a preference function for each group. For each perceived factor there will be a measurement attributable to each group.

Shafer (1968, 1969) also attempts to reconstruct the visual environment through the use of specific groups and detailed attitude-scaling techniques, in an effort to find out the effects of changing environmental conditions.

Shafer (1969) constructed attitude scales to determine the motivation and how important some wilderness values are to hikers interviewed in the Adirondack and White Mountains. Shafer found, according to the attitude scales, that aesthetic and emotional experiences were the most important wilderness-recreation values. Aesthetic values were ten times and emotional values were eight to nine times more important to the average respondent than social values. Physical experiences were
five to six times, and educational experiences were one to two times more important than social values.

Shafer and Thompson (1968) attempted to derive mathematical descriptions of recreation activity patterns to provide guidelines for regional planners "who now rely on intuitive judgments, past experience, or nationwide recreation-use trends." They investigated the relationship between camper use and 40 physical characteristics of sites in 24 Adirondack campgrounds to determine whether site variables significantly influenced use during the period 1959-1963. They assumed that people's behaviour patterns are related to what they perceive in their environment; thus, one meaningful way to measure perception would be to test for correlation between physical properties of an environment and some index of behaviour within that environment.

Campground use was summarized two ways for each park:

1. Average annual total visitor days. (A visitor day is defined as one camping party using one tent or trailer site at a campground for one day.

2. Average annual total visitor days per site, that is, average annual total visitor days divided by the total number of individual sites at that park.

The 40 variables that might affect campground use are those features which Adirondack campers said were the most important reasons they visited a campground, such as nearness to lake, availability of swimming and other water sports facilities, variability in the surrounding landscape, campground design, and tourist attractions nearby. The other variables were measured from U.S. Government survey maps, or were obtained from the files of the New York State Conservation Department.
Factor analysis identified nine factors that conveyed all the essential information in the original set of 40 site variables. Because of the strong correlation of variables within most factors, Shafer and Thompson selected the variables with the highest factor loading to represent each of the 9 factors. Where several variables were not correlated all were retained as representative of the factor. This resulted in 12 terms. Regression analysis was used to relate the average annual total visitor days per campsite to these 12 terms which summarized campground size and water-recreation variables.

The essence of the resultant equations is that they reflect the results of a recreation management policy designed to meet the demand for water-oriented outdoor recreation, and would be useful if another camping area was established in the Adirondacks under similar policy decisions, and the interaction between campground size and water resources was known. It would then be possible to estimate the amount of use the campground would receive.

The limitation of this model, however, is the absence of any sociological or economic criteria in the development of the model. There are, without a doubt, aesthetic and other non-monetary values which are intimately bound up with certain aspects of the physical environment which affect campground use.

2. Studies Concerned with Findings:

Studies which can be grouped under the heading "Findings" include those of Lucas (1964,1970), and Brougham (1968). These studies are specifically concerned with perception and the recreational environment. Rather than stressing methods by which information may be collected, however, they are more concerned
with their results and their implications.

Lucas (1964) attempts to determine the factors limiting capacity. He defines two types of factors that set limits to numbers of people and their satisfaction: (1) physical factors, and (2) the attitudes of people. He is of the opinion that both types of factors are related to the resource base and to its use and management.

He is also of the opinion that some physical elements limit numbers of people, although satisfaction may decline before the full physical capacity is reached. He also points out that more important are limitations or capacity, set by visitors' attitudes towards the area and its management and use.

Lucas' study examines the capacity limits based on attitudes of people who visit the Quetico-Superior wilderness area. He found the important variables affecting wilderness perception seemed to be amount and kind of recreational use. Different categories of recreationists differed sharply in their attitudes towards these two aspects of use. Canoeists wanted much lower levels of use and distinguished more sharply between sorts of groups met than did motor boaters.

The interviewer asked visitors what about the area bothered or disappointed them, without suggesting answers. Canoe-trippers and auto campers mentioned crowding most often. Most of the complaining auto campers were also canoeing, 'and the type of canoe used seemed to condition strongly the perception of crowding.'

The reaction to use intensity was approached in still another way. Groups were asked how many other groups they had met on an average day and whether they felt they were too many, too few. Canoeists reacted to increasing use and were most sensitive of all groups.
Heavily used areas were less often considered wilderness by all visitor types, especially the canoeists. The Spearman rank correlation coefficient for paddling canoeists revealed the more use the less wilderness. The conflict among canoeists, boaters and water-skiers was also noted. Water skiing created the most friction. Although this was not a common sport, people who did not water ski wanted to see it banned in the wilderness setting and some parties volunteered that this was the reason they had stopped visiting resorts in Wisconsin. Probably no single use is responsible for a major reduction in the capacity for all other uses and, because of the large area used by a water skier, a modest amount of skiing can have a large effect.

Lucas (1964) points out that any definition regarding capacity involves certain assumptions, of which satisfaction is one of the most important. The question, however, is how much satisfaction, and for whom?

"The variation in sensitivity to crowding within and between user types eliminates any simple standard, either of amount of use or its composition."

As the study adequately points out, level of use differs for recreationists who motorboat and those who canoe, and if policy were to satisfy wilderness demands for canoeists it would mean reducing motorboating capacity to zero; and maximizing the motorboating capacity would eliminate wilderness canoeing. Since canoeists consider areas overcrowded at much lower levels of use than do any other types of users, full capacity for canoeists would be less than full capacity for others.

Based on the threshold of use, Lucas found he could classify the area into (1) underused; (2) transitional; and (3) overused. Based on this classification most of Quetico Park was underused, while overuse was most widespread in the
Boundary Waters canoe area.

In an attempt to predict future trends, Lucas points out that standards for wilderness could change in the future and that the past trends were not clear, so that any projection must be viewed with caution. However, he makes some tentative suggestions as to when wilderness levels will exceed their capacity.

Based on these findings, Lucas derives a framework for recreational policy, and is of the opinion that the Quetico-Superior area presents a distinct choice within the range of recreational opportunities - canoeing under near-primitive conditions. Lucas feels that although it is near one extreme, this particular opportunity seems to serve a large and growing demand, faster growing than the demand for conventional recreation. While it is a minority demand, the area dedicated to it is only a small part of the Upper Great Lakes region.

Canoeists' attitudes indicate that motorboating is incompatible with canoeing in a wilderness and, without priority, the opportunity to choose wilderness canoeing would be reduced or lost. Lucas alludes to the fact that the priority is justified for two additional reasons, firstly that the wilderness qualities of the area were more important to the canoeists than to the other groups; secondly a map of recreational areas shows that canoeists have fewer alternative locations. And of the parties asked if there were parts of the United States and Canada that would be considered suitable for the activities carried out in the area, there were no substitutes for 78% of the paddling canoeists, 62% of motor canoeists, and 57% of the other visitor classes.

Lucas (1964) sees the present problem of policy and management as one of redistribution, i.e., shifting people from heavily used areas and separating con-
flicting uses. Lucas points out that the combination of distributional and perceptual study is particularly appropriate for consideration of recreational land use.

"It could lead to a more flexible view of wilderness resources and a higher return from wilderness everywhere."

Lucas, in later study in 1970, sees the problem of overuse of recreational areas as one of distribution of use. Some areas might be crowded while others are lightly visited. He is of the opinion that better selection of sites for recreational development, based on a better understanding of the reasons for uneven visitor distribution, could improve public enjoyment and operating efficiency. The later study of Lucas, while somewhat modified in terms of his first study, indicates that the basic dimensions remain the same, that is, perception of crowding and user satisfaction can best be determined by the users. The object of Lucas' study, therefore, was to determine how variation in recreational use among campgrounds is related to characteristics of the campground sites and people's ideas about them.

Lucas is of the opinion that the key to understanding the role of factors related to recreational use distribution lies in understanding people's perception of their environment. The study approach, therefore, undertakes to -

(1) find out how observed differences in campground use relate to characteristics of existing sites - as affected by three categories -
   (a) resource characteristics at the site;
   (b) facilities there; and
   (c) its relative location and accessibility;
(2) analyze visitors' attitudes towards -
(a) resources at site;
(b) type and quality of facilities;
(c) crowding and user conflicts;
(d) general satisfaction and sources of information about the area.

Lucas (1970) found that the larger the campground, the less use per unit it received, suggesting that larger campgrounds are not necessarily more attractive because of their greater size, or because they generate more word-of-mouth advertising. It is also possible that the large campgrounds are somewhat newer, and not as well known. The amount of beach had a strong positive relation to use, while the presence or absence of a beach was less strongly related to use. It would seem, therefore, that campground use could be fairly well predicted on the basis of a combination of physical resource features - type of water body and amount of beach - and size development. Lucas found, however, that campground use is not a simple function of a few dominant characteristics; one feature can apparently offset the lack of another in a complex and variable way. For example, beaches seem to be an important attraction, but there are popular campgrounds without beaches. There is, therefore, no simple method of forecasting the drawing power of a campground.

Lucas (1970) found, in general, that visitors were highly satisfied with the number of individual family units, their spacing, screening of vegetation, and amount of use. Lucas also found that there was no significant amount of complaining about too many people on beaches, in boats, canoes, or on fishing streams. There was, however, some negative reaction to the number of campers, especially on one
of the campgrounds, Manistee, where 12% of the groups said the campground was too full. These campers objected to crowding of every type much more than campers in the other campground.

Brougham (1969) in studying the effect of crowding on the recreational experience found that concept of crowding is an extremely subjective one, "and too complex to be related to such relatively crude indices as education, income, or even actual intensity of use." Brougham investigated the effect of crowding on the recreational experience at the micro level. Using a particular spot on a beach at Pinery Provincial Park, Ontario, he distributed questionnaires to glean information about people's attitudes to crowding and their socio-economic characteristics. Using a crowding attitude scale, people responded to whether they objected to the number of people around them very strongly, or not at all. Socio-economic variables included number of years spent in rural Canada, housing density, income, number of years spent in a rural environment, education, age and number of people in the group.

The socio-economic variables were used as independent variables, while the crowding attitude scale was used as the dependent variable in a multiple regression analysis. In addition to the crowding attitude scale, Brougham used a number of indices of crowding perception as dependent variables in a series of multiple regression analyses. These variables were (1) choice of spot on beach; (2) choice of area; (3) choice of time; (4) spatial relocation to avoid crowding; and (5) average distance to nearest neighbour. Brougham points out that the crowding attitude scale is the most important of the indices of crowding since it permits measurement of the intensity of perception whereas other indices are merely an indication that perception
exists at all.

Summary of Literature Survey:

The studies reviewed are preliminary attempts in the search for the development techniques of man-environmental relations. They have in common that their implications and suggestions at present are only tentative ones.

The studies grouped under the major heading of "Method" are those that tend to characterize a person on the basis of a specific kind of response to a given class of environmental setting.

The second group of studies, classified as "Findings", are concerned with a more comprehensive and differentiated description of a person's orientation to the recreational environment. Lucas used a questionnaire to assess user attitudes towards crowding and management preferences, while Brougham examined differences in the "environmental disposition" crowding. The significance and relevance of this environmental disposition can only be determined by further empirical research.

Most of the studies reviewed have involved the use of multivariate techniques. It is only through the use of these techniques that it is possible to gain a comprehensive description of a person's interpersonal traits. It is also through the use of multivariate statistical techniques that it has been possible to assess individuals against some "environmental disposition".


Chapter III

RESEARCH METHODOLOGY AND PRESENTATION OF DATA COLLECTED

The problem is seen as one of defining suitable environmental standards and of developing management techniques accordingly. The question is, what measures and standards are needed to determine the quality of recreational experiences, the carrying capacity of a resource, as well as the effects of use and of intensity of use on the quality of the recreational experience.

As Moncrief (1970) points out, as recreation becomes established as a research discipline, relative to other types of research, the highly discursive treatments based upon relatively unstructured and impressionistic observations seem to have diminished somewhat in recent years. Definite emphasis is now in the direction of quantitative studies which attempt to establish the relationship among variables using inferential statistical methods. Moncrief also points out that among the specific trends developing in the recreation research area, the simpler preference studies are giving way to more sophisticated studies.

Participant observation, defined as data gathering through direct observation, has often been suggested as a means of studying the behaviour patterns of people while they are engaging in recreational pursuits. The contribution that such studies can offer to the whole issue of environmental perception and research, however, is limited, as this technique can only be used when the investigator is interested in recording the actions of his subjects and not their perception and attitudes.
FORMAT OF QUESTIONNAIRE

A questionnaire was therefore designed as the best means of gathering data on the minimum requirements of the individual for space in which to carry out his recreational activities with the most satisfaction. The aim of the question­naire, and thus the research, is to investigate quantitatively which factors among individual differences modify perception of crowding in the environment and not in building a perceptual model.

Individual differences are seen in terms of factors which condition recreational patterns and hence people's perceptiveness. Age is considered as one of the factors which influence overall participation in outdoor recreation, as recreation tends to diminish with age. Brian Rodgers (1969) sees the life cycle associated with recreation divided into three phases. The first phase is occupied by young and single adults. In this phase constraints are fewest and it generates the greatest demands. Recreation usually involves formal types of pursuits, and sport in a narrow sense. As a result space requirements are quite limited.

In the second phase, the emphasis is on the family, and recreation becomes more informal and the focus tends to shift towards the coast, the countryside and the park. In this phase the car becomes a very crucial and critical factor. The third and final phase is that of old age - this is a phase where there is an excess of leisure and of recreational passivity. This phase is the most undemanding in terms of space and facilities.

Other factors that influence recreational patterns are income and education. While recreation is adapted and conditioned by the life cycle, Rodgers (1969)
and Sessoms (1964) also point out that recreation is also determined by an expression of one's life style, i.e., income, education. The higher these are the more pursuits one tends to have. Rodgers points out that life style in general, not income in particular, is the essential key. Type of living accommodation was also included as a variable because it was thought that apartment dwellers' and single-family dwellers' perception of crowding may be different, and differences in perception might also arise between urban and rural dwellers.

Other variables that can be classified as user preference measures that describe aggressiveness, or gregariousness, were included. These are variables which describe whether campers value privacy while camping, or whether day users like a quiet place with not too many people. These variables were included as it was felt that they might also have some effect on the perception of crowding.

Past experience seen as the length of time one spent on recreational activities on the last recreational trip are also seen as some of the factors influencing recreational patterns and people's perception of crowding. Activities being sought at the site also influence people's perceptions, values and attitudes towards the recreational experience.

Perception of crowding can be described as visual and psychological characteristics to which people respond. Because these characteristics can be measured we can, therefore, describe perception of crowding in terms of the quantity of specific characteristics. Since the measurement of perceptions is concerned with the description of the environment as observed by individuals, the perception measurements use the human as the instrument for observation of crowding in the environment and attempts to translate the observations into meaningful quantities.
George Peterson and Edward Neuman state:

"Given a set of environments, individual preferences can be measured. Each individual is then described quantitatively in terms of his preference as a vector of components."

While it may be assumed that perception and preferences are unique to each individual, this uniqueness is, however, influenced by social and economic background, past experiences and activities being pursued. It is these characteristics that really determine the perceptiveness of the individual.

Perception of crowding is measured in the following manner:

(1) A crowding attitude scale measures intensity of perception as the degree of awareness of people in the recreational environment.

(2) Measure of people's perception of intensity of use as seen through the number of sites in the environment.

(3) Perception of crowding of resources as measured by the degree of awareness of other people while swimming, fishing, boating or water skiing, and engaging in other similar activities.

(4) Perception of seclusion is defined as the degree to which people consider the area remote.

The attempt, therefore, is to identify certain relations between the users' perception of crowding and the effect of perceived crowding on the recreational experience. This definition of perception being examined in the study and the effect on the recreational experience is summarized in the flow chart, diagram three.
Visual and Psychological Responses to Crowding

Modified By

Individual Differences Seen as

Socio-economic Characteristics
Activities Sought At Site
Intensity of Use
User Preferences

Results in:

Reduction of the Quality of
The Recreational Experience
As a Result of Crowding

Diagram 2 - Summary of Definition of Perception Assumed in Study And its Effects on the Recreational Experience.
SITE VARIABLES

The density of users was used as an objective measure of the intensity of crowding. The total number of visitors in the period in which interviewing was conducted was obtained from the Parks Board. An average per day was determined from this figure and this was divided by the total number of sites (campsites, picnic sites) available to give average number of users per site. (See Table 1)

<table>
<thead>
<tr>
<th>PARKS</th>
<th>CAMPERS</th>
<th>DAY USERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cultus Lake</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>Golden Ears</td>
<td>1</td>
<td>18</td>
</tr>
</tbody>
</table>

TABLE 1
Average Number of Users per Site, July and August, 1971

It is of interest to note that the attendance in provincial parks decreased from a total of 7.54 million visits in 1970 to 7.34 million visits in 1971, the first drop since 1964. The biggest drop was in camper use, a drop of 15%. (See Table II for specific figures in the parks studied).
**TABLE II**
Total Number of Users at Parks, 1970 - 1971

<table>
<thead>
<tr>
<th>USERS</th>
<th>Total Number of Users</th>
<th>1970</th>
<th>1971</th>
<th>1970</th>
<th>1971</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day Users</td>
<td></td>
<td>305,968</td>
<td>303,000</td>
<td>505,875</td>
<td>319,400</td>
</tr>
<tr>
<td>Campers</td>
<td></td>
<td>90,600</td>
<td>63,800</td>
<td>92,441</td>
<td>47,900</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>396,568</td>
<td>369,800</td>
<td>598,316</td>
<td>367,300</td>
</tr>
</tbody>
</table>

The weather has been cited as a major factor in the decrease in attendance. The "total hours of sunshine" records for July and August, 1971, were obtained from the Vancouver Weather Office at the following stations: (See Table III)

1. Vancouver International Airport
2. Abbotsford
3. Agassiz

and the means and standard deviations calculated for the period to determine whether there were differences in the period during which interviewing was conducted.

**TABLE III**
Hours of Sunshine Records for July, August, 1971, period in which interviewing was conducted.

<table>
<thead>
<tr>
<th>Weather Station</th>
<th>July 1971</th>
<th>August 1971</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>St.Dev</td>
</tr>
<tr>
<td>Vancouver Internation Airport</td>
<td>11.7</td>
<td>4.7</td>
</tr>
<tr>
<td>Abbotsford</td>
<td>10.91</td>
<td>5.06</td>
</tr>
<tr>
<td>Agassiz</td>
<td>9.52</td>
<td>4.62</td>
</tr>
</tbody>
</table>
The readings at Abbotsford indicate weather conditions at the recreation sites. The readings for Vancouver were examined as metropolitan Vancouver forms the major "catchment" area for these parks, therefore the weather in Vancouver would also affect attendance. The amount of variation indicated in the table is sufficiently great to consider weather weather as a variable in the statistical analysis.

Based on the hours of sunshine it was also possible to divide the period in which interviewing was conducted into three parts -

(1) July 1 - 11, when the average daily hours of sunshine were less than the mean for the entire period.

(2) July 12 - 30, when the average hours of sunshine were more than the overall mean.

(3) July 31-August 30, when average hours of sunshine were less than that received in the preceding period.

These three periods were referred to as Start, Height, and End of Season, and together with hours of sunshine and density were entered into the analysis as site variables. It was thought that weather conditions would have some influence on people's perception of crowding, and also that weather would affect numbers visiting the parks.

CONSTRUCTION OF THE QUESTIONNAIRE

The questionnaire was designed to ensure that the questions did not produce predetermined results by omitting unfavourable alternatives in check list questions. For example, people were asked if they found the parks uncrowded and what
they liked about the parks. The questionnaire was designed to consist of a series of check list questions and open ended questions, ordered in a sequence which tended to minimize the danger of suggested response. It is, of course, impossible to eliminate all possible bias from the questionnaire.

The questionnaire was tested to help eliminate potential weaknesses. Testing was accomplished by interviewing 25 visitors and, as a result of these interviews, a few questions were modified, some of the checklist questions had more alternatives added to give greater choice, resulting in increased clarity of the questionnaire. Emphasis was given to checklist questions, as too many open ended questions tended to tax the respondent while on a leisure trip.

Method of Sampling Used

Selection was made among those parks in the Lower Fraser Valley which have a similar physiographic complex. That is, they should be homogenous in terms of their natural features, they must be located on a lake, and they should contain forested wilderness "conservancy" areas where nature walks and hiking are possible. Of the provincial parks in the Lower Fraser Valley two were selected. These were Golden Ears Provincial Park and Cultus Lake Provincial Park. Both these parks are located on lakes and both have conservancy areas.

The purpose of choosing parks so that they are as homogenous as possible in terms of resources was that they would have similar types of activities and would, therefore, attract the same type of people. The parks would therefore be internally heterogeneous in terms of their populations. On the other hand, there would be
very little difference in the types of people at both parks.

Description of Parks

Cultus Lake Provincial Park is located 8 miles southeast of Chilliwack and 55 miles east of Vancouver (see Map 1). The Columbia Valley Highway bisects the southeast section of Cultus Lake Provincial Park, providing easy access. It is 10 miles to the park entrance from the Trans-Canada Highway (Highway 401) via Yarrow and 6 miles via Sardis. Cultus Lake was known as Swee-ehb-chah or Tso-willie by local Indians. Cultus is a Chinook word derived from the Salish word "kul" meaning bad or worthless. The lake was apparently referred to as bad either because of the numerous squalls which occur or because of an Indian taboo.

The park is made up of an area of 1,620 acres which is almost evenly divided between the north-west and south-east sides of the lake. The north-west portion is mostly undeveloped with the visitor oriented facilities confined to the south-east portion. Adjacent to the south-east portion of Cultus Lake Provincial Park is an area of 80 square miles of wilderness, International Ridge Recreation Area, where hiking is possible.

Golden Ears Provincial Park is located 30 miles east of Vancouver (see map 1) and a few miles north of Haney. The park is over 137,000 acres and extends from near Haney into the coast mountains. Its northern boundary is the southern boundary of Garibaldi Provincial Park, of which it once formed a part. Golden Ears has derived its name from a prominent mountain in the park, the local Indian name T'Laguna, which has twin peaks that glisten like gold in
winter when the rays of the setting sun strike their snow encrusted peaks.

Method of Distribution and Collection of Questionnaire

While the method of sampling used leads to a substantial loss in precision, there are compensating advantages of cost in operation which more than offset that loss - so that greater precision for unit cost can be achieved. Secondly, in this instance, the population to be sampled lends itself to cluster sampling, since recreationists are found in clusters (parks).

Backstrom and Hursh (1963) point out that a cluster sample only approximates a simple random design, and there should be an increase in sample size for increased precision. They point out that with increase in sample size to account for increased error due to clustering, one sometimes attains a high level or precision. At a 5% level of error and 95% confidence interval they suggest a sample size of approximately 570.

Users at day sites were selected by roaming through the site. There was no other alternative available as there are several entrances to the picnic grounds. No one was forced to accept a questionnaire and, on the whole, people were extremely co-operative. Campers were handed a questionnaire by the gatehouse attendant as they registered, and completed questionnaires were returned to the gatehouse. There is only one entrance to the campgrounds, making this method a feasible one. It was also found, during pretesting, that campers resented intrusion of their privacy while eating. Unfortunately, at Golden Ears campground the park officials, after previously agreeing, refused to grant permission to collect information except on one occasion when one was forced to walk through the entire campground. It was found,
however, that there was very little bias in the responses received from both campgrounds, as can be seen from the response rate. The response rate at Golden Ears Park was 38.8% while the response rate at Cultus Lake Park was 40.0%.

Questionnaires were distributed to both campers and day users on a total of five weekend days and three weekdays during July and August. The purpose of distributing questionnaires on weekdays was to find out if people came on these days to avoid crowding. Of a total of 1160 questionnaires distributed, 560 were returned, that is, there was a response rate of 48.3% which was higher than the 33.3% response rate which was set for the study. It is of interest that the rate of response was higher on days when the weather was not very good, or on a weekday when the parks were less crowded. People were extremely responsive on these days, very co-operative and eager to talk, and many people volunteered information about how conditions had deteriorated because of increasing numbers. On days when the parks were extremely full, people were unfriendly and less co-operative. One could infer that this might be some indication of the effect of crowding on the recreational experience. On the 18th July, when it was extremely crowded at Cultus Lake, people were particularly unfriendly. At 3:00 p.m. on this particular day there were 25 cars parked in the "no parking" area along the side of the road just outside the parking lot, as the parking lot was full to more than its capacity.

Of the total of 560 questionnaires returned 516 were used, and 44, (3.8%) were not used because they were incomplete in some way. Of the total sample, 273 were campers and 243 day users. Of the total number of users, 318 were users at Cultus Lake and 198 were users at Alouette Lake.
USER PROFILES: UNIVARIATE CROSS TABULATIONS

In order to get some view of crowding, and to find out if there is any difference among day users at the two parks, a percentage distribution analysis was carried out. (see Table IV). Sixty-one, 50.4% of day users at Cultus Lake liked a quiet place with not too many people, while (85) 69.7% at Golden Ears liked a quiet place with not too many people. Of the (61) 50.4% of the people at Cultus Lake who liked a quiet place, (23) 76.7% felt there were too many people. Of the (85) 69.7% at Alouette Lake who liked a quiet place (21) 77.8% felt there were too many people. Twenty-seven, 22.1% of all the day users felt there were too many people at Alouette Lake, while (23) 24.8% of them felt that there were too many people at Cultus Lake. (See Diagram 4).

Day Users were asked to rate their dispositions towards crowding. The following are results of this rating: Eight, 6.6% at Cultus Lake and (11) 9.0% at Alouette Lake disliked crowding very much, (26) 21.5% at Cultus Lake and (21) 17.2% at Alouette Lake disliked crowding. Seventy-nine (65.3% and (49) 64.8% at Cultus Lake and Alouette Lake respectively had no opinion. It can, therefore, be concluded that perceptions of crowding and peoples' attitudes toward crowding are very similar in the two parks. (See Table IV for a summary of these figures).

To get a further view of the relative importance of the different resource elements and crowding at the two campgrounds, a similar analysis was done for campers (Table V). (14) 9.6% of the campers at Cultus Lake felt the spacing in the campground too close while (177) 89.9% felt it just about right. At Alouette Lake (14) 18.4% felt it too close; (61) 80.3% felt it about right. As regards the number of campers, (19) 9.6% of those at Cultus Lake felt there were too many
campers, (120) 60.9% felt the number just about right, (33) 16.8% had no opinion, and (24) 12.2% felt there could be more. At Alouette Lake (11) 14.5% felt there were too many, (34) 44.7% felt it about right, (18) 23.7% had no opinion, and (13) 17.1% felt there could be more. This is illustrated in Diagram 3. Privacy was important to (149) 75.6% of the people at Cultus Lake, while (60) 79.0% at Alouette Lake valued privacy. It can also be concluded that very little difference exists between the two parks. Nine, 4.6% of the campers at Cultus Lake said their visits had decreased because of crowding, while (4) 5.3% at Alouette Lake gave crowding as the reason. (See Table V for a summary of these figures).
### TABLE IV
Summary of Day Users' Perceptions and Attitudes

<table>
<thead>
<tr>
<th></th>
<th>CULTUS LAKE</th>
<th>GOLDEN EARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liked a quiet place</td>
<td>(61) 50.4%</td>
<td>(85) 69.7%</td>
</tr>
<tr>
<td>Liked a quiet place and</td>
<td>(23) 76.7%</td>
<td>(21) 77.8%</td>
</tr>
<tr>
<td>found it too crowded</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Too many day users</td>
<td>(30) 24.8%</td>
<td>(27) 22.1%</td>
</tr>
<tr>
<td>Decrease of visits due</td>
<td>(11) 9.1%</td>
<td>(5) 4.1%</td>
</tr>
<tr>
<td>to crowding</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TABLE V
Summary of Campers' Perceptions and Attitudes

<table>
<thead>
<tr>
<th></th>
<th>CULTUS LAKE</th>
<th>GOLDEN EARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spacing in campground</td>
<td>(19) 9.6%</td>
<td>(14) 18.4%</td>
</tr>
<tr>
<td>too close</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spacing just right</td>
<td>(177) 89.9%</td>
<td>(61) 80.3%</td>
</tr>
<tr>
<td>Too many campers</td>
<td>(19) 9.6%</td>
<td>(11) 14.5%</td>
</tr>
<tr>
<td>Privacy important</td>
<td>(149) 75.6%</td>
<td>(60) 79.0%</td>
</tr>
<tr>
<td>Decrease of visits due</td>
<td>(9) 4.6%</td>
<td>(4) 5.3%</td>
</tr>
<tr>
<td>to crowding</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
DIAGRAM 3: Percentage of Total Number of Day Users and Their Perception of Crowding.
Diagram 4: Percentage of total number of campers and their perception of crowding.
RESULTS OF CROSS TABULATIONS ON TOTAL NUMBER OF USERS (CAMPERS AND DAY USERS)

The purpose of the exercise is not to distinguish between the two parks involved, Cultus Lake and Golden Ears, but to analyze visitors' perceptions of crowding and its corollary, user conflicts of resource-based recreational activities. As already pointed out, both parks are very similar in terms of their physiographic make-up. Both parks charge the same entrance fee for campers, $2.00. Both parks are administered by the same provincial agency, the Parks Branch of the Department of Recreation and Conservation, and are subject to the same regulations and management policies.

Of the 516 subjects whose responses were cross-tabulated, the parks most heavily used by these people were those in the Okanagan, followed by Cultus Lake Park. One hundred and thirty-six people said their last recreational trip was to Cultus Lake, while 164 said their last visit was to the Okanagan. 362 people said that the primary purpose of their trip was to visit the parks in question, while 145 said it was part of a trip.

29 (5.6%) of the visitors said their frequency of visits to the parks had decreased because of crowding, and there is a falling off of visits in terms of distance zones. Eleven of these (36%) lived within 20 miles of the park, eight (26%) lived within 60 miles, and seven (23%) within 100 miles. 67 people (13%) have other reasons for why their visits had decreased. 207 (40%) said their frequency of visits had actually increased. Of the 29 people whose frequency of visits had decreased because of crowding 88% lived in single-family dwellings and 0.9% lived in apartments.
Of the 29 people who said their visits had decreased because of crowding, only 6 had difficulty finding a parking space and a camp, 3 had difficulty finding one or the other, while 17 had no difficulty at all.

RESULTS OF CROSS TABULATIONS OF DATA ON CAMPERS

Responses of campers were cross tabulated to find out how campers felt about crowding and its relationship to other variables. Of 273 campers, 30 people, (11.0%) felt that there were too many campers. Of the 143 people who had 10 years or more experience as campers 15 (10.5%) felt there were too many campers. (See Table VI)

**TABLE VI**

Perception of Crowding by Categories of Experienced Campers

<table>
<thead>
<tr>
<th>Perception Rating</th>
<th>10+</th>
<th>5-9</th>
<th>2-4</th>
<th>1</th>
<th>None</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too many campers</td>
<td>15(10.5%)</td>
<td>9(15%)</td>
<td>6(12.1%)</td>
<td>0(0.%)</td>
<td>0(0.%)</td>
<td>30</td>
</tr>
<tr>
<td>Just about right</td>
<td>82(57.3%)</td>
<td>27(45%)</td>
<td>31(63.3%)</td>
<td>5(71.4%)</td>
<td>9(64%)</td>
<td>154</td>
</tr>
<tr>
<td>No opinion</td>
<td>22(15.4%)</td>
<td>17(28.3%)</td>
<td>8(16.3%)</td>
<td>2(28.6%)</td>
<td>2(14.3%)</td>
<td>51</td>
</tr>
<tr>
<td>O.K. with more</td>
<td>23(16.8%)</td>
<td>7(11.7%)</td>
<td>4(8.2%)</td>
<td>0(0.0%)</td>
<td>3(21.4%)</td>
<td>37</td>
</tr>
<tr>
<td>No answer</td>
<td>1(0.7%)</td>
<td>0(0.0%)</td>
<td>0(0.0%)</td>
<td>0(0.0%)</td>
<td>0(0.0%)</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>143(100%)</td>
<td>60(100%)</td>
<td>49(100%)</td>
<td>7(100%)</td>
<td>14(100%)</td>
<td>273</td>
</tr>
</tbody>
</table>

(Percentages rounded)
Of the 30 people who disliked crowding, eight (26.7%) lived within 20 miles, six (20.0%) lived within 20-60 miles, six (20.2%) lived within 60-100 miles, two (6.7%) lived within 100-150 miles of the Park. The remaining 26% came from other parts of Canada and the United States.

Thirteen campers (4.7%) said their visits to the park had decreased because of crowding. Of the thirteen campers who said their visits had decreased because of crowding, four (30.7%) perceived the park was too crowded. (See Table VII).

**TABLE VII**

Perception of Crowding and Change in Frequency of Visits of Campers

<table>
<thead>
<tr>
<th>Perception Rating</th>
<th>CHANGES IN VISITS TO PARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Decrease due to crowding</td>
</tr>
<tr>
<td>Too many campers</td>
<td>4 (30.7%)</td>
</tr>
<tr>
<td>Just about right</td>
<td>5 (38.4%)</td>
</tr>
<tr>
<td>No opinion</td>
<td>3 (23.0%)</td>
</tr>
<tr>
<td>O.K. with more</td>
<td>1 ( 7.6%)</td>
</tr>
<tr>
<td>No answer</td>
<td>0 ( 0.0%)</td>
</tr>
<tr>
<td></td>
<td>13(100.0%)</td>
</tr>
</tbody>
</table>

It should also be noted that the largest percentage drop as a result of crowding was among those campers who perceived that the park was crowded. However, among all of the people who visited the parks, 'no change in frequency of visits' ranks as the largest group, (140). This is probably due to the
fact that there is very little option available to these people in terms of alternative locations.

It is also worth noting that in almost every category of the perception scale, no change in number of visits to parks ranks as the highest percentage group. Also of interest is the fact that of 37 campers who felt the park could do with more campers, only one person said his visits to the park had decreased because of crowding.

Of the 75 campers who had completed college eight (10.6%) perceived crowding. Of the 41 campers who had some college education 5 (12.2%) perceived crowding, while nine (10.7%) out of 84 campers who had some high school education perceived crowding. Five out of 47 (10.6%) campers who had some high school perceived crowding. Only one camper out of 13 who had completed elementary education (7.6%) perceived crowding. Four campers had some elementary education but no one from this group perceived crowding.

Income ranges vary a great deal with respect to crowding. There is no distinct pattern as regards income groups and crowding. Of the 11.0% who disliked crowding 20.0% had incomes of less than $2,000, while 23.2% had incomes of $8,000 - $10,000.00.

RESULTS OF CROSS TABULATION OF DATA ON DAY USERS

Out of 243 day users 57 (23.5%) perceived crowding. 146 (60.1%) of day users said they liked a place with not too many people, 39 (16.1%) said they liked a place where they could see and meet a lot of people, and 58 (23.9%) said neither of the above conditions mattered to them. Of the 60.1% that liked
a quiet place, 44 (30.1%) felt it was too crowded, 72 (49.3%) felt it was about right, and 11, (7.0%) felt it could do with more.

**TABLE VIII A**

Perception of Crowding by Category of Preferences of Day Users

<table>
<thead>
<tr>
<th>Perception Rating</th>
<th>A Quiet Place</th>
<th>See and meet people</th>
<th>Indifferent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too many people</td>
<td>44 (30.1%)</td>
<td>4 (10.3%)</td>
<td>9 (15.5%)</td>
<td>57</td>
</tr>
<tr>
<td>About right</td>
<td>72 (49.3%)</td>
<td>18 (46.2%)</td>
<td>24 (41.4%)</td>
<td>114</td>
</tr>
<tr>
<td>No opinion</td>
<td>19 (13.0%)</td>
<td>12 (30.7%)</td>
<td>14 (24.1%)</td>
<td>45</td>
</tr>
<tr>
<td>O.K. with more</td>
<td>11 (7.5%)</td>
<td>5 (12.8%)</td>
<td>11 (19.0%)</td>
<td>27</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>146 (100.%)</strong></td>
<td><strong>39 (100.%)</strong></td>
<td><strong>58 (100.%)</strong></td>
<td><strong>243</strong></td>
</tr>
</tbody>
</table>

Of a total of 105 people living within 20 miles, 29 (27.6%) perceived crowding. Eleven of the 68 day users who lived within 20-60 miles, (16.1%), perceived crowding. Fifteen out of 45 day users (33.3%) who perceived crowding lived within 60-100 miles. One out of the nine people who lived within 100-150 miles of the park perceived crowding. Only one other day user perceived crowding and he lived outside of the 150-mile zone, but within the Province of British Columbia. None of the other categories of day users perceived crowding.

Like campers, day users who disliked crowding most in terms of education came from the groups that had completed high school, completed college, and had some college.
<table>
<thead>
<tr>
<th>Perception Rating</th>
<th>Completed College</th>
<th>Some College</th>
<th>Completed High Sch.</th>
<th>Some High Sch.</th>
<th>Completed Elementary</th>
<th>Some Elementary</th>
<th>No Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too many people</td>
<td>16 (32.6%)</td>
<td>10 (28.5%)</td>
<td>20 (21.2%)</td>
<td>10 (20.4%)</td>
<td>1 (14.2%)</td>
<td>0 (0.0%)</td>
<td>0</td>
</tr>
<tr>
<td>About right</td>
<td>25 (51.0%)</td>
<td>16 (45.7%)</td>
<td>47 (50.0%)</td>
<td>19 (38.7%)</td>
<td>2 (28.5%)</td>
<td>4 (66.6%)</td>
<td>1</td>
</tr>
<tr>
<td>No opinion</td>
<td>7 (14.2%)</td>
<td>4 (11.4%)</td>
<td>16 (17.0%)</td>
<td>14 (28.5%)</td>
<td>3 (42.8%)</td>
<td>1 (16.6%)</td>
<td>0</td>
</tr>
<tr>
<td>O, K. with more</td>
<td>1 (2.0%)</td>
<td>5 (14.2%)</td>
<td>11 (11.7%)</td>
<td>6 (12.2%)</td>
<td>1 (14.2%)</td>
<td>1 (16.6%)</td>
<td>2</td>
</tr>
<tr>
<td>TOTAL</td>
<td>49 (100%)</td>
<td>35 (100%)</td>
<td>94 (100%)</td>
<td>49 (100%)</td>
<td>7 (100%)</td>
<td>6 (100%)</td>
<td>3</td>
</tr>
</tbody>
</table>
It would appear that perception of crowding affects decrease of visits to the park to a greater extent among day users than among campers. Sixteen people said their visits had decreased; of these Twelve (75.0%) had perceived crowding. Of the 57 people who perceived crowding 21.0% said the frequency of their visits had decreased because of crowding.

**TABLE VIII C**

Perception of Crowding and Change in Frequency of Visits of Day Users

<table>
<thead>
<tr>
<th>Perception Rating</th>
<th>Decrease due to crowding</th>
<th>Decrease - other reasons</th>
<th>No change</th>
<th>Increase</th>
<th>Not sure</th>
<th>No answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too many people</td>
<td>12 (75.0%)</td>
<td>5 (15.6%)</td>
<td>17(23.9%)</td>
<td>22(18.1%)</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>About right</td>
<td>3 (18.7%)</td>
<td>15 (46.8%)</td>
<td>35(49.3%)</td>
<td>60(49.5%)</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>No opinion</td>
<td>1 (6.2%)</td>
<td>7 (21.8%)</td>
<td>12(16.9%)</td>
<td>24(19.8%)</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>O.K. with more</td>
<td>0 (0.0%)</td>
<td>5 (15.6%)</td>
<td>7(9.8%)</td>
<td>15(12.4%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>16 (100%)</td>
<td>32 (100 % )</td>
<td>71 (100%)</td>
<td>121 (100%)</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

It should also be noted that among the group who said their visits to the parks had decreased, the largest percentage group was made up of people who perceived crowding (75.5%), while no one felt that the parks could do with more people.
LITERATURE CITED

Backstrom and Hursh, Survey Research, Northwestern University Press, 1963, p. 33


Chapter IV

MULTIVARIATE ANALYSIS OF DATA AND FINDINGS

This chapter attempts to establish whether perception of crowding exists for campers and day users and its relationship to variables referred to as 'individual differences'. Having established that perception of crowding does exist, an attempt was made to find out its relationship to density; and whether the concept of 'user groups' was a meaningful way of looking at visitors in terms of their perception of crowding.

The preliminary analysis indicates that perception of crowding is a function of such individual characteristics as age, level of education, and personal preferences. It further indicates that when studying perception of crowding classification of people into user groups is inadequate, since individuals in the same user group perceive crowding differently.

Camper Profiles: A Factor Analysis

Simple cross-tabulations of data carried out in Chapter III can only show relationship between two variables at any one time. This is useful for presenting preliminary data profiles. Multivariate techniques are more useful for investigating the relationship between several variables at the same time.

Factor analysis was the first multivariate technique used. It was used to analyze several variables in order to reveal the structure of the interrelationship and identify the factors or their underlying dimensions. The
The general goal of factor analysis is the reduction of a set of variables to a smaller set of new, uncorrelated variables which are defined in terms of the original dimensions, and which summarize the most important information contained in the data.

Each individual factor is comprised of a different combination of the variables and, thus, is basically a combination of sets of weights, referred to as factor loadings. Factor loadings indicate how much the variable is "loaded" unto the factor, and aids in interpretation of the factor.

Factor analysis of the variables associated with campers revealed 23 factors, accounting for 70.2% of the variance. It was found that 16 eigenvalues accounting for 70% of the variance would present a good summary. Table IX illustrates the most important factors and the variables which comprise these factors. Computer Print Out is attached as Appendix B.

Factor I is the most important factor; it accounts for 8% of the variance in the data. Weather, variable 28, and Period of Season, variable 83, are the variables which load highly on this factor. Factor I can, therefore, be interpreted as a 'weather-time' dimension. The variables which load highly on Factor 3 are variables which identify people who perceive crowding while swimming, boating, skiing or fishing; variables 36 – 39. Factor 3 can be interpreted as a "conflict of the lake resources factor" since it identifies as a distinct group people who felt crowded while swimming, boating, skiing or fishing.

Factors 6, 7 and 8 are 'water based' dimensions and their composition is of interest. Factor 6 is entirely a "rugged" water dimension, that is, length of
time spent canoeing on the last recreational trip and canoeing as the activity being pursued, load highly on this factor. Factor 7 is a "pleasure" type water dimension, length of time spent water skiing, and activities sought after, water skiing and sailing, load highly on this factor. Factor 8 is associated with beach usage and swimming. Factor 10 can be classified as a privacy dimension; that is, it identifies campers who value privacy and who felt there were too many people as a distinct group. Factor 11 reveals an association between age, years of experience and campers who felt that spacing in the campground was too close, as these variables load highly on this factor; it can, therefore, be defined as a "length of experience" dimension. Factor 14 may be termed an "accommodation" dimension, as the variables that load highly on this factor are those which identify people who had difficulty finding accommodation, and who felt that there were not enough units in the campground. Factor 9 may be classified as 'time of arrival' dimension, and Factor 13 may be cited as indicating the visitors who planned not to return because of overcrowding. Factors 4, 15, 16 and 17 are difficult to interpret (See Table IX).

Day User Profiles: A Factor Analysis

Factor analysis of the data associated with day users revealed 21 factors accounting for 71% of the variance. It was found that 16 factors accounting for 69% of the variance presented a good summary. Table X illustrates the most important factors and the variables that comprise them.

Factor 1, like campers, can be classified as a 'weather-time' dimension since the variables that load highly on this factor are time of arrival, variable 28;
### TABLE IX

CAMPERS: Factors and the Variables that Comprise Them

<table>
<thead>
<tr>
<th>FACTOR 1 Variables No. Name</th>
<th>FACTOR 3 Loading</th>
<th>FACTOR 10 Perception of crowding while no. of campers</th>
<th>FACTOR 11 Age</th>
<th>FACTOR 14 Perception of non-availability of accommodation</th>
</tr>
</thead>
<tbody>
<tr>
<td>28 Weather</td>
<td>-85</td>
<td>34 Perception of crowding while no. of campers</td>
<td>23 Age</td>
<td>20 Perception of non-availability of accommodation</td>
</tr>
<tr>
<td>29 Period of Season</td>
<td>-83</td>
<td>35 Value of Privacy</td>
<td>30 Years of experience</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td></td>
<td>36 swimming</td>
<td>32 Perception of spacing</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>37 boating</td>
<td>33 Perception of No. of Units</td>
<td>-71</td>
</tr>
<tr>
<td></td>
<td></td>
<td>38 water skiing</td>
<td>39 Crowded while fishing</td>
<td>-53</td>
</tr>
<tr>
<td></td>
<td></td>
<td>39 fishing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>Name</td>
<td>Factor 1 Loading</td>
<td>Factor 4</td>
<td>Factor 8</td>
</tr>
<tr>
<td>-----</td>
<td>-----------------------------</td>
<td>------------------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>28</td>
<td>Time of arrival</td>
<td>81</td>
<td>-82</td>
<td>4</td>
</tr>
<tr>
<td>34</td>
<td>Weekend/Weekday</td>
<td>79</td>
<td>44</td>
<td>34</td>
</tr>
<tr>
<td>35</td>
<td>Weather</td>
<td>-89</td>
<td>-58</td>
<td>9</td>
</tr>
<tr>
<td>36</td>
<td>Period of Season</td>
<td>-64</td>
<td>68</td>
<td>11</td>
</tr>
</tbody>
</table>

23 Activity sought at site - fishing 45
weekday or weekend, variable 34; weather, variable 35; and period of season, variable 36. Factors 2, 6 and 7 are 'water-based' dimensions and their composition is also of interest. Factor 2 is a "pleasure" based activity, water skiing and boating load highly on this dimension. Factor 6 is a 'slower pace' dimension as the variables that load highly on this factor are length of time one spent canoeing on last recreational trip, and canoeing the most important activity sought at the site, variables 6 and 22 respectively. Factor 4 is a 'decrease of visits' dimension: it identifies as a distinct group people whose visits tend to decrease as the nature of their visits becomes more oriented toward nature walks. Factor 8 reveals that for day users fishing, hiking and sightseeing are associated activities: that is, it identifies people who spent more time on these activities on the last recreational trip as a distinct group.

Factor 12 may be classified as a 'socio-economic-crowding' dimension: that is, it distinguishes as a distinct group younger people, and those with higher education felt that there were too many people, and that the parks were too accessible. The variables that load on factor 13 are those concerned with perception of crowding and lack of desire to pay for resources. Factor 9 may be described as an 'accommodation-crowding-distance' dimension: that is, it identified as a distinct group people who lived further away from the parks who perceived that they had less difficulty finding accommodation and were not as dissatisfied with crowding. Factors 3, 11, 15 and 16 are difficult to interpret.

Computer Print Out is attached as Appendix B.
CROWDING AMONG DAY USERS AND CAMPERS

Multiple regression analysis was used to investigate the relationships between the demographic variables, recreation activities, user preferences and peoples' perception of crowding. The predictor or independent variable (X) in a regression analysis is the one which varies in order to assess its relationship to, or influence on the dependent variable (Y).

In the first instance, the Y dependent variable was perception of crowding. The reason for use of this variable above all others is the fact that it is the one which directly measures perception. The purpose of this analysis was to find out -

(1) if perception of crowding is statistically significant, and
(2) what variables referred to as "individual differences" affect peoples' perception.

In the second regression analysis the dependent variable (Y) was density. The purpose of this second regression analysis was to find out -

(1) if perception of crowding was related to an objective measure of the environment, density;
(2) what variables were related to the measure density;
(3) are any of these variables the same as those found in analysis one; and
(4) if density as a measure was statistically significant.

Statistical significance was set at the 5% level for the purposes of this study.

Computer Print Out is attached as Appendix B.
<table>
<thead>
<tr>
<th>VARIABLES ON past experience</th>
<th></th>
<th>VARIABLES ON past experience</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DAY USERS</td>
<td></td>
<td>CAMPERS</td>
<td></td>
</tr>
<tr>
<td>No.  Name</td>
<td></td>
<td>No.  Name</td>
<td></td>
</tr>
<tr>
<td>1 Intensity of Beach use on last rec. trip</td>
<td></td>
<td>1 Intensity of Beach use on last Rec. trip</td>
<td></td>
</tr>
<tr>
<td>2 Intensity of Fishing use on last rec. trip</td>
<td></td>
<td>2 Intensity of Fishing use on last Rec. trip</td>
<td></td>
</tr>
<tr>
<td>3 Intensity of Boating use on last rec. trip</td>
<td></td>
<td>3 Intensity of Boating use on last rec. trip</td>
<td></td>
</tr>
<tr>
<td>4 Intensity of Canoeing use on last rec. trip</td>
<td></td>
<td>4 Intensity of Canoeing use on last rec. trip</td>
<td></td>
</tr>
<tr>
<td>5 Intensity of Water skiing on last rec. trip</td>
<td></td>
<td>5 Intensity of Water skiing on last rec. trip</td>
<td></td>
</tr>
<tr>
<td>6 Intensity of Swimming use on last rec. trip</td>
<td></td>
<td>6 Intensity of Swimming use on last rec. trip</td>
<td></td>
</tr>
<tr>
<td>7 Intensity of Hiking use on last rec. trip</td>
<td></td>
<td>7 Intensity of Hiking use on last rec. trip</td>
<td></td>
</tr>
<tr>
<td>8 Intensity of Cycling use on last rec. trip</td>
<td></td>
<td>8 Intensity of Cycling use on last rec. trip</td>
<td></td>
</tr>
<tr>
<td>9 Intensity of Sightseeing use on last rec. trip</td>
<td></td>
<td>9 Place of Last Activity</td>
<td></td>
</tr>
<tr>
<td>10 Place of Last Activity</td>
<td></td>
<td>10 Destination of Trip</td>
<td></td>
</tr>
<tr>
<td>11 Restoration of Trip</td>
<td></td>
<td>11 Duration of Stay</td>
<td></td>
</tr>
<tr>
<td>12 Duration of Stay</td>
<td></td>
<td>12 Decrease of Visits to Site</td>
<td></td>
</tr>
<tr>
<td>13 Decrease of Visits to Site</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**VARIABLES ON ACTIVITY AT SITE**

| 13 Activity sought at site - relaxing |  |
| 14 Activity sought at site - nature walks |  |
| 15 Activity sought at site - sightseeing |  |
| 16 Activity sought at site - picnicking |  |
| 17 Activity sought at site - canoeing |  |
| 18 Activity sought at site - canoeing |  |
| 19 Activity sought at site - fishing |  |
| 20 Activity sought at site - walking |  |
| 21 Activity sought at site - water skiing |  |
| 22 Activity sought at site - driving |  |
| 23 Activity sought at site - sailing |  |

**SOCI-ECONOMIC VARIABLES**

| 19 Distance Travelled |  |
| 20 Type of Living Accommodation |  |
| 21 Time of Arrival |  |
| 22 Non-availability of accommodation |  |
| 23 Education |  |
| 24 Income |  |
| 25 Age |  |
| 26 Attitude to Site |  |
| 27 Reasons for not returning |  |

| 30 Years of experience |  |
| 31 Type of camping unit |  |
TABLE XI - cont'd

<table>
<thead>
<tr>
<th>DAY USERS</th>
<th>CAMPERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PERCEPTION-ATTITUDES-SATISFACTION</td>
<td>PERCEPTION-ATTITUDES-SATISFACTION</td>
</tr>
<tr>
<td>34 Lack of desire of meeting others</td>
<td>32 Perception of spacing</td>
</tr>
<tr>
<td>35 Perception of number of units</td>
<td>33 Perception of number of units</td>
</tr>
<tr>
<td>37 Perception and satisfaction with lack</td>
<td>35 Value of Privacy</td>
</tr>
<tr>
<td>of crowding</td>
<td>36 Perception of crowding while swimming</td>
</tr>
<tr>
<td>38 Satisfaction with facilities</td>
<td>37 Perception of crowding while boating</td>
</tr>
<tr>
<td>39 Perception of remoteness</td>
<td>38 Perception of crowding while skiing</td>
</tr>
<tr>
<td>40 Perception and dissatisfaction with</td>
<td>39 Perception of crowding while fishing</td>
</tr>
<tr>
<td>crowding</td>
<td>40 Perception of accessibility</td>
</tr>
<tr>
<td>41 Perception of accessibility</td>
<td></td>
</tr>
<tr>
<td>42 Paying for resources</td>
<td></td>
</tr>
</tbody>
</table>

SITE VARIABLES

| 32 Weekend                                    | 28 Weekend                                    |
| 33 Weather                                    | 29 Weather                                    |

Variable 36 - Perception of Crowding is the dependent variable

Variable 34 - Perception of Crowding is the dependent variable.
Perception of Crowding by Day Users

Multiple regression analysis was undertaken to analyse the degree and direction of relationship among several variables and perception of crowding of day users. Forty one independent variables were used in the first analysis. These are listed in Table XI. The dependent variable was perception of crowding. The independent variables are classified as 'individual differences' and may be divided into four groups. These are:

1. Variables associated with socio-economic characteristics;
2. Variables associated with gregariousness and personal preferences of users;
3. Variables associated with past experience;
4. Variables associated with activities sought at site.

In addition, site variables were entered into the analyses.

The resultant regression equation explains 13.2% of the variance in the data and the regression equation is significant at the 95% level of significance. Of the 41 variables entered in the analysis, four variables were significantly related to Y, perception of crowding. In the stepwise regression analysis the variables appeared in the following order of significance:

Lack of desire to meet people (var. 34, Gp. 2);
Non-availability of accommodation (var. 27, Gp. 2);
Education (var. 28, Gp. 1); and
Length of time spent cycling on last recreational trip (var. 8, Gp. 3).

It should be noted that this latter variable is negatively related to Y.
Table 12 lists the beta weights of the significant variables. From this table we see that the lack of desire to meet other people has the highest correlation (R) with Y (0.2886); it explains 6% of the variance in the data. It is followed by non-availability of accommodation (var. 27) with an (R) coefficient of 0.2853. It would seem, therefore, that people who like a quiet place are the ones who are most perceptive of crowding. To these people the threshold of crowding has already been passed and they find the parks crowded.

The difficulty of finding accommodation has a correlation coefficient (R) of 0.2853. Thus perception of crowding is directly related to the respondents' inability to find various kinds of accommodation. Perception of crowding is also directly related to education (var. 28). The higher one's level of education the more perceptive one tends to be. It should also be noted that education of all the socio-economic variables listed in Table XI tends to influence day users' perception of crowding.

Time spent on cycling during the last recreational trip has a correlation coefficient of -0.2160 with Y. Its negative significance means that people who cycle a lot are less perceptive of crowding; that is, as the time spent cycling increases perception of crowding decreases. It indicates that if people cycle in the park they meet less people than those using the beach, lake and lawns.

Only four of the 41 independent variables listed in Table XI were statistically significant. It is important to point out that none of the variables concerning the activities sought at site were related to crowding. It would appear, therefore, that variables that measure peoples' predisposition toward liking a quiet
place and their perception of the difficulty in finding accommodation are better measures of their perception of crowding. Secondly, a few socio-economic variables such as education do affect perception. Other socio-economic variables, such as income and age, however, have very little effect on how day users perceive and react to crowding.

**Crowding Among Day Users as Measured by Density**

Having established that day users are perceptive of crowding an attempt was made to find out its relationship to density. In this second regression analysis the Y dependent variable was density. The 42 independent variables used in the analysis are listed in Table XIV.

The regression equation obtained explains 60.5% of the variance in the data which is fairly high.

The first variable to appear is weather conditions. It is obvious, then, that weather affects numbers and, in turn, density at the parks. It is of interest to note that weather, while affecting density, has little effect on people's perception of crowding.

Time spent swimming on the last recreation trip has a regression coefficient of 0.1107 with density (Y). This, of all the intensity-of-use variables, is significantly related to density. It indicates that swimming is one of the most crowded activities. It also indicates that swimming as an activity has passed its threshold of use and there is need for positive action.

The variable which indicates that the place of one's last recreational trip were the parks in the Fraser Valley, Cultus Lake in particular, has a regression
coefficient of 0.1524. Of the total number of users, both campers and day users, 26% said their last recreational trip was to Cultus Lake. This helps substantiate the implication given that the lakes at these parks are particularly crowded, and that swimming, as a major activity on the lake, is overcrowded.

Perception of accessibility is negatively related to density. As density increases people perceive the parks as being inaccessible. Accessibility is now perceived in terms of difficulty of getting to the park and finding accommodation. As density increases perception of inaccessibility increases, a direct result of crowded highways and lack of accommodation. It should be noted that perception of accessibility has a fairly high correlation coefficient (-0.3325) with Y.

The time dimension also affects density, the longer one stays, variable 13, and the later one arrives variables 17 and 33. This has certain implications for management policies since it indicates that density is at its height on weekends, especially in the afternoons.

The distance people travelled is negatively related to density. Thus, most people who visit on weekends when the weather is good and when density is high, are those people who live further away from the parks in the Vancouver area. People who live closer to the parks come more often on weekdays when it is less crowded.

Fishing is the only activity sought at site variable which is correlated with density. The correlation coefficient is also very high - 0.8906. The negative relationship indicates that fishermen tend to avoid crowds. By fishing in the surrounding creeks they never intermingle with the crowds that converge on the lake and the
picnic grounds or the lawns.

Non-availability of accommodation has a fairly high correlation coefficient (.4191) with Y. Its negative relationship to density (Y) must be noted however. It is significant to note that non-availability of accommodation has a positive relationship to perception of crowding in the previous analysis. While perception of crowding is directly related to peoples' inability to find accommodation, the relationship is not a direct one in the case of density. This substantiates the theory that perception of crowding, while related to actual numbers, is also affected by something more intangible.

It is also interesting to note that satisfaction has a negative relationship with density - 0.1491. While the correlation coefficient is not very high it is significant at the 95% level. This variable indicates that density is related to peoples' satisfaction with facilities. People are dissatisfied with facilities when it is crowded. This is extremely interesting, as it illustrates that crowding, as people perceive it, is something that is psychological. It is also of interest to note that lack of desire for meeting other people has a negative relationship with Y, and a correlation coefficient of -0.2045. This indicates that density and lack of desire to meet other people have a lot in common. In other words, as density increases, the lack of desire to meet other people decreases. The possibility of achieving the latter becomes less and less and people are forced into accepting the fact that there are too many people. This should not, however, negate the fact that people have probably surpassed their tolerance level as far as crowding is concerned. The important issue is that 60% of the people visiting the parks like a quiet place and, for this 60%, the recreational experience has diminished because of overcrowding. It is also
important to point out that those who come on weekends are those who live further away from the park, in the Vancouver area. These people have nowhere else to go for a short day's outing and must, therefore, accept crowded conditions, or not go anywhere.

It is of interest as well that perception of crowding is also related to density; the correlation coefficient is fairly high, 0.1816. It is obvious that increasing numbers do affect one's perception of crowding. However crowding, as something perceived, is affected to a greater extent by the psychological makeup of the individual. It is also interesting to note that education affects one's perception of crowding while there is no relationship between density and education.

In summary it can be pointed out that none of the socio-economic variables, and very few user preference variables are positively related to density. Density is affected by site variables to a greater extent than by variables classified as user preferences. It is also of interest that very few of the variables grouped under the headings "activities sought at site", or "experience" are related to density. This was also a finding when perception of crowding formed the dependent (Y) variable. It is important to point out also that perception of crowding is related to density, but the former is related to user preferences, the latter to site variables.

One can conclude, therefore, that among day users crowding exists to a great extent, as indicated by analysis two, the density measure. It is also of interest that 60% of the people visiting the parks perceive this density, or crowding, which, in turn, affects the recreational experience. Computer Print Out is attached as Appendix B.
**TABLE XII**

Regression Analysis I - Day Users

Independent variables significantly related to dependent variable Y - perception of crowding

\[
R^2 = 0.1323 \text{ (13.2\% of variance in data explained by perception of crowding)}
\]

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Regression coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Intensity of Cycling on last recreational trip</td>
<td>-0.2106* (-21.0%)</td>
</tr>
<tr>
<td>27</td>
<td>Non-availability of accommodation</td>
<td>0.2853* (28.5%)</td>
</tr>
<tr>
<td>28</td>
<td>Education</td>
<td>0.1020* (10.3%)</td>
</tr>
<tr>
<td>34</td>
<td>Lack of Desire of Meeting other people</td>
<td>0.2886* (28.8%)</td>
</tr>
</tbody>
</table>

*Significant at 5\% level

**TABLE XIII**

Regression Analysis II - Day Users

Independent variables significantly related to dependent variable Y density

\[
R^2 = 0.6051 \text{ (60.5\% of variance in data explained by density)}
\]

<table>
<thead>
<tr>
<th>No.</th>
<th>Independent variables significantly related</th>
<th>Regression coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Intensity of Swimming on last recreational trip</td>
<td>0.1107* (11.0%)</td>
</tr>
<tr>
<td>11</td>
<td>Place of last activity</td>
<td>0.1524* (15.2%)</td>
</tr>
<tr>
<td>13</td>
<td>Duration of Stay</td>
<td>0.1974* (19.7%)</td>
</tr>
<tr>
<td>20</td>
<td>Activity sought at site - fishing</td>
<td>-0.8906* (-89.0%)</td>
</tr>
<tr>
<td>25</td>
<td>Distance travelled</td>
<td>-0.1874* (18.7%)</td>
</tr>
<tr>
<td>27</td>
<td>Time of arrival</td>
<td>-0.1180* (19.8%)</td>
</tr>
<tr>
<td>28</td>
<td>Non-availability of accommodation</td>
<td>-0.4191* (41.9%)</td>
</tr>
<tr>
<td>33</td>
<td>weekday/weekend</td>
<td>0.1636* (16.3%)</td>
</tr>
<tr>
<td>34</td>
<td>Weather</td>
<td>0.7533* (75.3%)</td>
</tr>
<tr>
<td>35</td>
<td>Lack of desire of meeting other people</td>
<td>-0.2045* (20.4%)</td>
</tr>
<tr>
<td>37</td>
<td>Perception of crowding</td>
<td>0.1816* (18.1%)</td>
</tr>
<tr>
<td>39</td>
<td>Satisfaction with facilities</td>
<td>-0.1491* (14.9%)</td>
</tr>
<tr>
<td>42</td>
<td>Perception of accessibility</td>
<td>-0.3325* (33.2%)</td>
</tr>
</tbody>
</table>

*Significant at 5\% level
Perception of Crowding by Campers

Multiple regression analysis was also undertaken to analyze the degree and direction of relationship among several variables and perception of crowding by campers. Forty independent variables were used in the first analysis; these are listed in Table XI. The dependent variable was perception of crowding. The resultant regression equation explains 11.3% of the variance which is less than that explained for day users, 13.2%. Of the variables listed in Table XI, only four were significantly related to perception of crowding; these are listed in Table XV.

The first variable appearing in the stepwise regression analysis is whether campers value privacy or not. To 70% of campers privacy is important; to 13% it is unimportant. People who value privacy are the ones who perceive it as too crowded. It is of interest to note that a number of people pointed out that they could not achieve noise privacy. This probably indicates that most people felt the campgrounds were too noisy, either because of traffic moving through the campground or, as a lot of people complained, there were too many "loud mouth" people.

Age, variable 25, has a correlation coefficient of 0.0990, which is significant at the 95% level. Age is the variable which affects campers' perception more than any other socio-economic variable. It is also the older age groups that are more perceptive and seem to value privacy more.

Time spent water-skiing on the last recreational trip has a negative correlation (-0.2721) with perception of crowding. On the other hand, time spent canoeing on the last recreational trip has a positive correlation with Y, 0.1608.
This finding is of particular significance since it indicates that for campers the lake has surpassed its capacity as a resource. There are different levels of use for people using canoes and those using power boats and water skis. People who canoe prefer a quiet place, while people who water ski tend to look upon canoe enthusiasts as obstructions. There is obviously a conflict of resources that must be resolved. This finding also indicates that boating and water skiing are integral parts of the camping trip. If, therefore, people find that a conflict of resources and crowding exists, the recreational experience is affected.

It is of interest that the variable which measures gregariousness of the individual, variable 35, is the variable that appears first in the regression analysis. There was also a similar finding among day users. Perception is then bound up with peoples' preferences and values. It is also important that age is a more important sociological variable in the case of campers than it is with day users. This probably indicates that experience affects one's perception much more in the case of campers than it does in the case of day users.

At this point it is also worth noting the intensity of use variables; time spent boating and water skiing also affect campers' perception of crowding. Campers therefore tend to find a conflict of use among these activities and perceive that conditions on the lake are deteriorating. Computer Print Out is attached as Appendix B.

Crowding among Campers as Measured by Density

Having established that perception of crowding exists, analysis II was done. In analysis II density was used as the Y variable; the independent variables
variables are listed in Table XIV. In this analysis the regression equation explains 20% of the variance. This is much less than the variance explained in the case of day users (61%). This indicates that density is not as good a measure of crowding for campers as it was for day users. This results from the fact that campgrounds are not as crowded as picnic areas. Campgrounds are rigidly controlled. No more than six people are allowed per campsite, and there is a maximum capacity which has recently been enforced.

It is of interest that perception of crowding, variable 33, is not related to density. Perception of crowding of campers is related to privacy, particularly noise privacy, and experience. Campers see crowding, not in terms of increasing numbers, but as violation of one's privacy and conflict of the activities carried out on the lake. A constant complaint of campers is that there are too many power boats or too many water skiers on the lake. Perception of crowding to campers, like day users, is something that is related to personal preferences and values.

The independent variables related to density are distance travelled, weather conditions, reasons for not returning, and the time dimension, variable 29 (See Table XVI). The variables that are significantly related to density are listed in Table XVI.

Distance travelled has a correlation coefficient with Y of 0.074, and is positively related. Campers who live closer to the parks are those who visit on weekends, while day users who live further away from the parks are those who visit on weekends. This indicates something about crowding. Those who live close to the park perceive that day use areas are crowded on weekends and avoid the
areas at this time.

Weather also affects density at campgrounds; it has a correlation coefficient of 0.0855. Good weather conditions obviously affect numbers. Weather was also found to affect numbers in the analysis concerning density and day use.

Crowding as the reason for not returning to the park has a regression coefficient of 0.0231. Density affected the recreational experience for some people, as the reason they gave for not returning to the park was that they felt it too crowded. The coefficient, although significant, is extremely low.

Perception of crowding among campers is related less to numbers than it is to the whole concept of privacy. It is important to emphasize that both campers and day users perceive crowding in their recreational environment. Crowding in one instance is related to numbers and, to another group, the concept revolves around privacy. One can conclude, therefore, that crowding exists to a greater extent among day users, and is perceived by larger numbers of people. One can also conclude that 'numbers' affects perception of day users to a much greater extent than it does campers. It must be pointed out, however, that the number of campers is strictly limited by regulation, while there is no limit on the number of day users.
TABLE XIV

Variables used in Regression Analysis with Variable 1 Density as Dependent Variable are the same as in TABLE XI.

<table>
<thead>
<tr>
<th>DAY USERS</th>
<th>CAMPERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables are all the same except variable 1 is density. Variable numbers are adjusted accordingly.</td>
<td>Variables are all the same except variable 1 is density. Variable numbers are adjusted accordingly.</td>
</tr>
</tbody>
</table>

TABLE XV

Regression Analysis 1 - Campers

Independent variables significantly related to dependent variable Y, Perception of Crowding

\[ R^2 = 0.1162 \text{ (11.6\% of variance in data explained by perception of crowding)} \]

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Regression coefficient (b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Intensity of Canoeing on Last recreational trip</td>
<td>0.1608* (16.0%)</td>
</tr>
<tr>
<td>5</td>
<td>Intensity of waterskiing on last recreational trip</td>
<td>-0.2721* (27.2%)</td>
</tr>
<tr>
<td>25</td>
<td>Age</td>
<td>0.0990* (9.9%)</td>
</tr>
<tr>
<td>35</td>
<td>Value of Privacy</td>
<td>0.1877* (18.7%)</td>
</tr>
</tbody>
</table>

*Significant at 5% level
**TABLE XVI**

Regression Analysis II - Campers

Independent variables significantly related to dependent variable Y, density

\[ R^2 = 0.2374 \text{ (23.7\% of variance in data explained by density)} \]

\[ \bar{x} = \text{Independent variables significantly related} \]

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Regression Coefficient</th>
<th>(b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Distance travelled</td>
<td>0.0740* (7.4%)</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Reasons for not returning too crowded,</td>
<td>0.0231* (2.3%)</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Weekday / weekend</td>
<td>0.0395* (3.9%)</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Weather</td>
<td>0.0855* (8.5%)</td>
<td></td>
</tr>
</tbody>
</table>

*Significant at 5\% level
Perception of Crowding and Classification of Day Users into User Groups

Having established that crowding exists and is perceived by 60% of day users coming to the parks, it was also necessary to find out if crowding exists for user groups. The rationale for examining user groups is that these groups are often used as the basis for recreation planning. Very often simple user preferences are solicited from people, by finding out what activities they participate in most often in the summer. These are then, in turn, used as demand projections. However, this technique does very little to divulge what meanings and satisfactions people have derived from their recreational experiences. The underlying assumption, therefore, is that user group classification may not be a meaningful way of looking at recreationists in terms of peoples' perception of crowding. Perception of crowding and attitude variables related to crowding are selected as the attributes which should position and separate user groups in social space. The purpose is to find out if user group classification is a meaningful way of looking at recreationists in terms of diminution of the recreation experience. Visitors were classified into groups based on participation in summer activities.

Discriminant analysis was the multivariate technique applied, as this technique investigates the relationship between group classification and a set of variables. The general goal of discriminant analysis was to establish linear discriminant functions of the characteristics which are such that they distinguish most successfully between the user groups.

Discriminant analysis was applied to 17 user groups among day users. Seventeen variables measuring perception of crowding and satisfaction were used in
the analysis. The variables and groups used in discriminant analysis are shown in Table XVII. Four roots (discriminant functions) were extracted, three roots accounted for 92% of the variance between the groups. The first root absorbed 49% of the between group variance, the second root 25%. Table XVIII illustrates the roots extracted and the variance explained by each. Computer Print Out is attached as Appendix B.

**TABLE XVII**

Variables and User Groups used in Discriminant Analysis

<table>
<thead>
<tr>
<th>Variables</th>
<th>User Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Duration of Stay</td>
<td>P = Picnicking</td>
</tr>
<tr>
<td>2 Decrease of Visits due to crowding</td>
<td>S = Swimming</td>
</tr>
<tr>
<td>3 Non-availability of accommodation</td>
<td>C = Camping</td>
</tr>
<tr>
<td>4 Lack of desire for meeting others</td>
<td>W = Walking for Pleasure</td>
</tr>
<tr>
<td>5 Perception of number of units</td>
<td>D = Driving for Pleasure</td>
</tr>
<tr>
<td>6 Perception of number of people</td>
<td>E = Sightseeing</td>
</tr>
<tr>
<td>7 Satisfaction with everything</td>
<td>H = Hiking</td>
</tr>
<tr>
<td>8 Satisfaction with nothing</td>
<td>N = Camping/Canoeing</td>
</tr>
<tr>
<td>9 Satisfaction with beach</td>
<td>B = Boating</td>
</tr>
<tr>
<td>10 Satisfaction with scenery</td>
<td>K = Canoeing</td>
</tr>
<tr>
<td>11 Perception of and satisfaction with lack of crowding</td>
<td>I = Water Skiing</td>
</tr>
<tr>
<td>12 Perception of and satisfaction with facilities</td>
<td>F = Fishing</td>
</tr>
<tr>
<td>13 Liked the area because it was remote</td>
<td>Y = Cycling</td>
</tr>
<tr>
<td>14 Perception of and dissatisfaction with crowding</td>
<td>T = Tennis</td>
</tr>
<tr>
<td>15 Satisfied with other</td>
<td></td>
</tr>
<tr>
<td>16 Perception of accessibility</td>
<td></td>
</tr>
<tr>
<td>17 Desire of paying for resources</td>
<td></td>
</tr>
</tbody>
</table>
### TABLE XVIII

Number of Roots (Discriminant Functions) extracted in Analysis

<table>
<thead>
<tr>
<th>Number of Discriminant Functions</th>
<th>Roots (Eigenvalues)</th>
<th>Explained Variance-Percent</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.0</td>
<td>0.0</td>
<td>5%</td>
</tr>
<tr>
<td>1st</td>
<td>.243</td>
<td>49.0</td>
<td>5%</td>
</tr>
<tr>
<td>2nd</td>
<td>.123</td>
<td>24.9</td>
<td>5%</td>
</tr>
<tr>
<td>3rd</td>
<td>.089</td>
<td>18.0</td>
<td>5%</td>
</tr>
</tbody>
</table>

Table XIX illustrates the dimension of discrimination. It shows the variables that "load" on the four discriminant functions and their weights. These are the scaled vectors, which reflect, therefore, their relative contribution to the variance among groups.

### TABLE XIX

Scaled Canonical Variates, Illustrates Dimension of Discrimination and Variables that "load" on the Four Discriminant Functions.

<table>
<thead>
<tr>
<th>Name of Variable</th>
<th>Scaled Canonical Variates</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Decrease of visits due to crowding</td>
<td>-0.755</td>
<td>5%</td>
</tr>
<tr>
<td>4 Lack of Desire for meeting others</td>
<td>-0.602 -0.955</td>
<td>5%</td>
</tr>
<tr>
<td>12 Satisfaction with facilities</td>
<td>-0.737 -0.800</td>
<td>5%</td>
</tr>
<tr>
<td>14 Perception of and dissatisfaction with crowding</td>
<td>1.000 -0.721</td>
<td>5%</td>
</tr>
</tbody>
</table>
While canonical variates do not necessarily represent meaningful dimensions like factors in factor analysis, the "weights" of the variables on the dimensions give some indication of importance. The most important discriminant function is variate 1. It is the function which is the best discriminator between the groups. It can be interpreted as perception of and dissatisfaction with perceived crowding, as this variable 'loads' highly on 1.

Table XX illustrates the "linear distance" between the 17 user groups on the first two discriminant functions. This table illustrates that there is very little linear distance between the groups on both discriminant functions. This indicates that classification of user groups in terms of crowding preferences and attitudes is a meaningless classification. The important issue is that when perception crowding and its effects on the recreational experience are being examined, the concept of user group classification has little to offer as a technique for study, since individuals in the same user group perceive crowding differently. Table XXI further illustrates this point. Of the 14 user groups entered in the analysis, only 3.3% were correctly classified.
**TABLE XX**

Generalized Distance Between Groups Showing very little linear separation; therefore User Group classification meaningless.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Discriminant Functions 1</th>
<th>Discriminant Functions 2</th>
<th>Groups</th>
<th>Discriminant Functions 1</th>
<th>Discriminant Functions 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Picnicking</td>
<td>-0.026</td>
<td>0.118</td>
<td>Camping/Canoeing</td>
<td>0.122</td>
<td>-0.700</td>
</tr>
<tr>
<td>Swimming</td>
<td>-0.345</td>
<td>0.006</td>
<td>Boating</td>
<td>-1.343</td>
<td>-1.805</td>
</tr>
<tr>
<td>Camping</td>
<td>-0.015</td>
<td>0.074</td>
<td>Canoeing</td>
<td>-0.570</td>
<td>-0.600</td>
</tr>
<tr>
<td>Walking for pleasure</td>
<td>0.399</td>
<td>0.356</td>
<td>Water Skiing</td>
<td>1.505</td>
<td>-0.458</td>
</tr>
<tr>
<td>Driving for pleasure</td>
<td>0.923</td>
<td>0.036</td>
<td>Fishing</td>
<td>0.042</td>
<td>0.440</td>
</tr>
<tr>
<td>Sightseeing</td>
<td>0.572</td>
<td>-0.135</td>
<td>Cycling</td>
<td>2.096</td>
<td>-0.253</td>
</tr>
<tr>
<td>Hiking</td>
<td>0.659</td>
<td>-1.545</td>
<td>Tennis</td>
<td>-0.103</td>
<td>-1.459</td>
</tr>
</tbody>
</table>
### TABLE XXI

Change in Grouping of User Groups

<table>
<thead>
<tr>
<th>Group Membership</th>
<th>Before Analysis</th>
<th>After Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>84 67 24 12 17 13 2 3 3 3 7 3 3</td>
<td>P  S  C  W  D  E  H  N  B  K  I  F  Y  T</td>
</tr>
<tr>
<td></td>
<td>0  0  4  5  11  0  0  26  2  10  1  12  5  8</td>
<td>0  0  4  13  4  1  1  12  3  13  1  8  1  6</td>
</tr>
<tr>
<td></td>
<td>C  0  0  2  1  0  0  8  2  3  2  2  2  2</td>
<td>D  0  0  0  0  0  0  0  0  0  1  0  0  0</td>
</tr>
<tr>
<td></td>
<td>W  0  2  0  2  0  0  1  0  4  0  1  0  0</td>
<td>E  0  0  0  0  0  0  0  0  0  2  0  0  0</td>
</tr>
<tr>
<td></td>
<td>D  0  0  0  0  0  0  0  0  0  2  0  0  2</td>
<td>H  0  0  0  0  0  0  0  0  0  0  1  0  0  0</td>
</tr>
<tr>
<td></td>
<td>E  0  0  0  0  0  0  0  0  0  0  0  1  0  0  0</td>
<td>N  0  0  0  0  0  0  0  0  0  2  1  0  0  0</td>
</tr>
<tr>
<td></td>
<td>H  0  0  0  0  0  0  0  0  0  0  0  0  1  0  0  0</td>
<td>B  0  0  0  0  0  0  0  0  0  1  1  0  0  0  0</td>
</tr>
<tr>
<td></td>
<td>K  0  0  0  1  0  0  0  0  0  0  0  0  0  0  0  0</td>
<td>Y  0  0  1  0  0  0  0  0  0  0  1  0  0  0  0  0</td>
</tr>
<tr>
<td></td>
<td>I  0  0  1  0  0  0  0  0  0  0  0  0  0  0  2  0</td>
<td>T  0  0  0  0  0  0  0  1  0  0  1  1  0  0  0  0</td>
</tr>
<tr>
<td></td>
<td>F  0  0  0  1  0  0  2  0  1  0  0  0  0  0  0  0</td>
<td>P  S  C  W  D  E  H  N  B  K  I  F  Y  T</td>
</tr>
</tbody>
</table>

(See Table XVII, Page 77, for explanation of symbols used for user groups)
User groups is not a very meaningful way of examining perception of crowding by day users. It was thought that a broader classification that involved users with the same disposition towards their resources would provide a more significant means of looking at users in terms of perception.

A major group was formed by grouping together all people using the lake most intimately. This included people who boated, canoed, water skied, fished and swam. A second group was formed by aggregating activities intimately connected with land and water resources. In this group were included the following user groups: camping, camping/canoeing, hiking, walking for pleasure, and picnicking. The third and final group consists of activities less intimately related to resources. These include driving for pleasure, cycling, tennis and sightseeing.

The 17 variables used in the first discriminant analysis were also used in a second analysis but, in this case, the three groups outlined above were employed to classify day users. Discriminant analysis revealed three roots or three discriminant functions. The first root had an eigenvalue of 0.111 and contributed 73% of the variance in the data. Variable 14, the fact that people were dissatisfied because they perceived that the site was too crowded, appears once again as the best discriminant variable. That is, it is the variable which maximally discriminates between the three groups.

It should be noted that the second classification using three groups is a much better classification; 44.44% of the groups were correctly classified. The three groups have as their underlying dimension that people grouped in this way probably have the same view towards their resources. However, classification is far
from perfect and there is obvious need for refining, but it does form a better classification as it tries, but very crudely, to aggregate people in terms of their view towards their perception of their recreational environment.

TABLE XXII
Change in Grouping of New Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>A - Water based activities</th>
<th>B - Land and water based activities</th>
<th>C - Land based activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original grouping</td>
<td>82</td>
<td>125</td>
<td>36</td>
</tr>
<tr>
<td>After analysis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- illustrates A</td>
<td>49</td>
<td>10</td>
<td>23</td>
</tr>
<tr>
<td>change in B</td>
<td>52</td>
<td>31</td>
<td>42</td>
</tr>
<tr>
<td>grouping C</td>
<td>6</td>
<td>2</td>
<td>28</td>
</tr>
</tbody>
</table>

From Table XXII it can be seen that groups A and C were the groups that were best classified as at least 50% were retained in the group after analysis. In the case of Group A, most people using the lake found it crowded. Dissatisfaction with crowding is the best discriminatory variable and Group A has the least change; most lake users perceived the lake too crowded.

Group C, people who use the resources less intimately, also retains 50% in the group after analysis. People who use resources at the park less intimately probably have the same feelings towards the park resources. On the other hand, Group B was a very bad classification in terms of how users of both land and water feel towards the resources.
While this second classification forms a better one than the original user groups, it is still not a very efficient one. One could speculate the reason as being that this group is a very broad and general one of how people feel towards their recreational environment in terms of the resources they use.

More significant classifications are needed if peoples' satisfactions are to be included in recreational planning. It is significant to point out that of all the variables entered in the analysis the variables which were the most significant in terms of distinguishing between groups were variable 14, dissatisfaction with crowding; and variable 2, decrease of visits to the site due to crowding.

It is significant that dissatisfaction with perceived crowding is the most important discriminatory variable in both instances. People were obviously dissatisfied with crowding and people who used the lake most intimately were the ones who felt this most.

Summary

The analyses serve to substantiate that perception of crowding does exist, but more so for day users than for campers; that density is related to perception of crowding and that as density increases perception of crowding increases. It also points out that gregariousness or people's desires and preferences are the most significant "individual differences" that mould perception. Activities sought at site, and previous experience, had very little influence on one's perception.
The analyses also serve to substantiate that perception and satisfaction is a better way of looking at users that come to these parks than is the "classical" method of user groups. User groups tell us little about what users feel towards the resources they use and the recreational experience in general.
Chapter V

SUMMARY AND RECOMMENDATIONS

SUMMARY

The hypothesis proposed in this study was that parks in the Fraser Valley are crowded, that people perceive this crowding, and that as a result their recreational experience has diminished. The analysis of the previous chapter indicated that perception of crowding does exist among users of Golden Ears and Cultus Lake Provincial Parks, but more so for day users than for campers. The analysis also substantiates that density is related to perception of crowding of day users, and that as density increases, perception of crowding increases. Among campers, however, the whole concept of crowding revolves around privacy. The difference lies in the fact that authorities have already taken steps to control numbers among campers.

The research analysis also indicated that individual dispositions towards crowding, or peoples' desires and preferences are the most significant of all the variables that influence perception of crowding. On the other hand, 'individual differences' described as 'activities sought at the site' and 'previous experience' had very little influence on one's perception of crowding. Variables which describe these categories were only weakly and partially correlated with perception of crowding.

Variables that were related to and influence perception of crowding were those that measured lack of desire of meeting other people, education, age, and inability to find accommodation. On the other hand, variables that were related to
density were 'site variables' such as weather, period of the season, and time of arrival. This finding served to substantiate the hypothesis that perception of crowding is a psychological phenomenon, conditioned by certain characteristics of the individual.

It is also of interest to point out that when planning in terms of satisfaction of users, the concept of user groups tells us very little about the meanings people attach to their recreational experience, and it suggests that some other technique of looking at users be employed when perception, attitudes and satisfaction are under consideration.

Relevance of Study to Previous Empirical Work:

Brougham (1969) conducted a study to evaluate the impact of increasing numbers of people upon the quality of the recreational experience. His study was conducted at a particular spot on Pinery Provincial Park Beach in Ontario. Brougham also postulated in his study that 'certain' socio-economic variables would modify perception.

It is important, however, that one make a relevant choice of socio-economic variables when studying crowding in the recreational environment. Socio-economic variables that measure one's experience, such as age and education, were found in this study to be significant ones in modifying perception. Brougham's choice of variables were "too crude" to be used as measures "affecting" perception of crowding. Variables such as years spent in a foreign rural environment, years spent in Urban Canada, years spent in rural Canada, are not a relevant choice of variables
when studying crowding. Brougham concluded that the degree of perception of crowding was not a function of actual intensity of use modified by socio-economic profiles of recreationists. He points out that variables related to privacy and preferences would be more meaningful as measures of perception of crowding.

There is need for research to be directed in the area of finding more precise and significant measures of perception of crowding. Variables that measure peoples' preferences and dispositions towards their recreational environment appear to be of greater significance, as this study indicates.

**RECOMMENDATIONS**

The fact that crowding does exist and is perceived by day users indicates that certain steps must be taken to alleviate the situation. I see the most pressing need at present as better Management Policies. There is also need for a more comprehensive approach to Recreational Planning, one which involves research.

**Management Policies:**

I see these as short term remedial recommendations only. Long term solutions can come about only through effective recreational planning which, at present, is almost non-existent. In terms of management policies, action is needed to reduce crowding among day users at the parks.

It is obvious that there is need to change recreational patterns and to disperse users more evenly. This could be accomplished by allowing only a certain
number of users on a "first come, first served" basis.

Another method of easing crowding could be through encouraging recreational use of private lands and lands owned by other provincial agencies in the Fraser Valley. One hopeful sign is that large timber companies are opening areas to recreationists. Other government agencies that own potential recreation lands could be encouraged to open them up to the public. For example, B. C. Hydro and the Provincial Government are developing a new park at Buntzen Lake, north of Ioco. B.C. Hydro authorities stated that the three-mile-long Buntzen Lake offers good fishing and has several natural beaches. The Parks Branch of the Department of Recreation and Conservation plans hiking trails and picnic sites. This will be the second joint project between B.C. Hydro and the Provincial Government. Stave Lake, near Haney, is being developed for recreational purposes also. In the long run, however, it is only through opening up new lands in the Lower Fraser Valley that relief of pressure will be found, but this should not be undertaken until a recreational plan for the Lower Mainland has been developed. In the interim, methods could also be employed to make people aware of alternative areas, through publicity on radio and T.V., and in newspapers, as well as by maps and roadsigns.

A flexible system of zoning could serve to control the amount of use a particular area receives as well as directing users to areas not being used to capacity. There are areas along the lake front that presently are not being used because of inaccessibility. These areas could be made accessible only to foot traffic, through "rugged" paths, making them difficult to reach by vehicle, the purpose being that those who really want a quiet place and privacy will take advantage of the situation.
There is also a conflict among users of the lake, in terms of canoeing vs. motor boats and water skiers. It would appear that there is need for restriction on outboard motors. There is an even greater need for measuring the capacity of the lake for fishing, sightseeing, boating, camping, skiing and swimming, and imposing certain limits and restrictions. The lake has obviously surpassed its capacity in terms of some of its uses.

Recreational Planning

It is also important to look at the parks in the Fraser Valley in a regional context. The history of recreation planning has been too preoccupied with what people do now as a basis for predicting what they will do in the future. This study shows that user demands seen in terms of user groups tell us little about feelings, desires, or satisfaction of users. Some people obviously attach some meaning to their visits to the park. They were aware of crowding and perceived this as having a deleterious effect on the recreational experience. As pointed out previously, recreation, above any other activity, should be concerned with whether peoples' satisfactions are being adequately met or not.

The fact that people, particularly day users, found the parks overcrowded means that there is some deficiency in the system. Questions must be asked as to whether there are sufficient parks in the system. Is present overcrowding in Provincial Parks a result of inadequacy of parks at the National or Municipal level? A deficiency in one part of the system will have repercussions in another.

This problem revolves around policy making and goal setting. In the field of recreation planning, very little thought appears to have been given to the
problem of setting goals. The present policy is based on outdated objectives. The realization of the increase in leisure and wealth means that a whole new set of factors have to be worked into planning considerations.

When the question centres on user characteristics and goal setting, it is obvious that there is also need for carefully measuring the user's attitudes. It is possible to maximize satisfaction from recreational resources by avoiding unnecessary conflicts among users and tailoring recreational opportunities to meet specific needs. Without information on user attitudes, recreational resource administrators are ill-informed about the real or "effective" demand and cannot make efficient use of resources at their disposal. This directs me to the third need in the recreational field, that of research.

Research

This is, perhaps, one of the most needed facets of the recreational field when one is involved in problems of goal setting. Absolutely no information exists nor has any research been conducted on users of parks in the Lower Mainland.

Quality may be inferred partly by what people do and the areas and activities they choose. However, there is an urgent need for quantitative methods of analyzing visitor attitudes using psychological attitude scales. The very fact that the goal of Provincial Parks is to provide for the enjoyment of people necessitates peoples' attitudes and ideas being co-ordinated in management goals and policies. Research on carrying capacity or optimum intensity of use in Cultus Lake and Alouette Lake Parks is also badly needed. Research can provide insights into what type of activities and users are more likely to suffer because of overcrowding, and
what kind of activities and people can be accommodated in areas where crowding and quality of park use is not an essential part of the recreational experience.

Further investigation is needed into visitor attitudes about overcrowding on the lakes, and conflict of uses. There is need to find out how mutual interference has affected the recreational experience for users, and to establish the carrying capacity of the various uses on the lake.

Research is also needed on management programmes, policies and regulations. In open-ended questions asked in this study people complained about some of the regulations, finding them too strict in many instances. Research is also needed as to fees and information programmes. This study also indicated that day users were unanimously against the idea of having to pay for resources if the occasion arose. There is need to find out if fees could be charged for certain uses, for example, the boat ramp for power boats. This could be one way of controlling overuse by outboard motors on the lake while not actually charging an entrance fee to the park.

Above all, there is need for integration and major reinforcement in the research area by a co-ordinated look at all the present research efforts. While this study is one of the few conducted on visitors to some provincial parks in the Fraser Valley and possibly the only one concerned with visitors' perceptions and attitudes, it has merely broken ground. There is need for more effort in the research field, as this study has merely set the stage to generate further needed research about visitors, their attitudes and perceptions. There is also a need to attack the problem of finding variables which will become more relevant in modifying and defining perception.
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BIBLIOGRAPHY


B. OTHER SOURCES


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Driver, B.L., Elements of Outdoor Recreation Planning, Proceedings of a National Short Course held in Ann Arbor, Michigan, May 6-16, 1968, School of Natural Resources, University of Michigan, 1970.


Lowenthal, David, Environmental Perception and Behaviour, University of Chicago, Geography Paper No. 109, 1966.


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C. GOVERNMENT DOCUMENTS


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British Columbia Department of Recreation and Conservation, Annual Report, 1971, c.c. 51.
We would very much appreciate your participation in this recreational survey by completing the following questionnaire. The purpose of this questionnaire is to find out how you feel about conditions at this site. This information is necessary so that your needs and desires for recreation can be incorporated in the planning of better facilities for campers and day users. Would you be so kind as to fill out this questionnaire and return it before you leave this site. All information will be confidential. Your co-operation will be greatly appreciated.
1. Please check ☑ the outdoor activity you participate most in summer (check only one)
   - Picnicing
   - Hunting
   - Swimming
   - Camping
   - Cottaging
   - Sight-seeing
   - Driving for pleasure
   - Canoeing
   - Water skiing
   - Fishing
   - Hiking
   - Camping/canoeing
   - Boating
   - Canoeing
   - Water skiing
   - Fishing
   - Hiking
   - Camping/canoeing
   - Boating
   - Canoeing
   - Water skiing
   - Fishing
   - Hiking
   - Camping/canoeing

2(a). Do you participate in this activity as often as you would like (please ☑ check one)
   - Yes
   - No

2(b). If yes how often do you participate in the period June to September (please ☑ check one)
   - Once a week
   - On weekdays
   - More than once a week
   - On weekends only
   - Once a month
   - Once a summer
   - Other (specify) ________________

2(c). If no what reasons have you for not participating more often ________________

3. Thinking back to your last camping trip/recreational outing how many hours did you spend on the following activities
   - Using beach
   - Fishing
   - Boating
   - Canoeing
   - Water skiing
   - Swimming
   - Hiking
   - Riding
   - Cycling
   - Sightseeing
   - Getting outdoors
   - Other (specify) ________________

4. Where did you carry out these activities? Please ☑ one
   - Cultus Lake
   - Harrison Lake
   - Other ________________

5. Did you plan your trip to-day mainly to visit? Please ☑ one
   - This general vicinity
   - This park

6. How long do you plan staying? Please ☑ one
   - Less than 2 hrs.
   - 2 hrs.
   - 3 hrs.
   - 4 hrs.
   - 5 hrs.
   - 6 hrs.
   - 7 hrs.
   - 8 hrs.
   - 1 day more
   - 2 days more
   - 3 days
   - More than 8 hrs.
   - Please check one

7. If your visits to this park have increased/decreased in the past five years please say why
   - Increased
   - Decreased

8. Which recreational activity were you specifically looking for when you chose this site. (Please check ☑ one)
   - Relaxing around
   - Picnicing
   - Walking for pleasure
   - Sailing
   - Campsite
   - Nature walks
   - Canoeing
   - Water skiing
   - Other (specify) ________________

9. Where do you live? ☑ Coquitlam  ☑ North Vancouver  ☑ Vancouver  ☑ Other (specify) ________________

10. Is your home located in an (please check ☑ one)
    - Urban apartment
    - Urban single family
    - Suburban apartment
    - Suburban single family
    - Rural apartment
    - Rural single family
    - Other (specify) ________________

11. At what time did you arrive? (please specify day and hour)
    ________________

12. Did you have difficulty finding a
    - Parking space or camping space
    - No difficulty
    Please check ☑ one
Section B  CAMPERS ONLY

1. How many years experience have you had as a camper? (Please □ one)
   □ 0 □ 1 □ 2-4 □ 5-9 □ 10+

2. What shelter type are you presently camping in? (Please □ one)
   □ tent □ house trailer □ station wagon
   □ tent trailer □ pick-up camper □ (other specify)

3. Would you say that the spacing between units in this camp-ground are (Please □ one)
   □ too close □ about right □ too wide

4. What is your opinion of the number of units and number of campers in the camp-ground (Please □ one of a)
   a) number of units □ too □ about □ too □ no few right many opinion
   b) number of campers □ too □ about □ o.k. □ no many right with more opinion

5. Just how do you manage to achieve privacy while camping
   □ camping where there is dense vegetation between sites
   □ choosing a site as remote as possible
   □ other (specify)
   □ privacy not important

6. If you swam/boated/skied at this site please □ the adjective which best described how you felt while carrying out this activity

   ACTIVITY    NOT CROWDED    CROWDED    EXTREMELY CROWDED
   swam
   boated
   skied
   fished

7. Do you feel this area is □ remote □ fairly accessible
   □ off the beaten track □ quite accessible

Section C  DAY USERS ONLY

1. Please check □ one which best applies to you when choosing a site for outdoor activities
   □ where you can see and meet a lot of people
   □ a quiet place with not too many people
   □ quite indifferent to either

2. What is your opinion of the number of picnic tables and number of other picnickers at this site? (Please □ one of a b)
   a) number of tables □ too □ about □ too □ no few right many opinion
   b) number of picnickers □ too □ about □ o.k. □ no many right with more opinion

3. Is there anything about this place you particularly like or dislike?

<table>
<thead>
<tr>
<th>CHARACTERISTIC</th>
<th>LIKE VERY MUCH</th>
<th>LIKE</th>
<th>DISLIKE</th>
<th>DISLIKE VERY MUCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>everything</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nothing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>beach</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>scenery</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lack of crowding</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>facilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>remote</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hard to reach</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>crowded</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Do you feel that this area is (Please check □ one)
   □ remote □ fairly accessible
   □ off the beaten track □ quite accessible

The point is so many people want to enjoy the solitude and beauty of the surroundings that extreme pressures are being put on the surroundings. How do you feel about the area being made available to limited numbers only. (Please check □ one)
   □ not desirable □ very desirable
   □ desirable □ no opinion

PLEASE PROCEED TO SECTION D
1 Information about education plays a vital role in recreation planning. Would you indicate what grade you left school in.

Please check one: 
- never attended school
- kindergarten
- Elementary
- High School
- College

2 Information about income is important for recreation planning, would you give a rough indication of your income before taxes.

Please check one:
- below $2,000 a year
- from $2,000 - $4,000 a year
- from $4,000 - $6,000 a year
- from $6,000 - $8,000 a year
- from $8,000 - 10,000 a year
- from $10,000 - $15,000 a year
- from $15,000 - $20,000 a year
- over $20,000

3 Please indicate your age category
- under 11
- 11 - 16
- 16 - 25
- 25 - 35
- 35 - 45
- 45 - 65
- 65 - 75

4 What are the characteristics of this park that caused you to come here instead of some other recreation area.

- quietness and solitude
- remoteness
- lack of crowding
- close to Vancouver
- other (specify)

5 Do you plan to return to this site this summer?
- yes
- no
- maybe

If answer no or maybe were you
- not satisfied with site
- liked the site but felt it too hard to reach
- liked the site but prefer to visit new areas
- felt the site was too crowded
- felt the site was not remote enough

6 Would you recommend this park to someone else?

If yes its advantages

If no its disadvantages

Thank you very much for your co-operation