

IMPROVING METHODOLOGIES FOR EVALUATING
OUTDOOR RECREATIONAL RESOURCES:
A CASE STUDY OF SALT WATER SPORTS FISHING

by

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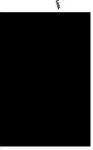
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ABSTRACT

Using a case study of salt water sports fishing in British Columbia, an attempt is made to show that an understanding of perceptions and attitudes in relation to outdoor recreation might usefully contribute towards improving evaluations of recreational opportunities. The analysis is primarily concerned with the uncertainty of how far market prices adequately reflect the demand for and values placed on outdoor recreation facilities. The results indicate that present techniques of measurement probably do not provide accurate evaluations because of their failure to incorporate factors other than recreationists' expenditures as indicators of demand. Furthermore, previous methods have concentrated on socio-economic characteristics as the primary determinants of variations in demand, when in fact other factors such as competing leisure time pursuits and components of the recreation experience are particularly significant in governing the amount of time and money spent on recreation. The results of the study also indicate that the methods used to estimate the value of a recreation opportunity do not reflect adequately the social loss that would result if a particular facility or resource were either removed or lost for recreation purposes. The conclusions reached should help to broaden the theoretical framework for recreation analysis and in so doing assist in the formulation of public policy.

Examiners:



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CHAPTER 1

INTRODUCTION

The past decade has witnessed the emergence of two related phenomena that are likely to have profound influence on the future management of natural resources in North America. These are the burgeoning demand for outdoor recreation and a public clamour for improved environmental quality. Both have resulted from growing affluence, burgeoning population, increasing urbanization, and expanding industrialization. Both pose some extremely difficult questions for planners and policy-makers. In particular they emphasize the need for better means of evaluating alternative uses of resources and of the environment.

Typically, the major criteria used in decision-making relating to resources management have been legal, technical, financial, political, and economic feasibility.¹ Some uses of a resource, for example, are forbidden by law. Some are not possible because technology is not available. Even if technology is available, and the use is permissible, there may not be sufficient revenues in prospect to cover the financial costs of developing the resource. A broader view of the economic feasibility of development would take into account the various gains and costs associated with it, including not only the direct costs of construction and operation, but also the impacts (positive and negative) on other uses of the resource, and on areas affected by the development.² Gradually, there has been a shift from legal and technological criteria towards broader economic criteria.

Theoretically, the application of these criteria should help in decisions relating to conflicting alternative uses of a resource, as well as those concerning how much of a particular commodity to provide. Unfortunately, however, the merits of certain resource uses, and the values of certain goods and services are not easily assessed in terms of such criteria. This is particularly the case with outdoor recreation and environmental quality. These are "public goods", that is, they are goods which the public desires but which are not usually supplied through the normal working of the market mechanism.³ As a consequence, the government generally assumes the responsibility of providing them.

In the absence of market prices, it is extremely difficult to decide how much of a given commodity should be provided, or whether one use of a resource is more desirable than another. It is difficult to decide, for example, how much wilderness area should be provided, or whether it is better to use a particular stream for power production or for migration and spawning of salmon.

Attempts have been made to overcome these difficulties through the development of surrogate measures of values. The question is posed, for example, how much would the consumer be willing to pay, rather than do without the commodity. It is generally assumed that the cost of the least expensive means of providing the commodity sets the minimum value to be placed upon it.⁴ Much progress has been made in the past few years in developing surrogate measures of values of resource uses involving non-market goods and services, notably those concerning flood protection,⁵ and effluent disposal.⁶ Attempts have also been made to improve techniques of evaluating recreational resource uses.

The Evaluation of Recreational Opportunities

There has been a considerable amount of research undertaken in the past decade on outdoor recreation. For the most part it has been descriptive rather than analytical, aiming to outline how much recreation of various types is undertaken, where it is pursued, and who is involved in it. Some attempts have been made to identify factors which influence the demand for recreation, notably the research undertaken under the auspices of the United States Outdoor Recreational Resources Review Commission,⁷ and that undertaken by Resources for the Future Inc.⁸ Results of this research have helped to remove recreation from the category of an 'intangible' resource use, and have enabled planners to weigh recreation with other uses in project plans.

There remain, however, important weaknesses in the assessment of values of recreational resource use. While it is possible through various techniques to assign monetary values to different aspects of the recreational experience, it may be that such assessments do not adequately reflect the satisfactions sought, or the values derived. Models of choice making used for weighing up alternatives for satisfying some needs, such as food, clothing, housing, or heat, may be unsatisfactory for weighing alternatives for satisfying other needs, notably those concerned with mental or spiritual dimensions. A different approach, therefore, may be required for the evaluation of outdoor recreation opportunities.

A Case Study of Salt Water Sports Fishing in Victoria, British Columbia

The present study is intended as a contribution to the search for improved methodologies for evaluating recreational resource opportunities.

It is focussed upon one of the most rapidly growing outdoor recreation activities in North America, salt water sports fishing. Its growth in British Columbia in particular has been spectacular in the past decade. Recent estimates show that there are now at least 150,000 salt water fishermen fishing in British Columbia waters each year.⁹ Possibly as much as ten percent of the province's population now turns to salt water sports fishing as a major recreational pursuit. Such fishing also provides an important attraction for visitors from elsewhere, the United States in particular. In 1966 over 43,000 non-residents engaged in salt water sports fishing in the province.¹⁰

The growth of this form of recreation is not without its problems. In particular it has given rise to conflicts in resource use. There is growing competition between commercial fisheries and sports fisheries. Questions have arisen as to which of these should be given precedence in certain regions.¹¹ At the same time there is increasing pressure to use salmon streams for purposes which would interfere with the migration and spawning of such fish. Log driving,¹² hydro power development,¹³ flood control,¹⁴ and pollution are seen as potential hazards to the maintenance of salmon runs on several rivers in the province. The conflicts on the Stellako, the Puntledge, and the Cowichan are illustrative of such problems. A third area of concern is the mounting call for funds to increase the fishery stock.¹⁵ As the number of sports fishermen has grown, more and more pressure has been placed on fishery managers to improve present migration and spawning areas, to provide artificial propagation facilities, and to invest more money in research. Decisions about the allocation of the resource between different users, about conflicts between the fishery and other uses of the rivers and lakes,

and about the allocation of public funds, are difficult to make because there is great uncertainty about the values involved.

A good deal of research has been undertaken in recent years on the values of the commercial fishery and much improved methods of evaluation have been developed as a result.¹⁶ It is only recently, however, that attention has been devoted to the evaluation of sports fishing. Satisfactory methods have yet to be developed.

It is believed that one of the most urgent needs in connection with the evaluation of sports fishing recreation opportunities is the identification of factors which influence the demand for such recreation.¹⁷ Expenditures on equipment, bait, guides, travel and so on, and time spent fishing provide some indication of the preference for this type of recreation as compared with other types, but they may not adequately reflect the full range of values derived from such activity. Without an understanding of these values, estimates of the demand for sports fishing may be very inaccurate.

The identification of values of recreation is not simple, as is reflected perhaps in the paucity of research undertaken on this subject so far. It involves in particular the consideration of factors which lead to the formation of perceptions of recreation opportunities and attitudes about the use of particular recreation resources as well as about the use of leisure time. Some of these factors relate directly to recreational activity; others relate to it indirectly.

The study reported on here represents an attempt to develop a methodology for the identification of various factors that underlie preferences for different forms of recreation. Specifically, it is focussed upon the factors influencing the individual's choice in making use of his

leisure time in general, and his preference for a particular type of recreation, salt water sports fishing. It also attempts to show that through perception and attitude research an estimate of the broad social value of this particular recreation activity in comparison with other leisure time pursuits, can be derived. The salt water sports fishery in Victoria, British Columbia was used as a case study to illustrate the application of the methodology.

It should be emphasized that the investigation described here represents basic research into the development of a methodology: specifically, the development of techniques of analysis and the introduction of perception and attitude research into the field of outdoor recreation. An attempt is also made to estimate some of the recreational benefits associated with the protection of salt water sports fishing. It is believed that the study will make a contribution to theory relating to the evaluation of non-market goods and services, and that it will help materially in developing more sophisticated methods for weighing competing alternative uses of rivers or fishing grounds, and managing the salt water sports fishery.

While the study presents information about salt water sports fishing, and about such fishing in Victoria in particular, these data must be interpreted within the context in which they were collected. They relate to a sample of sports fishermen in Victoria, all of whom had caught a fish. They leave out of account fishermen who fished but did not catch a fish. They may not reflect perceptions, values, and attitudes of salt water sports fishermen in other areas of British Columbia or elsewhere. The study does provide, however, some useful insights into

the types of information that need to be gathered, and it illustrates methods that might be used for obtaining and analyzing such data.

Footnotes

- 1 W.R.D. Sewell, et al, Guide to Benefit Cost Analysis (Ottawa, Ontario: Queen's Printer, 1962), pp. 1-2.
- 2 W.R.D. Sewell, op. cit., pp. 3-4.
- 3 J.V. Krutilla and O. Eckstein, Multiple Purpose River Development-- Studies in Applied Economic Analysis (Baltimore, Maryland: Johns Hopkins Press, 1958).
- 4 W.R.D. Sewell, op. cit., pp. 12-13.
5. J.V. Krutilla, "An Economic Approach to Coping with Flood Damage," RFF Reprint No. 58 (Washington, D.C.: Resources for the Future, Inc., 1966).
- 6 A.V. Kneese and B.T. Bower, Managing Water Quality: Economics Technology and Institutions (Baltimore, Maryland: Johns Hopkins Press, 1968).
- 7 Outdoor Recreation Resources Review Commission, Economic Studies of Outdoor Recreation, Study Report No. 24 (Washington, D.C.: United States Government Printing Office, 1962).
- 8 M. Clawson and J.K. Knetsch, Economics of Outdoor Recreation (Baltimore, Maryland: Johns Hopkins Press for Resources for the Future, Inc., 1966).
- 9 D.A. Benson, Fishing and Hunting in Canada 1961: A Report on an Economic Survey (Ottawa, Ontario: Queen's Printer for the Canadian Wildlife Service, National Parks Branch, Department of Northern Affairs and Natural Resources, 1963).
- 10 Economics Branch, Department of Fisheries of Canada, Salmon Sport Fishing in the Tidal Waters of British Columbia 1966 (Vancouver, British Columbia: Department of Fisheries of Canada, 1967), p. 7.
- 11 J.A. Crutchfield and D. MacFarlane, Economic Valuation of the 1965-1966 Salt Water Fisheries of Washington, Research Bulletin, No. 8 (Seattle, Washington: State of Washington, Department of Fisheries, 1968), pp. 46-50.
- 12 The Stellako River in north central British Columbia is important to the fisheries and forestry industries serving both as a spawning ground for fresh water trout and migratory salmon, and also as a means for timber transportation. In 1966 federal and provincial reports were prepared, resulting in conflicting opinions as to the impact of log drives on the spawning grounds.

- 13 The building of hydro-power dams have affected anadromous fish on the Puntledge River, Seton Creek, Ash River, Bridge River, Campbell River and the Cheakamus River. Several power dams on the Kootenay River have not affected the runs of salmon and steelhead since these supplies were cut off through earlier construction of large dams on the Columbia River in the United States.
- 14 Research by both the provincial and federal governments has recently focussed upon the problems of flood control measures and migratory salmon on the Cowichan River, Vancouver Island.
- 15 The B.C. Wildlife Federation, local Fish and Game Clubs, Conservation groups, and the United Fishermen's and Allied Workers' Union have called for increased funding to maintain and increase fishery stocks.
- 16 J.A. Crutchfield, "Valuation of Fishery Resources," Land Economics, Vol. 38 (1962), pp. 145-154.
- 17 W.G. Brown, A. Singh, and E.N. Castle, An Economic Evaluation of the Oregon Salmon and Steelhead Sport Fishing, Technical Bulletin 78 (Corvallis, Oregon: Agricultural Experimental Station, 1964), p. 10.

CHAPTER 2

THE STATUS OF RESEARCH ON THE EVALUATION OF OUTDOOR RECREATION

INTRODUCTION

There has been a burgeoning of outdoor recreation research in the past few years and there is now considerable literature on the subject. The major contributions have been made by geographers and economists although some work has been conducted by sociologists and psychologists. Most of the advances in theory, however, have come from economic research. Geographic studies have been dominantly concerned with recreation patterns, such as descriptions of the use of recreational resources or tourist movements. Economic studies, on the other hand, have attempted to measure the demand for outdoor recreation and the value of the recreation experience.

Helpful as such geographic and economic research has been, there remain gaps in understanding about the demand for recreation. Planners are not equipped with techniques to make accurate measurements of present and future demands, and thus cannot adequately evaluate the need for recreational resources, nor are they able to appreciate the success of present facilities in meeting user satisfactions. The purpose here is to review the nature of the research effort to date, and to show the need for further research that might usefully contribute towards improving evaluations of recreational opportunities, and in so doing assist in the formulation of public policy.

NATURE OF THE RESEARCH EFFORT

A convenient approach to review the literature on outdoor recreation is to categorize the research effort into two broad groups: those studies that are focussed mainly on the recreational resources themselves, and those concerned with the users of the recreational opportunities. Such a grouping is not all-encompassing since there have been significant contributions relating to recreation resource administration,¹ and attempts to develop new methodologies for recreation analysis.² There have also been a number of surveys of the literature.³ It will, however, serve the purposes of this particular chapter.

Recreational Resource Oriented Research

Considerable effort has been placed on studying the natural resource base, mainly because governments are concerned about the acquisition, maintenance, and development of recreational resource supplies. Basically these studies have been explanations of patterns of recreational use. As early as the 1930's there was growing alarm over the decrease in availability of recreational resources, particularly waterfront property.⁴ Pressure on natural resources gradually led to increased attention being devoted to the multiple purpose development of resources.⁵ Today, this concept remains crucial in the planning of parks, forests, wilderness areas, and water resources. It has attracted considerable attention from such economists as Krutilla,⁶ Eckstein,⁷ Clawson,⁸ Knetsch,⁹ and more recently, Pearse.¹⁰ They have written on the importance of recreation in resource use planning and the need for methodologies to evaluate the benefits of recreational resource development.

Geographic research, on the other hand, has tended to emphasize

recreational land use, the regional impact of recreation facilities, and tourism. Wolfe,¹¹ Glickson,¹² and Brooks,¹³ have made significant contributions in land use studies, although the Canada Land Inventory conducted under the authority of the Agricultural and Rural Development Act is probably the most prominent research of this kind in Canada.¹⁴ Ullman¹⁵ emphasized the importance of recreation in regional growth and his concern has led to further work in this area by geographers. Attempts have been made to study the economic impact of tourism, recreation activities, and resorts on the regional economy.¹⁶ Meanwhile there has been a growing concern about the lack of research on urban recreation, and the importance of parks to the urban community.¹⁷

In summary, the lack of knowledge about the availability of resources for recreation, and the impact of recreational facilities necessitates resource oriented research. However, the emphasis has focussed on the attractive and magnetic power of the recreation site and its economic impact, rather than on its proximity to metropolitan centers and its utility to the public--the generators of demand. Appreciation of the importance of the latter dimension has resulted in a shift in effort in the past decade to study the participants in outdoor recreation rather than the resources themselves.

User Oriented Research

Research on outdoor recreationists has followed four approaches: determining the need for outdoor recreation by different social groups and society as a whole; analyzing user perceptions, attitudes, and preferences; studying the movement and distribution of recreationists; and, quantifying the demand for and value of the recreation experience.

Clawson has probably placed the greatest emphasis on the effects of increased leisure time on society and the resulting demand for recreation facilities.¹⁸ His work has been supplemented by sociological studies stressing the importance of outdoor recreation facilities to human welfare.¹⁹ Others have stressed that there are many factors, in addition to increasing leisure time, involved in the demand for outdoor recreation.²⁰ Attempts have also been made to focus on the motivations in the desire to recreate.²¹ These, however, have centered mainly on the psychological motivations--considerations of "innate drives".²² Research has also been conducted on the socio-economic characteristics of outdoor recreationists,²³ and the relationship between social class and preferences during leisure time.²⁴ Probably the most profound research on the relation of socio-economic characteristics and outdoor recreation are those studies conducted under the United States Outdoor Recreation Resources Review Commission.²⁵ These have been influential in stimulating today's growing emphasis on the necessity for careful analysis of the social structure of a region in the development of the recreational resource base. This trend is presently being extended to stress the need for an understanding of public preferences in recreation planning.

Developing an awareness of public preferences in outdoor recreation is dependent on researching people's perceptions and attitudes. To date, there has been very little attention devoted to this area of research and its relationship to understanding recreationists' responses to the physical environment. However, a number of researchers, particularly geographers, have already contributed useful studies in this connection. Lucas pioneered this type of research when he studied recreationists' perceptions of 'wilderness' in the Boundary Waters Canoe

Area, Minnesota.²⁶ Priddle used the same approach in Algonquin Park, Ontario, and found similar results.²⁷ Both studies emphasized that wilderness managers would be better prepared to manage recreational resources once aware of the marked variations in wilderness perception among people from different backgrounds and from different user groups.²⁸ Among the other few researchers involved in perception and attitude studies, the most sophisticated research is that conducted by Shafer.²⁹ He has attempted to quantify a few pre-selected qualitative values of wilderness reaction in an attempt to develop some understanding of perceptions of the recreational environment. Although these studies are few in number, it is anticipated that with improvements in measurement techniques, and with an appreciation of the role that peoples' perceptions play in recreational-management decisions, this type of research will make important contributions to outdoor recreation research.

The majority of geographers interested in recreation studies have focussed upon tourist movement patterns. Wolfe,³⁰ Stanton,³¹ Ellis,³² Van Doren,³³ and Deasy and Griess³⁴ in particular have contributed to a better understanding of such patterns. In the main, these studies have been explorations of tourist distribution patterns in an effort to understand the spatial implications of recreation movements. Economists have gone one step further in an attempt to incorporate such patterns into theory to evaluate the recreation experience. They have recognized the need to study not only the patterns of recreational participation and land use, but also to utilize such studies to establish a value for outdoor recreation within the broad context of resources management. Without an appreciation of the demand for and

value of outdoor recreation, planners are at a loss to choose between alternative uses of a particular resource. It has been the economists' efforts in this regard that have provided the most voluminous and, to date, the most significant contribution to recreation analysis.

METHODS FOR EVALUATING RECREATIONAL RESOURCES

Conceptual schemes have been developed which assign monetary values to recreation. A variety of techniques have been proposed. These include the use of interviews and surveys to test the participants' willingness to pay for specific outdoor recreation services (often referred to as the direct method), and the use of these same research techniques to simulate a system of prices and attendance on the basis of travel costs incurred by visitors coming from various distances to a recreation site (commonly regarded as the indirect method). They have been reviewed in detail elsewhere,³⁵ and there is no point in presenting a lengthy discussion here. It will suffice for present purposes to point out some of the characteristics of studies undertaken in the field of outdoor recreation evaluation in general, and those concerned with salt water sports fishing in particular. It is important to note here that this particular study collected information that could have been analyzed on the basis of either the direct or indirect approaches mentioned above. It was decided, however, to use an alternative to these two.

Methods Relating to Outdoor Recreation in General

Cost Method

One of the earliest attempts to place a value on recreation was that based on the cost of facilities. This method assumes that the value of any recreational facility is equal to the costs involved in developing

it. It was contended, for example, that "A reasonable estimate of the benefits arising from a reservoir itself may be normally considered as an amount equal to the specific costs of developing, operating, and maintaining the recommended facilities."³⁶ There are several basic weaknesses, however, in this method.³⁷ The most obvious one is that any recreational resources project could be justified, regardless of whether the resources involved might be better employed in other uses. Another is that it provides no means of ranking projects.

Expenditures Method

The expenditures method has received perhaps the widest use of all evaluation techniques. It attempts to measure both the value of recreation to the recreationist and the value of the recreation to the local area in terms of the total amount spent on recreation by the recreationist. It is based on two assumptions: the value of the recreation is worth at least as much as the recreationists' expenditures in the pursuit of the activity; and the amount spent for recreation is determined by free choice over other alternatives to spend or save the same sum of money.

These arguments have been supported by several economists. Crutchfield, for example, has suggested that where people choose to spend money on a particular recreation activity it is possible to infer that they value the activity at least as highly as other goods and services that could have been purchased with the same amount.³⁸ It could be argued, however, that if a particular recreation activity were lost, expenditures would be directed to other goods and services. The expenditures method tells us nothing of the substitute pursuits that would

replace the activity. It does not assess the loss in a move from a particular recreation pursuit to alternative uses of the money. Loss, in a shift where the recreationist is forced to some second choice, would not equal total expenditures but some other amount which total expenditures by themselves do not measure. The expenditures method only indicates minimum values placed on recreation pursuits: it does not indicate total values.

Gross National Product Method

Attempts have been made to measure the contribution of recreation to GNP, assuming recreation as a factor of production or something which stimulates production.³⁹ This approach rests on the contention that the value of a day spent in recreation can be assumed to be (on the average) equal to the GNP divided by the total population multiplied by the number of days in the year.⁴⁰ It does not seem reasonable to treat recreation as a factor of production. It is essentially a consumer good, even though its pursuit may incidentally lead to increases in productivity.⁴¹

Value Added Method

Another method of estimating recreational benefits is to determine the value added in a given area because of the presence of a given recreation facility. The method is based on the gross expenditures method, but recognizes that all the money received from the recreationists does not fall into the category of profit, but in reality is only a part of gross income, which must in turn be divided into operating expenses and profits.

Value added estimates of this kind meet some of the major objections levelled at gross expenditures data. They do indicate the volume of

business within a province or local area and they are more directly comparable with similar data from other economic activities. Nevertheless these amounts are spent, not for the provision of the recreation opportunity as such, but for the provision of other services connected with the use of the recreational opportunity.⁴² Consequently, they provide only a partial indication of the value of the recreation to those who participate in it.

Travel Costs and Consumer Surplus Method

One of the more popular evaluation theories relies on the travel costs incurred by visitors coming from various distances, and the frequency of visits from those distances.⁴³ Most of the research undertaken in this connection has aimed at developing demand schedules for given recreation facilities. This approach involves predicting the participation rate of a particular group of recreationists, from a given distance range, after establishing a hypothetical toll for access. This is achieved by referring to the observed participation rate from similar populations with travel costs equal to those of the group in question plus the toll. By applying these predicted participation rates at various levels of toll to the number in the population, a demand schedule can be constructed for each population group, and these can be added to yield an aggregate demand schedule for the recreational resource.⁴⁴

The differential costs associated with the use of a particular recreation facility by recreationists located at various distances from the site have been used as surrogate measures of prices. Those who live closest to the site have to pay less than those who live further away, and as such they enjoy a consumer's surplus over the latter. The difference between the price paid by local consumers and those from

furthest away provides a measure of the potential recreation benefit.

Hotelling expressed these ideas in a simple model of recreation demand. His basic thesis was that travel cost was an indicator of values of recreation derived. In his now famous letter to the Director of the United States National Park Service he suggested that:

. . . concentric zones be defined around each park so that the cost of travel to the park from all points in one of these zones is approximately constant. The persons entering the park in a year, or a suitably chosen sample of them, are to be listed according to the zone from which they come. The fact that they come means that the service of the park is at least worth the cost, and this cost can probably be estimated with fair accuracy. If we assume that the benefits are the same no matter what the distance, we have, for those living near the park, a consumers' surplus consisting of the differences in transportation costs. The comparison of the cost of coming from a zone with the number of people who do come from it, together with a count of the population of the zone, enables us to plot one point for each zone on a demand curve for the service of the park. By a judicious process of fitting it should be possible to get a good enough approximation to this demand curve to provide, through integration, a measure of the consumers' surplus resulting from the availability of the park. It is this consumers' surplus (calculated by the above process with deduction for the cost of operating the park) which measures the benefits to the public in the particular year. This, of course, might be capitalized to give a capital value for the park, or the annual measure of benefit might be compared directly with the estimated annual benefits on the hypothesis that the park area was used for some alternate purpose.

The problem of relations between different parks can be treated along the same lines, though in a slightly more complicated manner, provided people entering the park will be asked which other national parks they have visited that year. In place of a demand curve, we have as a result of such an inquiry, a set of demand functions. The consumer surplus still has a defining meaning, as I have shown in various published articles, and may be used to evaluate the benefits from the park system.

This approach through travel costs is one of several possible modes of attack on this problem. There are also others, which should be examined, though I think the method outlined above looks the most promising. 45

Modifications to the Travel Cost Method

Several researchers have suggested improvements to the Hotelling

method. Clawson, for example, broadened its theoretical foundations and presented additional suggestions for measuring recreation values.⁴⁶

He proposes the derivation of a demand schedule for the total recreation experience⁴⁷ by plotting the relationship of the number of visits per 100,000 population to a recreation site and the travel costs per visit based on Hotelling's method. He assumed that the visit to the recreational site was the main purpose of the trip and, therefore, had to bear all costs of the trip, allocating to other activities on the trip only those costs additional to the main trip. By assuming that various prices were to be charged for entry to the recreation site he constructed a series of demand curves to show the effects that these prices would have on attendance and revenue that might be expected. This is accomplished by assuming that the differences in the rates of use between various distance zones is caused by differences in the money costs of visiting the site. By the use of this method it is possible to establish a figure that would yield the highest economic returns to the owners of the facility or to set a net worth of the recreation site that might be compared with that which could be realized from other resource uses.

In more refined applications the populations are stratified by other variables in addition to travel costs such as income and family size. One major criticism of such approaches is their assumption that not only the recreationists but also the whole populations from which the recreationists are drawn have similar characteristics and preferences. They involve predicting participation rates for population groups at different prices from observed relationships between participation and the explanatory variables associated with the participating recreationists.

Pearse criticizes this methodology stressing the difficulties in accurately identifying and quantifying all the variables that are likely to influence demand for a particular recreational opportunity, particularly where participants are drawn from widely dispersed population groups.⁴⁸ In his study of Big Game Hunting in the East Kootenay region of B.C. all his data were restricted to observations about recreationists themselves, and the analysis was based only on actual participants.⁴⁹

Willingness to Pay Method

The methods outlined so far all relate to the indirect approach to recreation evaluation. The direct approach differs in that it involves asking the recreationists how much they would be willing to pay for the right to participate in the activity. The best known work in this area is that by R.K. Davis in his study of big game hunting in private forests in Maine.⁵⁰ This study involved the establishment of demand curves on the basis of a bidding game in which respondents could react to increased costs of participating. Bids were systematically raised or lowered until the recreationist decided either to participate or not, or vice versa. This approach suffers from its use of hypothetical questions. Respondents' lack of consideration of other determining factors on participation, the novelty of the 'game', and the emotionalism toward recreation would tend to reduce the validity of the findings.

Methods Relating to Salt Water Sports Fishing

Attempts to measure the benefits of recreational salt water fishing have made significant contributions to the improvement of methods of evaluating outdoor recreation. Brown, Singh, and Castle's work on the Oregon salmon-steelhead fishery expanded the basic Hotelling-Clawson

model to encompass additional variables. In addition to the price variable they included distance and income. They found that income exercised a positive effect on the number of angler days spent on sports fishing. Distance acted as a "shifter" of the demand function in a negative fashion, indicating that the time factor exercises an effect over and above its role as related to the monetary costs. They also introduced the concept of "transfer costs", defined as ". . . those costs incurred by the buy or seller of goods, but which are not normally included in the prices."⁵¹ Their study also formalized a decision model for fishermen. It was based on equating the marginal transfer costs of obtaining an additional unit of recreation experience with the marginal utility or satisfaction from the experience to determine individual consumer equilibria. The marginal cost curve rose in a positive manner and the marginal utility declined as additional units of recreation were obtained to establish a point of intersection where the two functions resulted in an equilibrium.

Stevens expanded Hotelling's theory by including the "quality" of the recreational experience as an important determinant of the demand for salt water sports fishing. He defined "quality" as ". . . the angler success per unit of effort, as anticipated or experienced by the angler."⁵² Singh revealed some basic relationships involved in fishermen's demand for sports fishing by tracing family income, education, age, and fishing experience as factors influencing the degree of willingness to pay an increased salmon-steelhead licence.⁵³

Crutchfield and MacFarlane in their economic valuation of salt water fisheries in Washington chose to measure value on the basis of gross expenditures by sports fishermen, their contribution to incomes in the

State, and the net benefits generated by the sports fisheries. They state that:

For comparison with other water uses and as a basis for a more rational division of the salmon catch between sport and commercial fishermen, the net economic benefit concept is of primary importance. The net economic value of sport fishing relates to the value of the recreation experience, and cannot be inferred directly from data now available. It is, therefore, necessary to simulate a demand function measuring the number of user-days that would be forthcoming if the right to participate in sport salmon fishing were priced at different levels, with other factors determining the satisfaction derived from sport fishing (such as income, population, and quality of fishing), taken as given. It would then be possible to determine the combination of price and user days that produces the largest net benefit that the fishery can yield in recreational usage, or expressed in other terms, the true net loss to the economy if the fishery were to be eliminated. 54

In this study Crutchfield and MacFarlane attempt to combine certain factors governing demand in a simplified analytical formulation that illustrates the nature of the variables involved. They assume that per capita income is an important determinant of angler activity, that income elasticity of demand for sports fishing remains constant through time, and that angler success is an important factor in demand. Their model shows that population growth and rising per capita income both tend to increase the demand for sports salmon fishing through time. However, they point out that it is a gross oversimplification to assume income elasticity of demand for sports fishing and success elasticity will remain constant over time. Their model, at best, describes demand behaviour for sports fishing around the range of values that particular variables have taken in recent years. It seems probable that after income has reached a certain level, or when angler success begins to change markedly, behaviour patterns will alter in ways which now cannot be estimated accurately.

Implications and Results of Recent Studies

A variety of methods for evaluating non-priced recreation and for deriving demand curves for outdoor recreation have been reviewed above. The techniques of analysis have been categorized under the "direct" and "indirect" approaches, each attempting to analyze the recreationists' willingness to pay for access to a particular facility and to establish demand curves for outdoor recreation. In addition, several early methods of establishing measures of recreational benefits such as the 'cost', and the 'value added' methods, were reviewed. It is the former approaches, however, that are now the most popular and widely used.

As noted earlier the direct method used by Davis⁵⁵ suffers from several weaknesses. One of these is the fact that willingness to pay is governed directly by the recreationists' ability to pay. Another deficiency is that the bidding game used in the method is based on many assumptions that the typical recreationist fails to incorporate into his decision. For example, the game does not consider such factors as probable substitute activities, lack of experience with the problem, or possible constraints on recreational participation.

The indirect approach, on the other hand, assumes that the recreationists' response to increased user fees would be the same as their response to increased travel costs of the same magnitude. Also the costs of travel are assumed to be incurred entirely for participation in the particular recreational opportunity studied. This negates the importance of those attractions visited while travelling to the recreation site, and also the possibility of enjoying the driving experience.⁵⁶ Finally, these methods consider all people in the population to have the same characteristics and preferences. To overcome this latter deficiency more

recent studies have attempted to incorporate such variables as income levels, substitute recreation possibilities, and the effect of congestion in the predictive equations. To date, however, the methodologies developed have been limited not only by problems of measurement, but also by the fact that relatively few variables, other than distance, have been considered.⁵⁷

The foregoing discussion emphasizes that it is extremely difficult to evaluate recreational opportunities, and to make predictions about potential demands for them. Progress in overcoming this difficulty hinges upon identifying the key variables that influence the formation of tastes and habits, and upon measuring them in a consistent fashion and over a long enough period of time.

The question is, then, what are the key variables? From earlier studies it would appear that income, occupation, and education play an important role in determining preferences and the amount of time and money spent in outdoor recreation.⁵⁸ Economic evaluations have yet to successfully incorporate these variables in demand schedules. Furthermore, it is not known whether these same factors are as significant in determining demand for specific recreational activities, such as salt water sports fishing. Nor is it certain if these same factors influence the rate of investment, the frequency of participation, or the significance of the activity within the broad realm of leisure time activities, in the same way. To date researchers have relied on investment figures as the measure of demand for outdoor recreation. It is suggested here, that since demand is a function, not only of investment, but also of participation and the personal value ratings of the recreational opportunity, emphasis on any one of these, without considering the other two,

will lead to inaccurate estimates of the demand for and value of outdoor recreation.

It is clear that much remains to be learned about the factors that influence the demand for and value of outdoor recreation. It is not known, for example, why people choose particular places or particular pursuits. Nor is it clear what values people place on particular kinds of recreation, or how they weigh up one kind of recreation against another. Furthermore there is uncertainty as to what extent the demands are supply induced. Studies of the recreationists' perceptions, values and attitudes may provide a key to the understanding of such matters. This is particularly the case in salt water sports fishing.⁵⁹ Specifically there is a need for a decision-making model, incorporating those factors that affect choice-making in outdoor recreation.⁶⁰

In summary, studies undertaken to date have been based upon fairly bold assumptions about consumer behaviour. For the most part these have been derived from models that are concerned with goods that enter the normal market mechanism. There remains uncertainty, however, as to how far market prices or calculations of consumer investment in recreation adequately reflect the values of non-market goods and services. There are also complex theoretical difficulties in the use of statistically derived demand curves for the purposes of social evaluation.⁶¹ Such uncertainty can only be reduced by greater understanding of such matters as perception and attitudes, and their influence on human behaviour.⁶² In the case of sports fishing it is important to know more about the nature of the individual participant, his tastes and preferences, the underlying motives in his desire to fish, those socio-economic factors

that influence demand, and the likely readjustments that may result if the fishery were changed substantially in magnitude.

Footnotes

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CHAPTER 3

THE CONTRIBUTION OF ATTITUDE STUDIES TO OUTDOOR RECREATION PLANNING

INTRODUCTION

Until relatively recently planning relating to outdoor recreation resources has been fairly narrow in scope. For the most part it has been focussed upon the weighing of a few factors such as the physical aspects of potential sites, standards developed by professional associations or planning schools, the perceived political acceptability of proposed developments, or representations of pressure groups.¹ The advances made in other fields of resources development planning have been slow in coming to the outdoor recreation resources field. Only in the past few years, for example, have economic evaluations played an important role in recreation planning decisions.² Even today little attempt is made to determine whether the kinds of facilities being developed do in fact provide the satisfactions they are assumed to furnish. Reliance continues to be placed primarily upon the judgments of professional planners rather than on empirical investigations of consumer preferences and behaviour patterns.

There are some important weaknesses in the past approach to outdoor recreation resources planning. For example, it appears that physical attributes of particular sites are viewed in different ways by different individuals, reflecting variations in value systems, and hence the kind

of recreation expected or derived.³ Consequently, rigid application of standards based on experience in areas elsewhere may lead to the provision of facilities which have little relevance to the types of recreation sought by the local populace.⁴ Similarly, response to particular pressure groups may result in the provision of facilities that are satisfactory to them but not to the public at large. Growing demands on the public purse, and increasing conflicts in resource use have led to more emphasis being placed upon economic considerations in planning decisions in the resources field. Outdoor recreation facilities must compete with other claims for public funds, such as schools, hospitals, or power projects. At the same time, improved means of identifying and measuring recreation values are being sought so that the former can be weighed against values attached to alternative uses of the same resource.

Research by social scientists has a useful contribution to make towards recreational resources planning. Chapter 2 reveals that studies by economists have already helped towards this end. It is probable, however, that some of the most significant advances in understanding relating to preferences for recreation will be made through behavioural science research.

CHARACTERISTICS OF THE ECONOMIC MODEL OF CHOICE

Important advances in natural resources planning have resulted from research in two fields: economics and behavioural science. First, the use of economic criteria has introduced greater rigour into the evaluation process. In particular, it has helped in the measurement of goods and services that were long considered "intangible", and has enabled the comparison of alternative uses of resources. Present economic criteria,

however, have some deficiencies especially where non-market goods are involved. Recreation is a case in point. To the extent that recreation involves considerations of environmental quality, decision-making is even more difficult because it concerns the weighing of "incommensurables".⁵ Jarrett has noted, for example, that:

The solution to problems of quality, insofar as they can be agreed on, lie to a large extent outside the influence of the market economy The fact that modern man has a wide range of choices which must be made without the semi-automatic functioning of the market heightens the importance of public attitudes that affect political and private action. 6

The discussion of resource allocation decisions in the public sector by economists has two major characteristics. One has been the development of rules, and supporting analytical techniques to 'optimize' decisions. The basic assumption here is that the decision-maker has a particular object in mind and he acts 'rationally',⁷ free from any constraints, in achieving his given end. The second has been the concern with the normative and positive analysis of the decision-making process, noting those imperfections that result in choices which are not 'optimal'. There is a body of economic literature which now provides outdoor recreation planners with useful guidelines for decision-making. But there remain a number of conceptual and operational weaknesses. These relate mainly to:

- 1) the difficulty of quantifying all aspects of a problem that necessitates the collection of qualitative or subjective information;
- 2) the fact that studies to date have been based upon fairly bold assumptions about consumer behaviour; and,
- 3) the uncertainty as to how far market prices adequately reflect the values placed on market goods and services.

THE CONTRIBUTION OF BEHAVIOURAL SCIENCE

Additional progress in recreational resources planning has resulted from behavioural science research. Attempts have been made to identify the actual values which enter into preferences, and to describe how individuals respond to different kinds of recreational opportunities. This kind of research differs in nature from most of the economic research undertaken so far. The difference is illustrated in the contrast between normative and behavioural models of decision-making.

Normative Versus Behavioural Models

Normative and behavioural models both attempt to explain the selection of alternative courses of human behaviour; the former, however, aims to prescribe what man's behaviour ought to be, while the latter attempts to describe and predict such behaviour.⁸ Normative models help to explain, for example, what one ought to do to maximize one's satisfactions, given certain assumptions about goals and behaviour. Such an approach is especially appropriate where choice is conscious and information is available. Conscious choices involve analyzing the alternatives to reach a particular end, usually specified as profit maximization in the models of economic choice. Behavioural models on the other hand, help to explain how one arrives at decisions, given less restrictive assumptions about the goals sought and alternatives taken into account. This approach is more pertinent where intuition plays a large role, where choice is wide, and where the decision is more habitual or unconscious.

The principal weakness of the traditional economic model lies not in the techniques of measurement but in the assumption that men act rationally in making choices. In many aspects of human affairs men do not

appear to conform to the kinds of decision rules specified in economic models. The assumption is made, for example, that men seek to maximize their satisfactions. Several observers have commented that this is a severe abstraction from the way in which men do in fact make decisions. They have criticized the concept of "economic man", emphasizing that "allowance must be made for man's finite abilities to perceive and store information".⁹ It is argued that men tend rather to seek rewards which are satisfactory. In Simon's terminology men tend to make choices within "bounded rationality" and to "satisfy" rather than "maximize" satisfactions. Simon has described this process as "satisficing".¹⁰

The satisficer model provides an alternative to the rigid constraints of the concept of economic man. Simon emphasizes that "the capacity of the human mind for formulating and solving complex problems is very small compared with the size of the problems whose solution is required for rational objective behaviour--or even for a responsible approximation of such behaviour."¹¹ In most situations an individual will evaluate the range of possible alternatives until he finds one matching a broad class of satisfactory outcomes.

Simon's alternative approach of bounded rationality overcomes some of the weaknesses of normative models of decision-making. He suggests that:

. . . the rationality of an actor requires him to construct a simplified model of the real situation in order to deal with it. He behaves rationally with respect to this model, and such behaviour is not even approximately optimal with respect to the real world. To predict his behaviour we must understand the way in which this simplified model is constructed, and its construction will certainly be related to his psychological properties as a perceiving, thinking, and learning animal. 12

Models of choice-making based on the concept of maximizing satisfactions

seem most appropriate in situations where one can hypothesize substantial conscious choices. The view of rational economic man seems appropriate in such instances. There are obviously many such institutions in the resources management field. There are, however, other instances where choice is less conscious, and where instinctive choice processes are involved. In such cases decision-making models based upon the assumption of "psychological man" seem more appropriate. Such an approach is more suited to descriptive-predictive models of human behaviour. Simon's model of bounded rationality provides a framework which considers man, handicapped by inherent computational disabilities and governed by his societal values, attempting to achieve a satisfactory life for himself in his environment.¹³

THE CHOICE PROCESS IN OUTDOOR RECREATION

Choice-making in recreation may be different from decision-making relating to other resource management problems. It is not clear into which category of choice-making recreation fits. It is probable that in some cases recreation involves conscious or "rational" choice-making and in others instinctive choice-making. Conscious choices are made, for example, when values of alternatives are in fact evaluated in monetary terms. Such may be the case in certain forms of entertainment such as choices between going to the theatre or a hockey game. Other choices are less conscious and the values involved may be quite abstract. The individual may not be aware of certain aspects of the recreation experience which in part help motivate him initially to participate. The distinction between unconscious and conscious choices may be a function of motivation to pursue a particular goal rather than of some class or activity. It is

possible, for example, that as the desire or motivation heightens, so the decision-making becomes more irrational.¹⁴

Given the deficiencies of economic models, and that decision-making with respect to outdoor recreation is often intuitive rather than conscious, behavioural decision-making models may be much more helpful than normative models. The behavioural approach, for example, depends upon an understanding of how people reach decisions and act upon them, rather than specifies how they ought to act, given various assumptions to goals and behaviour. Attitude studies are a key input into cognitive-behavioural models. Such studies can be of considerable value to planners by providing a clearer understanding of how people actually decide whether to recreate or not, what values they take into account in choosing among competing alternatives, and how such attitudes relate to actual behaviour.

THE IMPORTANCE OF ATTITUDE STUDIES

The way in which people perceive resources explains to an important extent the ways in which they use them.¹⁵ Involvement in outdoor recreation, then, is a reflection of an individual's perception of recreational opportunities. Such perceptions are reflections of the individual's value system, his experience, and his attitudes towards the environment.¹⁶ Because value systems, experience and attitudes vary among individuals, there are likely to be considerable variations in perceptions of recreational opportunities, and so of the uses that are made of them. Understanding of the factors which influence perceptions, values, and attitudes, therefore, could lead to considerable improvements in methods of forecasting the demands for outdoor recreation.

Perceptions

Perception may be defined as the ". . . process by which people select, organize and interpret sensory stimulation into a meaningful and coherent picture of the world."¹⁷ Perception of the same environments can vary tremendously among individuals, partly because of the physiological factors involved in the process, and partly because they are reflections of psychological factors and the social experience of the individual. Perceptions may be distorted by conscious or unconscious attempts to avoid elements not in harmony with the individual's attitudes. It is apparent, therefore, that it would be extremely difficult for anyone to have a truly objective perception of the environment, particularly when such perceptions are usually only temporary images of reality.

Values

Values refer to those factors that are imbibed as part of culture. They are something we assimilate, both consciously and unconsciously, from our perceptions of the environment, and the experience and education acquired. They can be secular or religious in origin. They can influence what we perceive and, in turn, have largely been molded by our perceptions.¹⁸

Attitudes

Attitudes may be defined as more permanent ideas about the environment or some particular facet of it. They are a product of one's knowledge and emotions, which in turn depend upon the individual's perceptions and values, and ultimately govern behaviour. Attitudes, therefore, are dependent on the interplay of a variety of factors, whose importance varies both through space and over time. White classifies these factors

as follows--the actual decision situation of the moment, the individual's perception of the environment in which he is forming a preference, his value system, and his sense of efficacy or being able to take some action that would have meaningful or beneficial results.¹⁹ Attitudes toward outdoor recreation may be affected by one or more of these factors, and in turn attitudes will affect the demand for types of recreation.

Perceptions, values, and attitudes are reflected in various ways in the decision-making process.²⁰ The precise connections between the factors themselves on the one hand, and behaviour on the other, are not clearly understood. Without such understanding planners are unaware of what recreationists are seeking, and how they will react to what is provided. Estimates of demands, therefore, typically involve a considerable amount of guesswork.²¹

In summary, the demand schedules that have been developed to date are based on the assumptions that people respond in a linear fashion and that monetary expenditures provide a useful indicator of the values derived. These computations, however, may not represent the total value of the recreational opportunity. It would be difficult to assess, for example, such values as beauty, pleasant living, freedom from stress, and the like, in monetary terms. These values, however, may be of key importance in certain recreational pursuits.

It is possible that a better indication of the values of sports fishing may be found in the kinds of choices that people make when forced to weigh such factors as investment, time, and competing alternative recreation opportunities. This study seeks to identify the extent to which these factors, and others, affect the demand for salt water sports fishing. It is believed that improved understanding of the goals sought

in such recreation, and of the factors that influence actual choices, such as perceptions, values and attitudes, will enable better estimates to be made of future demands, and improved predictions of the impact of changes in the availability of the resource.

Footnotes

- 1 In this sense it has resembled planning in many other fields. See R.W. Kates, "Comprehensive Environmental Planning," M. Hufschmidt, ed., Regional Planning: Challenge and Prospects (New York: Frederick A. Praeger, 1969), pp. 67-114.
- 2 J.L. Knetsch, "Outdoor Recreation Demands and Benefits," Land Economics, Vol. 39 (1962), pp. 387-396.
- 3 R.C. Lucas, "Wilderness Perception and Use: The Example of the Boundary Waters Canoe Area," Natural Resources Journal, Vol. 3 (1964), pp. 394-411. See also R.C. Lucas and G.B. Priddle, "Environmental Perception: A Comparison of Two Wilderness Areas," Annals, Association of American Geographers, Vol. 54 (1964), pp. 428-429.
- 4 G.F. White, "Formation and Role of Public Attitudes," H. Jarrett, ed., Environmental Quality in a Growing Economy (Baltimore, Maryland: Johns Hopkins Press, for Resources for the Future, Inc., 1966), pp. 107-125.
- 5 Non-monetary benefits can be divided into two kinds--intangibles and incommensurables. Intangibles are those which are incapable of any direct quantitative measurement, while incommensurables are those which can be quantified, but not directly in monetary terms. See E.J. Devine, "The Treatment of Incommensurables in Cost-Benefit Analysis," Land Economics, Vol. 62 (1966), pp. 383-387.
- 6 H. Jarrett, ed., Environmental Quality in a Growing Economy (Baltimore, Maryland: Johns Hopkins Press, for Resources for the Future, Inc., 1966), pp. xi and xiv, Introduction.
- 7 Rationality describes the ability to choose objectively and consistently between patterns of human behaviour that will attain a particular goal.
- 8 R.W. Kates, Hazard and Choice Perception in Flood Plain Management, Department of Geography Research Paper No. 78 (Chicago, Illinois: University of Chicago, 1962), p. 14.
- 9 J. Wolpert, "The Decision Process in Spatial Context," Annals, Association of American Geographers, Vol. 54 (1964), p. 537.
- 10 H.A. Simon, "Theories of Decision-Making in Economics and Behavioural Science," American Economic Review, Vol. 66 (1959), pp. 253-283.
- 11 H.A. Simon, Models of Man: Social and Rational (New York: John Wiley and Sons, 1957), p. 198.
- 12 Simon, op. cit., p. 198.

- 13 Kates, op. cit., p. 16.
- 14 Suggested by L. Wundheiler as quoted in Kates, op. cit., p. 18.
- 15 Kates, op. cit., p. 1.
- 16 White, op. cit., pp. 105-108.
- 17 B. Berelson and G.A. Steiner, Human Behaviour (New York: Harcourt, Brace and Co., 1964), p. 88.
- 18 I. MacIver, "Testing People's Attitudes Toward the Environment" (Mimeo, University of Chicago, Department of Geography, 1966).
- 19 White, op. cit., pp. 110-115.
- 20 White, op. cit., pp. 118-125.
- 21 P. Pearse, "Water-Based Recreation Demands," in W.R.D. Sewell and B.T. Bower, eds., Forecasting the Demands for Water (Ottawa, Ontario: Queen's Printer, 1968), pp. 161-193.

CHAPTER 4

METHODOLOGY

CONSTRUCTION OF THE QUESTIONNAIRE

Information for this study was obtained through the use of questionnaires. Two questionnaires were used, one of which was administered by an interviewer, and the other was left to be filled out by the respondent. They focussed upon the individual's use of leisure time and on his participation in recreational salt water sports fishing.

In designing the questionnaires a major concern was to ensure that the instruments did not produce predetermined results, either by omitting unfavourable alternatives in multiple-choice questions or by suggesting desired responses through the phrasing and sequence of questions.¹ To avoid these problems the questionnaires were comprised of a series of alternate-choice questions and open-ended questions ordered in a sequence which tend to minimize the danger of suggested response. However, it is recognized that it is not possible to eliminate all the potential bias from a questionnaire.

Both questionnaires underwent two pre-test examinations to eliminate potential weaknesses. It was found that the use of hypothetical questions did not always lead to useful results. Such questions, therefore, were used selectively in the final version of the questionnaire. In addition, attempts to delve into the individual's total use of leisure time proved to tax the respondent to the detriment of other questions asked. Consequently, fewer questions were asked, and greater emphasis

was placed upon forced-choice questions to obtain the required information.

The pre-testing was accomplished by interviewing a total of twenty salt water fishermen during a two week period. Probably one of the most significant advantages of the pre-test situations was the opportunity to add clarity and uniformity to the questions asked. In addition, a more detailed insight into the problems of interviewing salt water fishermen in their homes was gained.

CONDUCTING THE STUDY INTERVIEWS

Both questionnaires were completed at the respondent's home. The first questionnaire (Appendix A) was administered during a personal in-depth interview which lasted approximately one and one-half to two hours. The second (Appendix B) was left with the respondent to complete during his own time and forward to the researcher. Out of a total of 116 people interviewed during the period between March 18, 1969 and June 15, 1969, 103 returned the second questionnaire. Due to the time limitations it was decided that the first 100 to be returned would constitute the basis of this particular study. The analysis of the results was commenced on August 17, 1969.

Contact with those interviewed was first made through a letter explaining the nature of the study and requesting their cooperation (Appendix C). Following this, the interviewer contacted the respondent by phone to establish a time for interviewing. Upon completion of the second questionnaire a letter of thanks was sent (Appendix D). For those respondents who failed to return their second questionnaire within approximately three weeks after the interview, another letter (Appendix E) was forwarded.

Response to this letter of acknowledgment proved to be particularly rewarding.

Table 1 gives a breakdown of the success in contacting the sample and questionnaire returns. It shows that 88.8 percent of those interviewed returned the second questionnaire. Only 14.5 percent of the total sample contacted by letter refused to cooperate in the study, and another 25.4 percent could not be contacted.

TABLE 1
SUCCESS RATIOS IN SAMPLE SELECTION
AND QUESTIONNAIRE COMPLETION

Total number interviewed	116
Total who refused to cooperate	28
Total number who could not be contacted (due to having moved, sickness, no phone, holidays, etc.)	49
Total sample contacted by letter	193
Total number who returned the second questionnaire	103

Sample Selection

The fact that there is no licence requirement for the salt water sports fishery creates major problems in the selection of a sample. It is practically impossible, for example, to obtain a list of the total number of salt water sports fishermen in any given region of B.C. Such a situation makes it difficult to design a province-wide or regional study that could be relied upon to produce statistically sound results. It was felt that a large scale survey would be worthless until some of

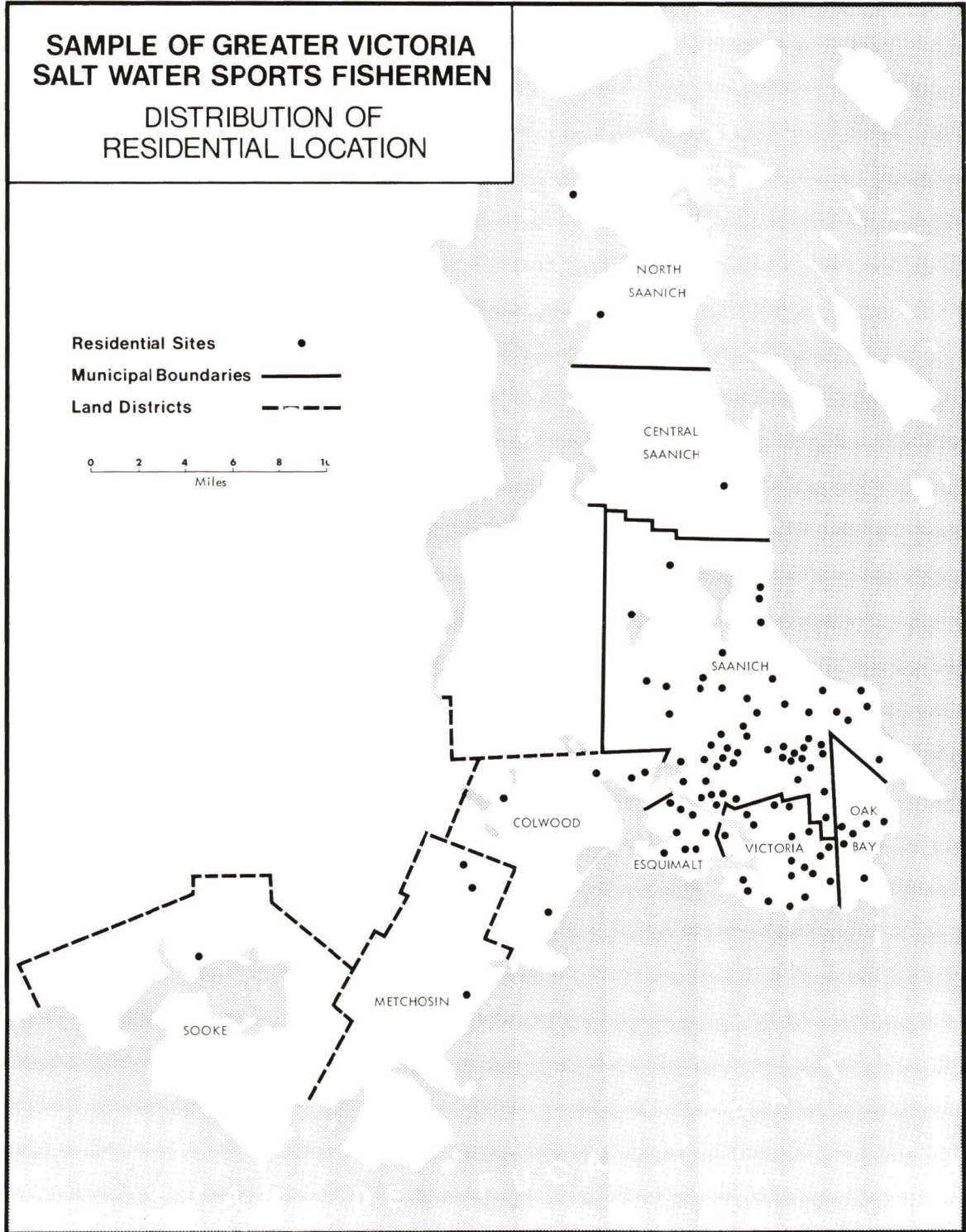
the basic methodological problems had been thoroughly investigated and field tests made on the proposed technique. Accordingly, it was decided to select a sample that would be representative of a particular segment of the sports fishing population.

The universe studied here is based on the 1968 tabulations of the Victoria Daily Colonist King Fisherman Contest which ran from April 30 to October 27 of that year. The sample was taken from approximately 9,600 Greater Victoria residents who caught a salmon and recorded their catch in the 1968 contest. Greater Victoria in this instance, refers to the municipalities of Victoria, Oak Bay, Esquimalt, North and Central Saanich, and Saanich, and the unorganized areas of Colwood, Metchosin, and Sooke (Figure 1).

The study sample was based on a table of random numbers. The selection so derived can be considered therefore as representative of the universe used in the study. Some 193 people were initially selected. Of these, 100 were used in the analysis (Table 1). It is believed that those who could not be contacted, those who refused to cooperate, and those who failed to return the second questionnaire are not systematically distributed, and therefore could not be predicted.

Theoretically the sample is only representative of those participants in the King Fisherman Contest. The results do not provide any information on fishermen who caught no fish at all, nor with those who do not believe in entering their catch in fishing contests, nor with any other types of recreationists. Those individuals in the universe sampled are only a small proportion of the total number of sports fishermen in Victoria. According to studies conducted by the Department of Fisheries, eighty percent of the sports salmon catch in a given year is caught by only

FIGURE 1



twenty percent of the total number of salt water sports fishermen.² There is bias, therefore, in the sample chosen for the study. Nevertheless, the data gathered did enable the accomplishment of the major objective of the study: the development and testing of a methodology for identifying factors which appear to influence recreational choices.

Coding Information

Upon completion of the interviews all the data was coded for analysis. The coding format is explained in detail in Appendix F.

STATISTICAL ANALYSIS

Before any coding, the questions (variables) were divided into those associated with the a priori determined dependent variables: investment and participation in, and personal value of, sports fishing; those determinants of the dependent variables, which hereafter are called independent variables; and those variables which were more descriptive in nature.

The three dependent variables selected were hypothesized as being independent of each other. Investment includes all money spent in the purchase of the present equipment owned. In addition to fixed or durable goods such as rod, reel, boat and motor, variable or current expenses for 1968 were considered. Such current costs included those associated with transportation, lodging, charter boats, guide services, bait, and rental of boats and other equipment.

The amount invested in boat(s), motor(s), and trailer(s) in 1968 was computed by depreciating the cost from the time of purchase by fifteen percent on the declining yearly balance up to 1968.³ Then the amount devoted to salt water fishing alone was calculated, based on the respond-

ent's estimates of the percentage of use in this activity in 1968.

The gear investment was established by the individual's estimate of the replaceable value of his equipment at the time of the interview. Current costs were simply tabulated for the year 1968, excluding food costs.

The total investment figure for coding purposes was the square root of the sum total of investment calculated for 1968. The square root was taken here, and in the case of participation, to de-emphasize the extreme differences, and make the results more typical of the average fisherman.

The second dependent variable, participation, involves the tabulation of the number of visits to a site for the purpose of sports fishing, a technique used in the Clawson, and in the Brown, Singh and Castle studies. As a measure of participation, information was gathered on the number of trips the individual took during 1968. Involvement in the recreational pursuit is postulated as a means whereby participants can be compared, and the benefits of recreation evaluated.

Participation was calculated over four three month periods in 1968: January to March, April to June, July to September, and October to December. The total number of days in each group was added, the means calculated, and then added, and the square root of the total was recorded.

The third variable is the measurement of worth that salt water sports fishing provides to the individual fisherman. Very little work has been done in this area so far, except perhaps the Outdoor Recreation Resources Review Commission⁴ or the user-perception studies of Lucas⁵ and Priddle.⁶ Worth in this study is defined in terms of the participant's rating of fishing as a recreation pursuit. This rating provides a measure of how valuable the activity was to the sports fishermen in 1968. It is not a measure that explains why an individual values sports fishing more highly

than other recreational pursuits. This explanation is provided by the various analyses in the study.

Value was coded on the basis of a rating scale of one to seven. The respondents were asked how valuable the activity was to them on the basis of the scale, seven being very valuable and one being not valuable at all.

Factor Analysis

Preliminary analysis of the simple correlations between the dependent variables--investment, participation, and personal value--revealed that they are positively related, although the relationship was not too statistically 'strong'. For example, the correlations were: investment and participation, .39; investment and value, .35; and participation and value, .44. Accordingly, any one of these dependent variables could have been used in the analyses with the independent variables. However, it was felt that since the correlations were relatively 'weak', the relationships between the independent variables and each dependent variable should be researched and compared. For example, it is possible that different factors are more influential in the determination of investment rather than participation or vice versa.

Factor analysis is a technique that classifies a broad set of variables without any foreknowledge of their structure of independence. It reduces the series of variables, by means of intercorrelation, into a few independent groups which are called factor scores. The technique was used here to validate the measurement techniques used in establishing the a priori determined dependent variables, and to improve upon their validity by incorporating other information that related to investment,

participation, and personal value. Table 2 sets out the variables used in the analysis and the factor scores obtained therefrom.

TABLE 2

FACTOR ANALYSIS OF THE DEPENDENT VARIABLES AND OTHER MEASURES OF SIMILAR INFORMATION: ROTATED FACTOR MATRIX (3 FACTORS)

	1st Factor Score	2nd Factor Score	3rd Factor Score
Variable 1--Rate of Participation	0.32873	0.67588	0.23508
Variable 2--Salmon Fishing Outside of the Study Area	0.08230	0.06221	0.83951
Variable 3--Number of Fish Caught in 1968	0.31102	0.74326	0.06590
Variable 4--Current Expenditures in 1968	0.89950	0.14868	0.08037
Variable 5--Personal Value of Salt Water Sports Fishing	0.22048	0.44907	0.43884
Variable 6--Salt Water Fishing Rated as Most Important Recreation Activity	-0.14897	0.73581	0.03098
Variable 7--Willingness to Pay for Licence Fees	0.10257	0.19164	0.62461
Variable 8--Total Investment in Salt Water Fishing in 1968	0.94714	0.13171	0.16876
Variable 9--Boat Investment in 1968	0.87303	0.08553	0.21495
Variable 10--Total Gear Investment in 1968	0.56343	0.21833	-0.02700

Table 2 shows that ten variables were entered in the analysis: numbers one, five and eight being the a priori determined dependent variables, and the remaining being measures of related information. There are three

factor scores formed, the first being the most significant factor loading, or intercorrelation. A review of the first column shows variables four, eight, nine, and ten to be intercorrelated with the factor score. Therefore, current expenditures in 1968, total investment in salt water sports fishing in 1968, and boat and gear investment in 1968 are highly intercorrelated. The fact that the variables entered into the first factor score all relate to investment in fishing, and the fact that the predetermined dependent variable, number eight, is highly correlated with the factor score indicate that the measurement technique used in this study to establish total investment is a valid approach. It should also be remembered that the factor score formed called 'investment' can now be used as a dependent variable that is not correlated with any other dependent variable.

The second factor score established has variables one, three, and six intercorrelated, although the level of correlation is not as 'strong' as the 'investment' factor score. All three variables relate to participation in fishing and thus establish the second new dependent variable, which will continue to be called 'participation'. The third factor loading, which is somewhat aligned to 'personal value', involves variables two, five, and seven. It should be noted that the a priori designated dependent variable, variable five, does not have a high correlation with the factor score, probably indicating the factor score method of measuring this variable requires improving. Factor, analysis, then, was used not as a method of data interpretation but as a means to screen the data for further statistical analysis.

An attempt was also made to use factor analysis to reduce the number of independent variables by establishing factor scores. The data were

divided into four categories:

- 1) leisure time activities;
- 2) socio-economic and demographic characteristics;
- 3) recreation experience; and
- 4) restricting factors on demand.

Unfortunately only the socio-economic variables and to a lesser degree the restricting factors, showed patterns of strong intercorrelation.

As a consequence this procedure was dismissed as a practical approach in this study. It is worth noting, however, that the inability to establish any patterns in leisure time activities and recreation experience by the use of factor analysis indicates that salt water sports fishermen have varied recreational pursuits and evidently enjoy sports fishing for a wide variety of different reasons.

Multivariate Regression Analysis

The traditional kind of analyses in recreation studies aim to establish simple, descriptive relationships between levels of participation in each recreation activity and such background variables as income levels, occupation, and standards of education. These, however, are inadequate for establishing leisure use patterns or recreation 'types'. All that these can indicate is the extent to which, for example, levels of participation in each activity appear to be related to levels of income, to occupation status, and to standards of education. They cannot show the extent to which levels of participation in any particular activity are related to, say, levels of income rather than standards of education. This requires some form of multivariate analysis, as used in this study. The researcher chose to use stepwise multiple regression as

the basis of the analysis to isolate the significant variables that influence the demand for salt water fishing.

The regression analysis was carried out in two stages. First, those variables in each of the four categories: leisure time activities, socio-economic and demographic characteristics, recreation experience, and restricting factors, were related to the three dependent variables. Second, those variables in the first stage that were found to be statistically significant beyond the five percent level of confidence were collated and run again with the dependent variables. This provided the opportunity to determine which variables within each of the four categories were related to the dependent variables, and if there were significant similarities. It also allowed the author to group all of the statistically significant variables and to determine where each placed as a predictor of each dependent variable. For example, if income was found to be the major predictor of investment in the socio-economic category and, say, lack of time shared the same position in the restricting factors category, which of the two would be the more significant predictor when compared with all the other significant variables from each category? These two stages form the basis of the statistical analysis reviewed in Chapter Six.

Footnotes

- 1 J. Nixon, "The Mechanics of Questionnaire Construction," Journal of Educational Research, Vol. 62 (1954), pp. 481-487.
- 2 Communication with Mr. Blake Campbell, Canadian Department of Fisheries and Forestry, Vancouver, British Columbia, August, 1969.
- 3 The declining balance method of depreciation was chosen because it does not take into account the economic life of the goods being depreciated. In the case of sports fishing equipment, particularly boats, this would appear to be appropriate since a figure of investment in each boat can be established for a given year. Boats, unlike many other products, tend to maintain a dollar value despite the age of the craft. The rate of fifteen percent depreciation was chosen because it is the taxable base for depreciating by the diminishing balance method for income tax purposes.
- 4 Outdoor Recreation Resources Review Commission, Outdoor Recreation for America, A Report to the President and to the Congress of the United States, 27 volumes (Washington, D.C.: United States Government Printing Office, 1962).
- 5 R.C. Lucas, "Wilderness Perception and Use: The Example of the Boundary Waters Canoe Area," Natural Resources Journal, Vol. 3 (1964), pp. 394-411.
- 6 R.C. Lucas and G.B. Priddle, "Environmental Perception: A Comparison of Two Wilderness Areas," Annals, Association of American Geographers, Vol. 54 (1964), pp. 428-429.

CHAPTER 5

ANALYSIS OF THE PERSONAL INTERVIEW SURVEY: DESCRIPTIVE DATA

INTRODUCTION

A basic component in planning the use of outdoor recreation resources is an understanding of the socio-economic characteristics of the participants, and their preferences for particular uses of leisure time. Such an understanding would help not only to determine how a particular resource is likely to be used, but also the alternatives that would be sought and the social losses that would result if the resource in question was no longer available. To that end, the first part of the analysis undertaken in this study was focussed upon descriptive data relating to the following matters:

- 1) the socio-economic characteristics of the salt water sports fishermen;
- 2) the preferences for salt water fishing compared with other uses of leisure time;
- 3) the barriers to increased participation in salt water sports fishing;
- 4) the factors in the recreational experience that attract participation; and,
- 5) the extent to which expenditures in salt water sports fishing are specific to that activity.

WHO ARE THE FISHERMEN?

Compared to other forms of outdoor recreation salt water sports fishing is a unique activity in that it appeals to people from all sections of society. As a leisure time pursuit it is important for people who differ in occupation, formal educational training, family income, age, marital status, and even family size (Table 3).

Thirty percent of the sample was composed of those in the managerial, professional, and technical occupational classes, seventeen percent were craftsmen, forty percent were in a miscellaneous category, including clerks, labourers, and service personnel, and a further twelve percent were retired. The remaining one percent was composed of students.

Sports fishermen are drawn from a wide spectrum of levels of formal education. By far the large portion of the sample (eighty-six percent) did not go beyond grades eleven or twelve of secondary school. Of the remaining fourteen percent who had attended university, only five percent had completed degrees.

Similarly, sports fishermen are drawn from a wide range of levels of family income. In the sample studied, thirteen percent had an annual family income of less than \$5,000, sixty-three percent between \$5,000 and \$8,999, fourteen percent between \$9,000 and \$12,000, and ten percent over \$12,000 per year.

Table 3 also outlines the attempt to see if any statistical relationships exist between the demand for salt water sports fishing (as measured by the dependent variables investment, participation, and personal value as described in Chapter Four) and the socio-economic and demographic characteristics of the participants. The analysis based on simple correlations revealed few statistically significant relationships. Salt water sports fishing apparently appeals to people who differ in age, family size, occupation, formal levels of education, and income. The only significant finding was the relatively weak correlation (.44) between family income and investment in fishing equipment and current expenditures on sports fishing. It is evident, therefore, that salt water sports fishing is an activity that appeals to people from a wide spectrum of economic and social circumstances.

TABLE 3
THE DEMAND FOR SALT WATER SPORT FISHING IN RELATION
TO SOCIO-ECONOMIC AND DEMOGRAPHIC CHARACTERISTICS
(Sample of 100 Salt Water Sport Fishermen)

SOCIO-ECONOMIC OR DEMOGRAPHIC CHARACTERISTIC	INVESTMENT (Dollars)					PARTICIPATION (Number of Days Spent Fishing)					VALUE OF FISHING TO THE INDIVIDUAL (Rating Scale High to Low Value)						
	250	250-500	501-1,000	1,001-2,000	2,000	0-25	26-50	51-75	76-100	100	High 7	6	5	4	3	2	Low 1
INCOME																	
Less than \$2,999	2	1	0	0	0	1	1	0	0	1	1	0	1	1	0	0	0
\$3,000-\$4,999	4	2	1	2	1	3	5	2	0	0	5	0	4	1	0	0	0
\$5,000-\$6,999	7	6	8	2	3	6	9	7	3	1	19	4	1	1	1	0	0
\$7,000-\$8,999	3	9	11	10	4	3	12	11	6	5	26	5	2	3	0	1	0
\$9,000-\$12,000	3	2	2	2	5	3	4	1	4	2	11	1	1	0	1	0	0
Over \$12,000	1	0	2	1	6	3	2	3	1	1	7	1	0	0	2	0	0
	Correlation .44					Correlation .08					Correlation .28						
EDUCATION																	
Elementary School (Grades 1-7)	1	1	1	1	0	1	2	0	1	0	3	0	1	0	0	0	0
Secondary School (Grades 8-10)	6	7	13	9	6	8	12	8	8	5	29	4	5	2	0	1	0
Secondary School (Grades 11-12)	10	9	6	7	9	5	15	12	4	5	29	6	2	3	1	0	0
Some University	3	3	2	0	1	5	2	1	1	0	5	0	1	0	3	0	0
University Degree	0	0	2	0	3	0	3	0	0	0	3	1	0	1	0	0	0
	Correlation .10					Correlation -.03					Correlation .02						
OCCUPATION																	
Managerial	3	1	1	0	4	3	2	2	2	0	7	0	1	0	1	0	0
Professional and Technical	6	2	5	4	4	3	8	6	3	1	14	3	2	1	1	0	0
Clerical	1	1	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0
Sales Clerk	0	0	2	0	1	1	1	1	0	0	2	1	0	0	0	0	0
Service and -Recreation	1	3	1	1	1	1	3	0	2	1	4	2	0	0	1	0	0
Transportation and Communication	1	3	3	3	4	2	4	5	0	3	11	1	1	2	0	0	0
Primary Industry	0	3	3	2	1	0	5	1	2	1	7	1	1	0	0	0	0
Labourer	1	1	1	2	0	1	2	1	1	0	3	1	1	0	0	0	0
Craftsman	1	3	6	5	2	4	4	4	3	2	12	1	0	2	0	1	0
Retired	6	3	2	0	2	4	4	3	1	1	8	0	3	1	1	0	0
AGE																	
Under 24 years old	4	0	0	0	0	2	1	0	0	1	2	0	1	1	0	0	0
25-34 years old	1	4	2	1	3	2	4	2	3	0	8	2	0	0	1	0	0
35-44 years old	3	8	13	6	4	4	12	10	3	5	26	4	1	2	1	0	0
45-54 years old	5	4	5	2	6	4	6	5	4	3	17	3	1	0	0	1	0
55-64 years old	2	1	4	6	4	3	6	5	2	1	11	2	2	2	0	0	0
Over 65 years old	5	3	0	2	2	4	4	2	2	0	5	0	4	1	2	0	0
	Correlation .14					Correlation .08					Correlation -.19						
NUMBER OF CHILDREN																	
0	8	4	4	6	5	6	8	6	3	4	13	3	5	4	2	0	0
1	4	1	4	3	2	1	5	4	2	2	9	0	2	1	1	1	0
2	5	8	4	1	3	5	7	4	3	2	15	4	1	1	0	0	0
3	2	4	3	4	9	4	6	6	5	1	20	2	0	0	0	0	0
4	1	3	4	2	0	2	5	2	1	0	7	2	0	0	1	0	0
5+	0	0	5	1	0	1	2	2	0	1	5	0	1	0	0	0	0
	Correlation .06					Correlation -.01					Correlation .17						

SALT WATER SPORTS FISHERMEN'S USE OF LEISURE TIME

How do those people who go salt water fishing spend their leisure time generally, and where does this particular activity fit in the total realm of their leisure time activities? Questions were phrased to establish those leisure time activities participated in during 1968 and the importance of certain other pursuits which occur on a more regular day-to-day basis and which therefore may not be regarded by everyone as uses of leisure time.

Respondents were asked to enumerate their major leisure time activities of 1968 in response to an open ended question (question 1 in Appendix A). It should be noted that the responses to this particular question were generally biased toward outdoor recreation activities, possibly a result of the respondents' introduction to the survey as one focussed on leisure time and outdoor recreation. To overcome some of this bias they were also presented with a list of forced choice questions relating to activities other than those pursued out of doors. It was assumed that those activities which are most important to the individual would be mentioned spontaneously. However, the forced choice questions (numbers 3, 4, and 5 in Appendix A) were needed, not only to alleviate some of the inherent bias, but also because it is known that the more educated groups in the population respond more fully to open ended questions than the less educated, and because some activities such as visiting with friends or gardening are not as likely to be thought of as leisure time activities as others, such as fishing, camping, or boating.

Leisure Time Activities Spontaneously Mentioned

In response to the question "How did you spend your leisure time in

1968?", salt water sports fishing was mentioned by every respondent. This, of course, is to be expected when dealing with a sample drawn from sports fishermen! Table 4 reveals that home and garden activities are regarded as leisure time pursuits by forty-five percent of the sample. Sports (both indoor and outdoor) ranked quite high, surprisingly higher than family outings and camping. It is possible that family outings and entertaining may rank lower than outdoor sports either because they demand less time or because they are less commonly thought of as leisure time pursuits. Camping on the other hand, tends to be a more seasonal activity, whereas hiking introduces age as a limiting factor. It is important to note that the only other related use of salt water facilities, boating, receives considerably less attention than fishing. Possibly another surprising finding is that only twenty-four percent of those who went sports fishing also hunted in 1968. The implications may be that sports fishermen find particular kinds of satisfaction in that activity and that hunting is not an off-season substitute for it.

TABLE 4

LEISURE TIME ACTIVITIES, 1968

Spontaneous Mention of Activities-- in order of Frequency	Number of Times Mentioned
Fishing--salt and fresh water	100
Home and garden; cabin building; boat building	45
Sports--lawn bowling, golf, curling, shooting	42
Family outings; club activities, entertaining	30
Camping; trailering	26
Hunting	24
Boating; water skiing	22
Hiking--beachcombing, exploring, prospecting	15
Sunbathing; swimming	15

Response to Forced Choice Questions

A comparison between Tables 4 and 5 reveals the discrepancy between perceptions of leisure time activities, particularly in the cases of entertaining, family outings, sports, and home and garden responsibilities. Observation of the extremes reveals a typical regard for television and reading, and a rather distinct disinterest in plays, concerts, lectures or museums. To get a more complete review of the range of leisure time pursuits, it is necessary to review the response to the forced choice question specifically on outdoor recreation activities (question 4 in Appendix A) (Table 6).

TABLE 5

ARE THE FOLLOWING LEISURE TIME ACTIVITIES
IMPORTANT TO YOU PERSONALLY?

Activity	Number of Times Mentioned
Visiting with friends, parties, dancing	75
Reading or watching television	90
Workshop or homemaking hobbies	73
Going to plays, concerts, lectures, museums	28
Participating in clubs and other organizations	51
Gardening and working in the yard.	55
Photography	35
Driving for pleasure	44
Sports	65
Participant	9
Spectator	36
Both	20

It should be noted that Table 4 indicates a fairly broad range of outdoor recreation activities perceived by the respondents, suggesting perhaps an orientation towards such activities as compared with indoor

recreation pursuits. Table 5 lists a wider range of indoor activities and relatively fewer outdoor recreation activities, suggesting that when forced to consider specific indoor recreation activities, respondents become more aware of the way in which they allocate their time. A possible interpretation of this is that there may be a difference between what they do and what is important to them.

Taking outdoor recreation activities alone, there seems to be a concentration on particular kinds of related pursuits. Table 6 ranks outdoor recreational activities, other than salt water sports fishing, in which sports fishermen participate. Boating and canoeing seem to be the most popular probably because they are activities which require similar equipment to that which is used for salt water or fresh water sports fishing. Such activities as outdoor swimming and going to the beach,

TABLE 6

PARTICIPATION IN SPECIFIC OUTDOOR RECREATION ACTIVITIES,
OTHER THAN SALT WATER SPORTS FISHING--1968

Activity	Percent who Engaged in the Activity a Specified Number of Times		
	Often	A Few Times (1-4 times)	Not at All
Boating and canoeing	81	7	12
Outdoor swimming or going to the beach	64	23	13
Driving for pleasure	57	15	28
Picnics	44	28	28
Camping	42	22	36
Fresh water fishing	31	24	45
Hunting	25	5	70
Nature walks	22	24	54
Hiking	15	22	63
Walks in the city	12	17	71
Skiing and other winter sports	9	15	76
Water skiing	5	7	88
Horseback riding	3	1	96

driving for sightseeing or pleasure, and picnics are frequently participated in because they are activities which require minimal preparation, skill or exertion. They also are relatively inexpensive activities and they represent pursuits which the entire family can enjoy together. At the bottom of the list are those more specialized activities, such as snow skiing, water skiing and horseback riding, which require a good deal of skill, effort and interest, and often are quite costly. It is worth noting that of those who went salt water fishing in 1968, only fifty-five percent also participated in fresh water fishing, and nearly half of those went less than four times during the year.

This ordering of activities is not a direct measure of the degree of interest or involvement in various outdoor recreation activities. It probably represents an ordering of the relative ease with which one may engage in different activities. However, disregarding the relative degrees of interest and involvement, the figures presented are important in their own right, for they represent the actual demand, by salt water fishermen, for outdoor recreation facilities and also provide some insight into the possible substitute activities that would replace salmon fishing if the available stocks declined to the extent that angler success was drastically reduced.

RATING OF THE MOST IMPORTANT LEISURE TIME PURSUITS

Still to be established is the relative rating of the importance of salt water sports fishing among outdoor leisure time pursuits. To this end, respondents were asked to record their rating of outdoor recreational pursuits from most important to least important, and a comparison was made between participation in salt water fishing and participation in other

activities (Table 7).

Probably the most significant result in Table 7 is the rating of salt water fishing. Again it was rated well above all other activities. However, its relative importance is a little clearer. All respondents indicated they participated in salt water fishing in 1968, yet only ninety percent rated it as having any significant importance. Startling results can be seen in comparing the high rate of participation in boating and such family outings as swimming, going to the beach, driving for pleasure and even camping with the relative rating of importance of these same pursuits. These particular activities are mentioned very few times as important leisure time activities. A possible explanation is that instead of being regarded as preferred leisure time pursuits they are regarded more as recreation activities involving family responsibilities or wife pacification. Salt water fishing does not so easily accomplish these objectives.

TABLE 7

PRIORITY RATING OF LEISURE TIME ACTIVITIES
FROM MOST IMPORTANT TO LEAST IMPORTANT

Activity	1st Place	2nd Place	3rd Place	4th Place	Number of Times Mentioned
Salt water fishing	66	15	9	0	90
Fresh water fishing	3	11	6	2	22
Sports (spectator and participant)	8	9	2	0	19
Home and garden	3	13	3	0	19
Hunting	6	8	4	0	18
Camping and hiking	3	5	5	1	14
Boating and skiing	5	5	2	0	12
Family outings	4	6	1	1	12
Beach and swimming	1	1	2	0	4

BARRIERS TO PARTICIPATION IN SALT WATER SPORTS FISHING
AND OUTDOOR RECREATION IN GENERAL

One might assume that people would participate most actively in the recreation activities they prefer. There are factors, however, which may limit such opportunities. Why is it that people do not participate in outdoor activities to the full extent of their desires? What factors keep them from their desired level of participation?

In response to the question relating to the respondents' satisfaction with their extent of participation in sports fishing, thirty-two percent felt they spent the right amount of time in the activity in 1968. This leaves sixty-eight percent that would like to have spent more time in the pursuit of their leisure time pursuit. Tables 8 and 9 shed some light first on those factors considered in the decision whether or not to go fishing, and second, on those factors that restrict the demand for the activity.

Tables 8 and 9 show that the most influential factor in the decision to go salt water fishing is the weather, followed by the availability of fish, family responsibilities and also tide conditions. Weather conditions and tidal conditions are obvious limiting factors. However, they are not factors over which the individual or responsible agencies have any control. Interestingly, factors over which some control might be exerted were frequently mentioned. The availability of fish, for example, was mentioned by thirty-two percent of the sample, indicating perhaps that increased stocks for sports fishing would likely increase participation. It is worth noting, however, that the availability of fish ranks relatively low compared with weather. Family responsibilities, next to weather, is mentioned as the most important governing factor

TABLE 8

COULD YOU IDENTIFY THOSE FACTORS THAT YOU CONSIDER
WHEN YOU ARE TRYING TO DECIDE WHETHER TO GO
SALT WATER SPORTS FISHING OR NOT?

Activity	Number of Times Mentioned
Weather	78
Availability of fish	32
Family responsibilities and other activities	30
Tide conditions	28
Availability of companions	15
Number of hours available determines location	13
Cost of operation or rental	8
Access to the fishery area	6
Does not consider anything	4
Health	1

TABLE 9

FACTORS IN THE DECISION TO GO SALT WATER FISHING:
ORDER OF PRIORITY OF RESPONSE

Order Mentioned	Weather	Availability of fish	Family Respon- sibilities	Tide	Availability of Companions	No. of hours available determine location	Cost of opera- tion or rental	Access to the fishery area	Health
1st	62	5	13	4	5	3	1	2	0
2nd	13	15	8	22	7	5	1	0	1
3rd	3	11	8	2	2	4	5	3	0
4th	0	0	1	0	1	1	1	1	0

(Table 9). Little else can be said about the significance of each of the factors as their frequency of being mentioned decreased considerably. However, this approach does serve to identify those spontaneously mentioned factors in the decision to participate.

Tables 10 and 11 help to clarify the actual significance of certain factors in Tables 8 and 9 when the respondents were asked to specifically indicate those reasons that prevented participation rather than those factors considered in the decision to participate. Weather takes on a totally different significance since only six persons considered it a restricting factor, indicating that when considered in the decision to participate the weather conditions were generally favourable.

The most influential consideration is the available time for leisure pursuits and to a lesser degree family responsibilities. It is interesting to note the large increase in the frequency that the lack of time was mentioned as a restricting factor in salt water sports fishing participation compared to general recreation activities. A possible interpretation is that salt water fishing commands a greater proportion of the time available for leisure time pursuits as a whole. A similar relationship exists in the response to being 'quite satisfied' with the extent of participation. Fewer people are satisfied with their frequency of sports fishing participation. Although old age and sickness are mentioned by fifteen percent of the sample as restricting recreational participation, only six percent regard this factor as preventing sports fishing activity.

TABLE 10

WHAT WAS IT MAINLY, THAT PREVENTED YOU FROM ENGAGING
IN MORE SALT WATER FISHING IN 1968?

Reason	Number of Times Mentioned
Lack of time	42
Family responsibilities	20
Other activities	16
No fishing partner	9
No boat	7
Weather	6
Old age and/or sickness	6
Cost	6
Quite satisfied	3

TABLE 11

WHY DID YOU NOT PARTICIPATE IN MORE
RECREATIONAL ACTIVITIES IN 1968?

Reason	Number of Times Mentioned
Lack of time	72
Quite satisfied	20
Old age and/or sickness	15
Family responsibilities	13
Cost	11
Weather	6
Lack of friends to go with	4
Community responsibilities	3
Away from home (armed forces)	1

FACTORS IN THE RECREATION EXPERIENCE OF SALT WATER FISHING THAT
ARE THE UNDERLYING MOTIVES IN THE DESIRE TO PARTICIPATE

To appreciate the relative importance of the twelve reasons for enjoying salt water sports fishing, used in Question 12, Appendix B, it is necessary to utilize a priority rating scale. This was established through the use of a weighting procedure whereby the most important reason for enjoying sports fishing received a score of one, and the least important a score of twelve. Table 12 shows the relative ordering of the components of the recreation experience.

Table 12 clearly points out the importance of the 'thrill of catching a fish' as the basic motive underlying the demand for salt water sports fishing. It also points out, however, the relative importance of numerous other aspects of the recreation experience. Enjoying 'the companionship of others' and 'the healthy atmosphere of the outdoors' share a similar importance in comparison to the other facets of the experience. Those rated four to seven are characterized by similar weighting scores, and all appear to relate to the 'on-site' experiences as 'escapes' from everyday life. It is significant to point out the relative importance of those aspects not related to the 'on-site' experience. 'Enjoying the planning and anticipation of the trip', 'recalling the experience with friends', and 'travelling to and from the fishing site' do not appear as significant in relation to the other aspects of the experience--a finding which somewhat contradicts the importance of "off-site" experiences in Clawson's studies on outdoor recreation. The low rating of 'having a change of pace by doing something different' probably can be explained by the fact that for the sample, salt water sports fishing was not a leisure time activity that could be considered as a different

recreational pursuit.

TABLE 12

PRIORITY RATING OF THE COMPONENTS OF THE RECREATION EXPERIENCE

Components of Recreation Experience	Total Rating Scale Score for all Fishermen in the Sample
1. Appreciating the thrill of catching a fish	315
2. Enjoying the easy-going companionship of friends or family while fishing	493
3. Enjoy the healthy atmosphere of the outdoors	502
4. Getting away from the demands of the work-a-day world	550
5. Observing the beauty of nature and the peaceful surroundings	561
6. Taking it easy and getting rid of tensions	565
7. Enjoying the pleasures of boating	589
8. Enjoying the planning and anticipation of the trip	698
9. Recalling the experience of fishing trips with oneself or with friends	728
10. Having a change of pace by doing something different	795
11. Travelling to the fishing site	947
12. Travelling home from the fishing site	1069

It is important to note at this stage that there is a significant difference between those aspects of the recreation experience that are considered as reasons for enjoying fishing and those factors that statistically explain varying levels of demand for the activity. For example, Chapter Six will reveal that although the 'enjoying of the planning and anticipation of the fishing trip' was not considered too important in the above analysis, it is proven to be a statistically reliable determinant of high investments in salt water sports fishing.

THE SPECIFICITY OF EXPENDITURES IN SALT WATER SPORTS FISHING

Expenditures in salt water fishing are relatively high due to the necessary investments in boats, equipment, and tackle. The one hundred sports fishermen had a total of \$127,223 invested in salt water sports fishing in 1968, after depreciation had been taken into account. Sixty percent of the sample had an investment of over \$500 in 1968, and thirty-seven percent had over \$1,000 invested in the activity.

'Investment' in this study refers not only to the actual money invested in equipment but also to those current expenditures associated with operating costs in 1968. Investment may be broken down as follows:

Boat and Motor Investment	\$ 78,837
Gear Investment	\$ 15,093
and Current 1968 Expenditures	\$ 33,293
	Total
	\$127,233

A total of nineteen persons out of the sample did not own a boat. The average value of their gear and current expenditures was: gear--\$83; and current expenditures--\$79. The investments of those who did own boats were as follows: gear--\$167; and current expenditures--\$392.

Table 13 indicates that among those who owned a boat approximately fifty-five percent had all their investment in their boat and gear tied directly to salt water sports fishing. The answers to the question "On how many days did you use your boat for other than salt water sports fishing?" seemed to corroborate this. Answers to the latter question suggest that boats are used relatively little outside of the salt water fishery (Table 14). The following conclusions can be drawn:

- 1) Fifty percent of those who own boats spend some time using them in

other salt water activities such as cruising, water skiing, skin diving, etc., but the number of days spent on these activities is relatively small compared with the number of days spent on salt water sports fishing (Table 15).

- 2) This tendency is underlined by the fact that approximately fifty percent did not use their boat for any other activity besides salt water sports fishing.
- 3) Sixty-seven percent of the boat owners do not use their boat in fresh water at all. Only seventeen percent used their boat more than ten days in 1968 in such fresh water activities as pleasure boating, fresh water fishing, hunting, water skiing, etc.

TABLE 13

SPORTS FISHING EQUIPMENT: BOAT OWNERS' INDICATION
OF THE PERCENTAGE OF USE DEVOTED TO ACTIVITIES
OTHER THAN SALT WATER FISHING IN 1968

Percentage of Use in Salt Water Sports Fishing	Number of Fishermen in Each Group
100	45
91 - 99	11
80 - 90	5
50 - 79	15
0 - 49	5
Total number who owned a boat	81

As far as the original intention of the boat purchases, fishing is mentioned by eighty of the eighty-one boat owners, seventy-four of these listing fishing as the major reason for getting the boat (Table 16).

The table elaborates on the reasons for the purchase or the building of

TABLE 14

ON HOW MANY DAYS IN 1968 DID YOU USE YOUR BOAT¹
FOR OTHER THAN SALT WATER SPORTS FISHING?

A. In salt water for such activities as cruising, water skiing, skin diving, etc.

Number of Days	Number of Fishermen
- 0	40
1 - 5	15
6 - 10	12
11 - 15	4
16 - 20	4
21 - 25	1
26 - 30	0
31 - 35	1
36 -	4
	81

B. In fresh water for such activities as fresh water fishing, water skiing, hunting, pleasure boating, etc.

Number of Days	Number of Fishermen
- 0	54
1 - 5	5
6 - 10	8
11 - 15	7
16 - 20	3
21 - 25	1
26 - 30	2
31 - 35	0
36 -	1
	81

¹This question was answered only by the respondents who owned a boat.

TABLE 15

THE NUMBER OF DAYS THAT BOAT OWNERS
USED THEIR BOATS FOR SALT WATER SPORTS FISHING

Number of Days	Number of Fishermen
1 - 20	7
21 - 40	21
41 - 60	17
61 - 80	16
81 - 100	11
101+	9
	81

TABLE 16

WHEN YOU ORIGINALLY PURCHASED OR BUILT YOUR BOAT(S),
WHAT WERE THE MAIN PURPOSES YOU INTENDED TO USE IT FOR?

Activity	Number of Times Mentioned
Fishing	80
Cruising	43
Water skiing	9
Sailing	1
Hunting	2
Scuba diving	2

Order of importance of these same activities on the basis of the respondents' priority rating

Priority Rating	Fishing	Cruising	Water Skiing	Other
1st	74	6	0	1
2nd	5	36	4	3
3rd	1	3	5	1
Times Mentioned	80	43	9	5

TABLE 17

WHAT OTHER ACTIVITIES DO YOU USE YOUR SALT WATER EQUIPMENT FOR? (THIS IS NOT 1968 ONLY)

Activity	Number of Times Mentioned
Cruising	37
Nothing else	36
Fresh water fishing	23
Camping; vacations; exploring	15
Water skiing	10
Other salt water fishing	5
Hunting	5
Kite flying; competitive racing	3
Sailing	2

TABLE 18

INTO WHAT USES WOULD YOU PUT YOUR PRESENTLY OWNED SALT WATER EQUIPMENT IF THE SALMON FISHERY WERE REMOVED?

Activity	Number of Times Mentioned
Sell equipment	50
Cruising	33
Fresh water fishing	26
Other salt water fishing	10
Camping	8
Water skiing	3
Sailing	1
Hunting	1
Kite flying	0

a boat and also indicates the order of importance of these activities to the individual at the time of initial ownership.

To obtain a further insight into the alternative uses of salt water equipment the respondents were asked to indicate first, the other present uses of their equipment, and second, probable uses if the salmon fishery were removed (Tables 17 and 18). It is apparent that if the salmon fishery were removed fifty percent of the sample claimed they would sell their equipment. A review of the investment figures for these same persons indicates the total of their boat investment equalled \$44,009. Table 17 points out those other activities that might take over the mainly predominant salt water fishing if the success rates of this activity decline to the extent that interest wanes.

It is apparent that there would be some important social losses if the fishery were removed. This study has clearly revealed that fishing is an important reason for purchasing boats. Not only would salt water sports fishermen experience losses because secondhand boats and equipment would saturate the market and so would depress prices, but also others to whom fishing was not the primary but nevertheless an important reason for purchase.

The foregoing discussion of the descriptive data gathered in the study provides some broad indication of who the fishermen are, and the value of recreation to them. To determine the statistical significance of the information, however, it is necessary to undertake more sophisticated analyses. Chapter Six elaborates on this stage of the analysis to establish statistically significant determinants of the demand for sports fishing.

CHAPTER 6

MULTIVARIATE ANALYSIS OF THE DEMAND FOR SALT WATER SPORTS FISHING: CONSIDERATION OF THE STATISTICALLY SIGNIFICANT INDEPENDENT VARIABLES

INTRODUCTION

The demand for salt water sports fishing is influenced by a wide variety of factors. The simple correlations described in Chapter Five give a broad indication of some of the factors involved. They do not indicate, however, the extent to which any one of them is responsible for variations in demand, or, more specifically, variations in the selected indicators of demand: investment, participation, and personal value. An attempt was made to identify such factors, and to assess their relative importance in relation to each measure of demand through the use of step-wise multiple regression analysis.

As noted in Chapter Four, step-wise multiple regression analysis is undertaken in two main stages. The first involves classifying the various independent variables into groups and then correlating each of the variables within the groups with each of the dependent variables (investment, participation, and personal value). In this study four groups were used, namely, leisure time activities, socio-economic and demographic characteristics, recreation experience, and various restricting factors. The second stage uses those independent variables found to be statistically significant in the first stage, and combines them in an effort to explain variations in the dependent variables. Statistical

significance was set at the five percent level for the purposes of this study.

The correlation studies undertaken for the first stage of the step-wise multiple regression analysis are described in Appendix G. This Chapter focusses upon Stage Two, the analysis of the statistically significant independent variables identified in Stage One. These are listed in Table 19. Each factor is taken in turn, and an attempt is made to determine the extent to which the statistically significant variables influence the demand for salt water sports fishing, as measured by each of the dependent variables.

STEP-WISE MULTIPLE REGRESSION ANALYSIS

Investment

The results of the analysis presented in Table 20 indicate that 'income' is an important determinant of investment in sports fishing: it accounts for about twenty percent of the observed variance. 'Boat ownership' accounts for a further seven percent, and 'the use of one's boat for non-salt water sports fishing activities' another four percent. Other variables noted in Table 20 account for an additional twenty-four percent of the variance. In total fifty-four percent of the variance is explained by those independent variables with a statistical significance above the five percent level. No doubt more of the variance could have been explained with variables at a lower level of statistical significance, but the author felt that the level chosen was satisfactory for the purposes of this study.

Participation

Identification of salt water sports fishing as the most important

TABLE 19

STATISTICALLY SIGNIFICANT VARIABLES IDENTIFIED IN STAGE ONE
OF THE STEP-WISE REGRESSION ANALYSIS

Income
Age
Unskilled employee
Used their boat in other salt water activities in 1968
Salt water sports fishing is rated as the most important leisure time activity
Reading and watching television as an important 1968 activity
Plays and concerts as an important 1968 activity
Gardening and working in the yard as an important 1968 activity
Boating as an important 1968 activity
Picnics as an important 1968 activity
Camping as an important 1968 activity
Hiking as an important 1968 activity
Fishing (fresh water) as an activity participated in in 1968
Hiking as an activity participated in in 1968
Boating and canoeing as an activity participated in in 1968
Sports as an activity participated in in 1968
Hunting as an activity participated in in 1968
Family outings as an activity participated in in 1968
Poor health as a restricting factor on participation in salt water sports fishing
Lack of time as a restricting factor on participation in salt water sports fishing
Other competing activities as a restricting factor on participation in salt water sports fishing
Poor weather as a restricting factor on participation in salt water sports fishing
Lack of owning a boat as a restricting factor on participation in salt water sports fishing
Provides an opportunity to enjoy the aesthetics of the outdoors
Provides an alternative to everyday life
Enjoying the pleasures of boating while ocean fishing
Getting away from the work-a-day world
Travelling home from the fishing site
Enjoying the planning and anticipation of the fishing trip
Provides a change of pace by doing something different

TABLE 20

PREDICTION OF INVESTMENT IN SALT WATER SPORTS FISHING BY VARIABLES FOUND STATISTICALLY SIGNIFICANT--
SUMMARY OF STEP-WISE REGRESSION ANALYSIS

Independent Variable Entering the Equation	Sign	R	R ²	Increase in R ²	T-Value		Level of Significance
					To Enter Equation	In Final Equation	
Income	+	.444	.197	.197	4.910	4.786	.0005
Do not own a boat	-	.512	.262	.065	2.917	2.711	.005
Boating 1 (important 1968 leisure time activity)	+	.554	.307	.045	2.497	2.579	.01
Alternative to everyday life	+	.587	.345	.038	2.325	1.017	*
Boating and canoeing 2 (participation 1968)	+	.608	.370	.025	1.948	1.344	.10
Hiking as a 1968 leisure time activity	-	.628	.394	.024	1.921	2.145	.025
Age	+	.644	.415	.021	1.835	1.207	*
Other competing activities	-	.661	.437	.022	1.846	2.073	.025
Most important recreation activity	-	.675	.456	.019	1.768	2.986	.005
Participant in sports (1968-- golf, curling)	-	.682	.465	.009	1.258	1.257	*
Lack of time	-	.689	.475	.010	1.308	1.699	.05
Reading and watching T.V.--1968	+	.697	.486	.011	1.343	1.997	.025
Enjoying the planning and anti- icipation of the fishing trip	+	.705	.497	.011	1.375	2.345	.025
Change of pace by doing something different	+	.714	.510	.013	1.518	1.369	.10
Opportunity to enjoy the aesthetics of outdoors	+	.721	.520	.010	1.292	1.756	.05
Family outings as a 1968 activity	-	.730	.533	.013	1.555	1.646	.10
Poor weather	+	.736	.542	.009	1.209	1.209	*

*Statistically insignificant

recreation activity appears to be the best single predictor of participation, accounting for fifty-three percent of the observed variation (Table 21). Fishing participation and the choice of the activity because it provides a 'change of pace from the routine of everyday life' has a negative correlation, implying that while this factor is related to participation, it is not a basic motivation for extensive participation. This particular factor in the recreation experience, however, does increase the R^2 by five percent. A further increase to sixty-two percent is gained with the addition of the variable relating to participation and 'opportunity to enjoy the aesthetics of the outdoors'. All three of these factors are highly significant. Beyond this point the addition of the other variables increases the R^2 only very slightly.

Personal Value

The analysis revealed that forty-six percent of the observed variance in personal value of recreational sports fishing could be explained by the statistically significant independent variables selected (Table 22). 'Getting away from the work-a-day world' was the best indicator among those considered, but it accounted for only nine percent of the variance. The other variables considered together, however, accounted for an additional thirty-seven percent of the variance.

Among the variables other than 'getting away from the work-a-day world', 'camping' and 'reading and watching television' are the most useful indicators of variations in personal value. Those people who value camping as an important leisure time activity also place a high value on salt water sports fishing. The same seems to be true in ratings

TABLE 21

PREDICTION OF PARTICIPATION IN SALT WATER SPORTS FISHING BY VARIABLES FOUND STATISTICALLY SIGNIFICANT--
SUMMARY OF STEP-WISE MULTIPLE REGRESSION

Independent Variable Entering the Equation	Sign	R	R ²	Increase in R ²	T-Value		Level of Significance
					To Enter Equation	In Final Equation	
Salt water sports fishing is their most important recrea- tion activity	+	.733	.537	.537	10.659	9.039	.0005
Change of pace by doing something different	-	.763	.582	.045	3.262	4.079	.0005
Opportunity to enjoy the aesthetics of outdoors	+	.787	.619	.037	3.043	3.614	.0005
Unskilled employee	+	.801	.642	.023	2.472	1.482	.10
Boating and canoeing 2 (participation 1968)	+	.815	.664	.022	2.432	3.095	.005
Other competing activities	-	.823	.667	.013	1.961	2.431	.01
Plays and concerts	+	.829	.687	.010	1.769	1.116	*
Age	-	.834	.696	.009	1.486	1.869	.05
Lack of time	+	.838	.702	.006	1.413	1.311	.10
Enjoying the pleasures of boating	-	.841	.707	.005	1.361	1.949	.05
Getting away from the work- a-day world	-	.845	.714	.007	1.434	1.806	.05
Hiking as a 1968 activity	-	.850	.723	.009	1.544	1.936	.05
Sports as a 1968 activity (golf, curling)	-	.854	.729	.006	1.520	1.720	.05
Picnics as a 1968 activity	+	.859	.738	.008	1.639	1.639	.10

*Statistically insignificant

TABLE 22

PREDICTION OF PERSONAL VALUE FOR SALT WATER SPORTS FISHING BY VARIABLES FOUND STATISTICALLY SIGNIFICANT--
SUMMARY OF STEP-WISE REGRESSION ANALYSIS

Independent Variable Entering the Equation	Sign	R	R ²	Increase in R ²	T-Value		Level of Significance
					To Enter Equation	In Final Equation	
Getting away from the work- a-day world	+	.302	.091	.091	3.141	1.654	.05
Camping as an important leisure time activity	+	.379	.144	.053	2.438	2.241	.025
Reading and watching television	+	.423	.179	.035	2.012	2.491	.01
Income	+	.468	.219	.040	2.228	2.740	.005
Does not own a boat	-	.504	.254	.035	2.100	2.776	.005
Boating 1 (important 1968 activity)	-	.544	.296	.042	2.334	2.565	.01
Plays and concerts	-	.576	.332	.036	2.235	2.253	.025
Unskilled employee	-	.592	.350	.018	1.621	1.978	.05
Picnics as an important activity	-	.602	.362	.013	1.319	1.553	.10
Gardening and working in the yard	+	.612	.375	.012	1.275	1.586	.10
Alternative to everyday life	+	.625	.391	.016	1.511	1.386	.10
Other competing alternatives	+	.634	.402	.011	1.338	1.694	.05
Poor weather	+	.643	.413	.011	1.241	1.412	.10
Hiking as an important leisure time activity	-	.650	.423	.009	1.198	1.485	.10
Travelling home from the fishing site	-	.658	.433	.011	1.235	1.374	.10
Hiking as a 1968 activity	+	.667	.445	.012	1.297	1.136	*
Hunting as a 1968 activity	+	.672	.452	.007	1.069	1.118	*
Lack of time	+	.676	.457	.005	0.880	0.880	*

*Statistically insignificant

of 'reading and watching television'. These latter two variables increase the R^2 to eighteen percent. Other statistically significant variables increase the amount of variance explained to thirty-five percent.

Results of the Multiple Regression Analysis: An Overview

The results of the statistical analysis described in this Chapter and in Appendix G can best be appreciated by an examination of the multiple correlations derived in each of the step-wise regression analyses. Table 23 presents the multiple correlations between each of the four categories chosen in Stage One of the analysis (leisure time activities, socio-economic and demographic characteristics, recreation experience, and various restricting factors) and each of the dependent variables. In addition it shows the multiple correlations between those variables found statistically significant beyond the five percent level in the first stage of the analysis (Table 19) and each of the dependent variables.

A review of Table 23 reveals the following conclusions:

- 1) Variations in each of the indicators of demand are explained to an important extent by a particular set of independent variables.

For example:

- (a) The group of variables that can best predict investment rates are those leisure time activities that salt water fishermen do, or do not, engage in. The correlation between investment and leisure time activities is .596.
- (b) Among the four categories established, the socio-economic and demographic variables provide the best explanation of levels

TABLE 23

RELATIONSHIP BETWEEN THE CATEGORIES OF INDEPENDENT VARIABLES AND THE DEPENDENT VARIABLES:
 MULTIPLE CORRELATIONS (R) AND THE PERCENTAGE OF THE VARIANCE EXPLAINED (R²)

	Leisure Time Activities		Socio-Economic and Demographic Characteristics		Recreation Experience		Restricting Factors		All Statistically Significant Variables in each Category *	
	R	R ²	R	R ²	R	R ²	R	R ²	R	R ²
Investment	.596	.355	.519	.269	.327	.106	.509	.259	.736	.542
Participation	.566	.319	.769	.591	.589	.347	.561	.315	.859	.738
Value	.622	.387	.413	.171	.416	.173	.561	.315	.676	.457

*Statistically significant beyond the five percent level

of participation. The correlation between participation and this group of variables is .769.

(c) The information gathered and incorporated in the category of leisure time activities is the most significant in predicting personal value for salt water sports fishing. The correlation in this instance is .622.

- 2) None of the categories used in Stage One of the analysis, except perhaps socio-economic and demographic characteristics in relation to participation, are singularly very good predictors of the demand for salt water sports fishing. This finding is important, indicating that in order to fully analyze the demand for this recreational activity, information must be collected on each of the set categories established. Such an approach will enable more accurate predictions of the demand for sports fishing.
- 3) When the statistically significant variables, established in Stage One, are collated and related to investment, participation, and personal value as single variables and not in any set groups there is a significant increase in the multiple correlations. The correlations between these independent variables and the dependent variables are as follows: investment, .736; participation, .859; and personal value, .676.
- 4) Calculating the percentage of variance explained by the variables introduced in the second stage compared with the first stage of the analysis it is evident that a much greater degree of variation can be accounted for by the second stage. For example:
 - (a) Investment--the explanation of variance is increased from a high of thirty-six percent to fifty-four percent.

(b) Participation--the explanation of variance is increased from a high of fifty-nine percent to seventy-four percent.

(c) Personal Value--the explanation of variance is increased from a high of thirty-nine percent to forty-six percent.

Explanations of variance above thirty percent in studies involving perceptions and attitudes are commonly accepted in social psychology as satisfactory.¹

FACTORS ESTABLISHED AS SIGNIFICANT DETERMINANTS
OF THE DEMAND FOR SALT WATER SPORTS FISHING

Table 24 provides a summary of the second stage of the regression analysis. It records the level of statistical significance of those variables established as important predictors of demand and indicates whether this relationship is either positive or negative. On the basis of this analysis it is possible to shed some light on such questions as "What factors govern the varying demands for salt water sports fishing?" and "What interferes with desired levels of participation?"

A division of the factors listed in Table 24 into their earlier established categories (recreation experience, leisure time activities, socio-economic and demographic characteristics, and restricting factors) provides a useful means to interpret the results.

Investment

It has been statistically proven that from the total number of variables studied only nine are significantly related to investment in salt water sports fishing, four of them positively and five in a negative fashion. The following factors have a positive effect on investment: 'provides the opportunity to enjoy the aesthetics of the outdoors',

TABLE 24

STATISTICALLY SIGNIFICANT VARIABLES RESULTING FROM
THE SECOND STAGE OF THE STEP-WISE REGRESSION ANALYSIS--
LEVELS OF STATISTICAL SIGNIFICANCE AND CORRELATION RELATIONSHIP
WITH DEPENDENT VARIABLES

Variables	Levels of Significance		
	Investment	Participation	Value
Recreation Experience			
Enjoy the pleasures of boating		-.05	
Change of pace by doing some- thing different	*	-.0005	
Provides opportunity to enjoy aesthetics of the outdoors	+.05	+.0005	
Enjoying the planning and anticipation of a fishing trip	+.025		
Getting away from the work-a- day world		-.05	+.05
Leisure Time Activities			
Boating as an important 1968 activity	+.01		-.01
Hiking	-.025	-.05	*
Sports participation in 1968	*	-.05	
Boating and/or canoeing in 1968	*	+.005	
Camping			+.025
Socio-Economic, Demographic and Miscellaneous Characteristics			
Income	+.0005		+.005
Age	*	-.05	
Unskilled employee		*	-.05
Salt water fishing rated as the most important recreation activity	-.005	+.0005	
Restricting Factors			
Other competing activities	-.025	-.01	+.05
Lack of time	-.05	*	*
Does not own a boat	-.005		-.005

*Statistically related but below the five percent level

'enjoys the planning and anticipation of a fishing trip', 'boating is regarded as an important 1968 activity', and 'family income'.

On the other hand, those having a negative relationship are 'hiking as a 1968 activity', 'the rating of salt water sports fishing as the most important recreational pursuit', 'other competing activities', 'lack of time', and 'not owning a boat'. 'Hiking' is an important activity for fifteen percent and to a lesser degree another twenty-two percent of the sample (Table 4). Apparently for some of these respondents this activity competes with sports fishing as a leisure time pursuit. Among those who rated fishing as their most important activity there appears to be a wide variety of investment levels, causing a negative relationship with investment. The three remaining variables that are related to low investment are socio-economic factors. Their relationship can easily be appreciated since they are all restricting factors on demand.

Participation

Participation is related to ten of the total number of independent variables. Only two have a positive relationship, namely, 'provides an opportunity to enjoy the aesthetics of the outdoors' and 'boating, other than fishing, as a 1968 recreational pursuit'. Those factors in the recreation experience that are negatively related are 'enjoys the pleasures of boating', 'provides a change of pace by doing something different' and 'getting away from the work-a-day world'. All three relate to low levels of participation indicating they are important to demand but, for those who participate on a more regular basis, other factors, such as the two positively related components of the recreation experi-

ence, are important determinants.

Of the remaining four negatively related variables three provide evidence of conflicting opportunities. 'Other competing activities' and participation in 'hiking' and such 'sport activities' as golf, lawn bowling, shooting and curling reduce the number of fishing trips during a year. The only other factor, 'increasing age levels', also has a negative relationship to the dependent variable, indicating lower levels of participation for those in the upper age brackets.

Personal Value

Only seven factors were proven to be significantly related to the measurement of the worth of sports fishing to the individual. 'Getting away from the work-a-day world' is the one aspect of the recreation experience that is positively related to the dependent variable. The values held for camping and salt water sports fishing are positively related revealing a possible similarity in the values shared by these activities. Boating, on the other hand, is related to personal value in a negative fashion indicating that those who place a high value on boating often have a lower preference for salt water sports fishing, relative to other members of the sample.

Although 'other competing activities', such as sports, home building, community activities, and gardening has a negative relationship to investment and participation, it is positively related to value. This factor, then, does not necessarily result in lower value ratings for sports fishing, but it does govern investment and participation levels. The remaining two factors, 'income' and 'does not own a boat', are similarly related to both value and investment; higher family incomes

stimulate demand whereas the lack of a boat curtails demand.

The foregoing interpretations reveal that the three indicators of demand--investment, participation, and personal value--are influenced by quite different factors. Among the seventeen variables considered, only eight influenced more than one dependent variable: 'provides the opportunity to enjoy the aesthetics of the outdoors', 'getting away from the work-a-day world', 'boating as an important 1968 activity', 'hiking', 'income', 'rating of salt water sports fishing as the most important recreation activity', 'other competing activities', and 'does not own a boat'. Only the factor 'other competing activities' was found to be statistically related to each of the dependent variables. The remaining seven were statistically related to two of the dependent variables; however, only four of them share the same correlation relationship with both of the indicators of demand. For example, 'income' is positively related to both investment and personal value, whereas 'getting away from the work-a-day world' is negatively related to participation but positively related to personal value.

Two inferences may be drawn from these results. First, demand for salt water sports fishing must be measured in more than one way. Investment alone, for example, does not provide a completely satisfactory indicator. Second, the various dependent variables apparently measure quite different values. The factors associated with participation, for instance, differ considerably from those concerned with investment or personal value. Such differences must be taken into account in future analyses of the demand for outdoor recreation in general, and salt water sports fishing in particular.

Footnotes

- 1 J. Cohen, "Some Statistical Issues in Psychological Research," in B. Wolman, ed., Handbook of Clinical Psychology (New York: McGraw-Hill, 1965), pp. 95-121.

CHAPTER 7

SUMMARY AND SIGNIFICANCE OF THE FINDINGS

Determining the factors responsible for variations in the demand for outdoor recreation in general and salt water sports fishing in particular is a difficult task. In contrast to most of the other goods and services which men desire, there are no convenient means of measuring preferences for outdoor recreation. The problem is complicated by the fact that there is no charge for the right to sports fish. Outdoor recreation is commonly regarded as a free good, and one which involves values in addition to those normally expressed in the market place. The absence of market criteria makes it difficult to decide how much of a given commodity to provide and also whether one use of a resource is more desirable than another.

Despite the fact that considerable progress has been made in outdoor recreation research to date, there remain numerous gaps in our understanding of preferences for this activity. Two of the major research needs are the collection and analysis of data in such a way to facilitate estimates of present demands and predictions of future trends; and the development of a means to evaluate the benefits (or values) of outdoor recreational resource opportunities. While studies have been conducted on these areas of interest, there are important weaknesses in the methods developed to date.

Measurement of Demands

The measurement of present demands for outdoor recreation and prediction

of future demands have been complicated by the fact that the key variables that influence the formation of tastes and habits are not known. Nor is it certain whether these variables will retain the same significance through time. Previous studies have shown that income, occupation, and education play an important role in determining the amount of time and money spent on certain types of outdoor recreation.¹ The result has been that researchers have assumed these factors to be equally as significant in establishing demand curves for other recreational pursuits such as salt water sports fishing.² These assumptions have yet to be tested empirically.

Studies of recreational demand undertaken to date also suffer from the absence of more sophisticated methods of analyzing recreation data. This has tended to compound the problem of identifying the background variables that affect the demand for outdoor recreational opportunities. It has resulted in the reliance upon those factors that are the easiest to measure, both in the collection and in the analysis of the data. Previous studies have in fact focussed upon only a limited range of variables, principally those concerned with socio-economic and demographic characteristics.

These 'traditional' analyses have tended to establish simple descriptive relationships between the demand for each recreation activity and socio-economic characteristics. They cannot show, however, the extent to which levels of participation in a particular activity relate to, say, family income rather than levels of formal education. This requires some form of multivariate analysis which permits an estimate of the separate effect of each factor while all other factors are held constant.

Finally, estimates of the demand for outdoor recreation have been

based primarily on using investment estimates as the indicator or measure of demand. This again is particularly the case in salt water sports fishing. The demand for this particular activity, and other outdoor recreational pursuits, should probably be measured in more than one way. Investment alone, for example, may not provide a completely satisfactory indicator of demand, and thus other measures should be used.

Measurement of Values

The second major need in outdoor recreation research is the improvement of methods for estimating the value of particular recreation activities. Here again the basic problem with past attempts to evaluate recreational resources has been the failure to incorporate the many factors that underlie the values placed upon the activity. Also, inaccurate estimates of benefits have resulted from the attempt to measure value, as in the case of demand for outdoor recreation on the basis of expenditures spent in the pursuit of the activity. Expenditures on an activity such as sports fishing provide some indication of the preference for the activity, but they may not reflect the full range of values derived from the recreation.

Another possible deficiency of previous methods of evaluation derives from assumptions that are made about human behaviour. For the most part outdoor recreation research has been based upon normative models which assume rationality on the part of the participant, that he tries to maximize some objective, and that choices are made in much the same way as they are made for other goods and services which he consumes. All of these assumptions can be challenged, particularly in the case of outdoor

recreation, where emotional considerations may play a large role, where the aim may be to satisfy rather than maximize, and where the choice process may differ considerably from that involved in other activities in which recreationists participate. Behavioural models may be especially useful, therefore, in deriving estimates of recreational values. In particular they may provide a clearer understanding of how people actually decide whether or not to recreate, and which activities to pursue. They may also help to identify the factors that govern their behaviour in this connection.

Principal Results of the Study

Two major types of analysis were undertaken in this study: the identification of factors that underlie the value placed on salt water sports fishing and their effect on the decision to participate; and the identification of characteristics of the sports fishermen, and the relationship of this activity to other types of leisure time pursuits. The results of the investigation provide information that should be of value both to researchers interested in recreational resources and to planners responsible for the management of such resources.

The results of the study question the assumptions underlying some of the previous investigations in the recreational resources field. In particular, they question reliance upon investment as a satisfactory indicator of value of recreation. The results also suggest that choice-making in outdoor recreation differs in important ways from choice-making relating to other goods, services, and activities. One important implication of this is that conventional models may fail to take into account important values involved in decisions relating to outdoor

recreation. In this case the removal of the salt water sports fishery would lead to much greater social losses than would be indicated by normative decision-making models. Finally the study clearly showed that studies of perceptions and attitudes can make an important contribution to the evaluation of outdoor recreation opportunities. Studies of motivations to participate in particular forms of recreation, and of values attached to various aspects of the recreation experience provide a valuable source of information for those concerned with provision or preservation of recreational opportunities.

Investment as a Measure of Value

The study revealed that salt water sports fishermen invest considerable sums of money in this activity. Although one might go fishing for as little as \$10 for a single trip (involving the hire of a fishing rod and a boat, and the purchase of bait), the average sports fisherman has an investment of at least \$500 in boat and equipment. It seems, however, that investment is only a partial indicator of value derived from the activity.

It was hypothesized that the importance attached to salt water sports fishing is reflected by three measures: investment, participation, and personal value. The statistical analysis revealed that although the three indicators of demand or value were not independent of each other, they did not share very 'strong' correlations. Each one, therefore, could have a different significance in the evaluation of salt water sports fishing. The correlations were: investment and participation, .39; investment and personal value, .35; and personal value and participation, .44. Any evaluation based upon only one of these measurements

probably would provide an inaccurate estimate of the demand for and value of the recreational activity.

Further evidence of the fact that these measures of demand are different enough to be treated independently in any analysis is seen in the step-wise regression analysis. Using this method it was shown that those factors that govern investment in salt water sports fishing are not the same influencing factors on the extent of participation or on the personal value rating (Table 24). It should be apparent, therefore, that attempts to establish demand curves for outdoor recreation on the basis of investment tabulations alone, incorporating only a few of those factors that are influential determinants, are probably inadequate. More valid estimates and projections will be made when evaluations consider participation and personal value rating, and their determining factors, in addition to investment figures.

A further significant contribution in this study is the attempt to broaden the range of determining factors that are used in recreation evaluations. Previous studies have focussed upon a limited number of variables, mainly those concerned with socio-economic characteristics. Little study has been given to other factors, such as motivation, competing uses of leisure time, and various 'restricting' considerations. The present study considered these latter factors as well as socio-economic characteristics. This broadening of the approach seems to be justified by the results of the analysis. Socio-economic characteristics explained only a small part of the variance in demand for salt water sports fishing (Table 23). Other factors, therefore, must be considered along with socio-economic factors if satisfactory explanations of variations in demand are to be obtained.

Choice-Making in Salt Water Sports Fishing

As suggested earlier many of the theories used in recreation analysis to date have been concerned primarily with economic efficiency and have emphasized that recreationists can make conscious 'rational' decisions in determining their use of leisure time. In actual fact, however, such theories are limited in their application to real life situations. They are also restricted in their attempt to explain reality because they generally focus on only one or a few aspects of the whole decision process. Recreational choice-making would better be understood if a behavioural approach were adopted.

The results of this study emphasize several weaknesses of traditional approaches. They show, for example, that the fisherman operates under many constraints and that he may not in fact maximize his satisfactions. The results of the analysis show there is a considerable difference between those activities that salt water sports fishermen participate in and those which they regard as most important. Those activities having high rates of participation like boating and such family outings as swimming, going to the beach, driving for pleasure and even camping, were mentioned very few times as important leisure time activities. Sports fishing was regarded by most of the respondents as important, but in some cases involved less time commitment than these other activities. A possible interpretation is that other outdoor recreation activities were mentioned as important because they are regarded as activities which enable the discharge of family responsibilities. In contrast, salt water sports fishing appears to be an activity for the man in the household and not for the wife or the family as a whole.

A better appreciation of recreational decision-making was obtained in

the study's concern with impediments to increased recreation. The respondents clearly revealed a desire for increased salmon fishing activity. Sixty-eight percent would have liked to have spent more time fishing in 1968 compared to thirty-two percent who felt they had spent the right amount of time fishing.

What factors restricted participation rates for those who would have preferred to have spent more time in the activity? The most influential consideration is the number of hours available for leisure time pursuits. Increases in the amount of leisure time in the future will certainly have reciprocal results in the rates of participation of those who already enjoy salt water sports fishing and probably those who presently do not regard fishing as an important recreational pursuit. Other important barriers to participation include family responsibilities and other competing activities. It is important to appreciate in this connection that the costs involved in salt water sports fishing do not appear to be much of a restriction on participation.

The statistical analysis further emphasized that the decision to go sports fishing is affected by a wide variety of factors, which range from the amount of money the fisherman has invested in the activity, to certain aesthetic values attached to this form of recreation. The analyses revealed that six of the factors studied were statistically significant in explaining high demand for salt water sports fishing; and seven of them were statistically significant as restrictors on the demand for such fishing. These factors are set out in Table 25. They provide a better description of the recreationists' behaviour, emphasizing the weakness of using models based on conscious choice-making involving an analysis of alternatives to reach a given end, usually

TABLE 25

FACTORS WHICH APPEAR TO AFFECT THE DECISION TO GO FISHING

A. Factors which Influence High Demand for Salt Water Sports Fishing

1. Provides the opportunity to enjoy the aesthetics of the outdoors.
2. Provides the opportunity to enjoy the planning and anticipation of the fishing trip.
3. Provides the opportunity to get away from the work-a-day world.
4. Boating and/or canoeing, other than fishing, is an activity participated in during 1968.
5. Camping is regarded as an important leisure time activity.
6. The rating of salt water sports fishing as the most important recreational activity.

B. Factors which Restrict the Demand for Salt Water Sports Fishing

1. Family income levels.
2. Age.
3. Competing alternatives (sports, homebuilding, gardening, and family activities).
4. Lack of available leisure time.
5. Does not own a boat.
6. Hiking is an activity participated in during 1968.
7. Participation in sports in 1968 (golf, lawn bowling, shooting, and curling). *

* Mainly outdoor recreation activities.

specified as profit maximization.

Potential Social Losses from the Removal of the Fishery

The study also revealed some important characteristics about salt water sports fishermen and about the activity as a recreational pursuit. The results indicate that salt water sports fishermen are drawn from a wide spectrum of economic and social circumstances, and that they pursue a variety of other recreational activities. One would expect, therefore, that they would differ considerably from each other on various grounds, such as in their use of leisure time. The one thing that characterizes salt water sports fishermen, however, is their homogeneity in their use of leisure time, and the great emphasis they place upon salt water sports fishing compared with all other activities.

Every member of the sample investigated rated outdoor recreation as highly important among possible uses of leisure time. Even more significant was the fact that sports fishermen spend much more time on salt water sports fishing than on other outdoor recreation activities. In addition, there is some similarity in the other forms of outdoor recreation fishermen engage in. There is no distinct pattern of preferences, however, in this regard. Although the salt water sports fishermen interviewed appeared to enjoy similar outdoor recreation pursuits, they differed as to their order of priority. Some regarded camping as the second most important activity after salt water sports fishing, whereas others rated hiking as the second most important activity and camping was relegated to a lower preference level.

An important implication of these findings is that removal of the sports fishery would not only affect a large number of people, but it

would also cause significant social losses for most of them. Although they enjoy other forms of outdoor recreation, most of them rate them far lower than salt water sports fishing. Consequently the former cannot be considered as effective substitutes for the latter. This conclusion is underlined by the fact that more than half of those interviewed said that if the salmon fishery were removed, they would try to sell their salt water fishing equipment (boats, fishing rods, motors, etc.). Apparently many would not seek alternative uses of the equipment. Among those that indicated that they would use their equipment in other recreational pursuits, cruising and fresh water fishing appeared to be the main alternatives. Even this, however, might still involve a considerable social loss. Cruising is an activity that generally requires larger boats and motors. Fresh water sports fishing is usually undertaken in fairly small boats which are easily transportable. Many of the boats used in salt water sports fishing, however, are either too small for cruising or too large for fresh water sports fishing.

Another measure of the potential social losses from the removal of the fishery is the availability of substitute activities. Activities such as outdoor swimming, going to the beach, driving for sightseeing or pleasure, and picnics were frequently participated in by sports fishermen. These require minimal preparation, skill or exertion, and generally are inexpensive and satisfy family responsibilities. Several related activities were identified in this study such as participation in boating and camping, and to a lesser extent fresh water fishing, hunting, and hiking or nature walks as outdoor recreational pursuits. Boating is an important activity, probably because it requires similar

equipment to that used in salt water or fresh water fishing. Camping is a popular pursuit possibly because it not only satisfies family responsibilities but may also enable participants to derive values similar to those involved in fishing. Sometimes camping also provides the opportunity to participate in salmon fishing. The more specialized activities of skiing and horseback riding were ranked comparatively low to other pursuits probably because they are activities which require considerable skill, energy, and money.

Fresh water fishing was a recreational activity for only fifty-five percent of the salt water fishermen studied. Among these, over one-half went fresh water fishing less than four times in 1968. Also significant in this study was that only twenty-four percent of those who went sports fishing also hunted in 1968. The implications of these findings may be that most salt water sports fishermen find particular kinds of satisfactions in salt water fishing, and that hunting and fresh water fishing do not provide satisfactory substitutes.

The Value of Research on Perceptions and Attitudes

The results of this study emphasize the value of research on perceptions and attitudes. Such research can help to identify the different values sought and attributed to specific kinds of outdoor recreation. Moreover, it can help to explain how people decide to recreate in particular places or particular pursuits. As a consequence planners not only become more aware of who their clientele are, but also they are able to compare more effectively alternative uses of given resources, and to provide facilities that more closely satisfy what recreationists desire. Further research needs to be undertaken

to refine the methods used, and to test the conclusions in areas elsewhere in the province.

Footnotes

- 1 See for example: C. Proctor, "Dependence of Recreation Participation on Background Characteristics of Sample Persons in the September 1960 National Recreation Survey," in Outdoor Recreation Resources Review Commission, National Recreation Survey, Study Report No. 19 (Washington, D.C.: United States Government Printing Office, 1962), Appendix A; and, T.L. Burton and P.A. Noad, Recreation Research Methods: A Review of Recent Studies, Occasional Paper No. 3 (Birmingham, England: Center for Urban and Regional Studies, University of Birmingham, 1968), pp. 35-40.
- 2 Examples of this trend in research are particularly evident in studies of salt water sports fishing. See W.G. Brown, A. Singh, and E.N. Castle, An Economic Evaluation of the Oregon Salmon and Steelhead Sport Fishery, Technical Bulletin, No. 78 (Corvallis, Oregon: Agricultural Experimental Station, 1964), and J.A. Crutchfield and D. MacFarlane, Economic Evaluation of the 1965-1966 Salt Water Fisheries of Washington, Research Bulletin No. 8 (Seattle, Washington: State of Washington, Department of Fisheries, 1968).

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APPENDICES

APPENDIX A

NAME _____ ADDRESS _____

QUESTIONNAIRE ON OUTDOOR RECREATION

INTERVIEWER: Indicate to the respondent that you are a researchers from the University of Victoria working on the recreation activities of Victoria residents. Explain that the questions are relatively easy to answer and that all information given will be kept confidential.

1. How did you use your leisure time in 1968? Leisure time is that time not devoted to your job or to household chores. LIST IN ORDER MENTIONED

- | | |
|----|-----|
| 1. | 6. |
| 2. | 7. |
| 3. | 8. |
| 4. | 9. |
| 5. | 10. |

2. What are the most important of these activities that you mentioned?

- 1.
- 2.
- 3.
- 4.
- 5.

3. Here are some other leisure time activities. Please tell me whether they are important to you. Answer yes or no. CIRCLE THE NUMBER AT THE RIGHT FOR A YES RESPONSE

Visiting with friends, parties, dancing _____	1
Reading or watching T.V. _____	2
Going to plays, concerts, lectures, museums _____	3
Driving for pleasure _____	4
Participating in clubs and other organizations _____	5
Gardening, working in the yard _____	6
Photography _____	7
Workshop or homemaking hobbies _____	8
Sports _____	9

If sports are mentioned: 1. Participant 2. Spectator 3. Both

4. I'm going to read you a list of outdoor recreation activities. Please tell me how often you did each of these things during 1968 on the basis of this card.

	#4	#5
1. Outdoor swimming or going to the beach _____		
2. Boating or canoeing _____		
3. Fresh water fishing _____		
4. Hunting _____		
5. Skiing and other winter sports _____		
6. Water skiing _____		
7. Driving for sightseeing or relaxation _____		
8. Nature and walks _____		
9. Picnics _____		
10. Camping _____		
11. Horseback riding _____		
12. Going for walks in the city _____		
13. Hiking _____		
14. Other _____		

5. REPEAT THE SAME OUTDOOR ACTIVITIES AND HAVE THE RESPONDENT REPLY ON THE BASIS OF THE FOLLOWING CARD

6. Why did you not participate in more recreational activities in 1968?

1. _____
2. _____
3. _____
4. _____

7. How valuable is salt water fishing to you? HAND RESPONDENT THE CARD AND EXPLAIN THE SCALE -- HAVE HIM REPLY BY NUMBER

Number _____

8. Would you pay a licence fee of \$3 a year for the right to go fishing for salmon in 1970? Note that your income and leisure time will be the same as it is at present. Please answer on the basis of this card.

Number _____

EXPLAIN THAT ALL THE FOLLOWING QUESTIONS DEAL ONLY WITH SALT WATER FISHING

9. Thinking back to 1968 on how many days did you go salt water fishing?
 Answer on the basis of this card

	Jan. 1 - March 31	April 1 - June 30	July 1 - Sept. 30	Oct. 1 - Dec. 31
(a) During a day when you also worked at your job (normally Monday-Friday).				
(b) During your weekly days off and on statutory holidays				
(c) During vacations				

10. Which of these statements apply to you? HAND THE RESPONDENT THE CARD

Number _____

11. FOR THOSE WHO WANT MORE SPORT FISHING

What was it, mainly, that prevented you from engaging in more salt water fishing in 1968? LIST IN ORDER OF RESPONSE

- 1.
- 2.
- 3.
- 4.
- 5.

12. Could you identify those factors that you consider when you are trying to decide whether to go salt water fishing or not? LIST IN ORDER OF RESPONSE

- 1.
- 2.
- 3.
- 4.
- 5.

13. If the licence fee was set at \$10 next year would you buy one? HAND RESPONDENT THE CARD

Number _____

14. What are the reasons for your enjoying salt water fishing?

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

15. Here are some reasons that people have given for enjoying salt water fishing. Would you put these reasons in an order from most important to least important for you personally. LIST THE SEQUENCE AFTER THE INTERVIEW

16. What other activities do you use your salt water equipment for?

- 1.
- 2.
- 3.
- 4.

17. Into what uses would you put your presently owned salt water equipment if the salmon fishery were removed?

18. If the licence fee was set at \$20 next year would you buy one?
HAND THE RESPONDENT THE CARD FOR HIS ANSWER

Number _____

ANSWER CARDS USED IN THE INTERVIEW

Question 4

1	2	3	4
NEVER	1-4 TIMES	5-10 TIMES	11+ TIMES

Question 5

PARTICIPATED IN		DID NOT PARTICIPATE IN	
1	2	3	4
<u>Don't</u> want to do more often	<u>Do</u> want to do more often	<u>Would</u> like to	Would <u>not</u> like to

Question 7

VERY VALUABLE 7 6 5 4 3 2 1 NOT VALUABLE

Question 9

- A. No days at all
- B. 1 to 5 days
- C. 6 to 10 days
- D. 11 to 15 days
- E. 16 to 20 days
- F. More than 20 days

Question 10

1. All things considered I feel I spent about the right amount of time salt water fishing in 1968.
2. I would have liked to have spent more time at salt water fishing if it had been possible in 1968.
3. Looking back on it I wish I had spent less time on salt water fishing last year.

Questions 8, 13, and 18

VERY LIKELY 1 2 3 4 5 6 7 NOT AT ALL

Question 15

- Card 1. Recalling the experience of fishing trips to oneself or with friends
- Card 2. Enjoying the pleasures of boating
- Card 3. Getting away from the demands of the work-a-day world and the city environment
- Card 4. Travelling home from the fishing site
- Card 5. Appreciating the thrill of the actual catching of the fish
- Card 6. Taking it easy and getting rid of tensions
- Card 7. Enjoying the healthy atmosphere of the outdoors
- Card 8. Travelling to the fishing site
- Card 9. Enjoying the planning and the anticipation of a fishing trip
- Card 10. Having a change of pace by doing something different
- Card 11. Enjoying the easy-going companionship of friends or family while fishing
- Card 12. Observing the beauty of nature and the peaceful surroundings

APPENDIX B

UNIVERSITY OF VICTORIA

DEPARTMENT OF GEOGRAPHY

QUESTIONNAIRE ON SALT WATER SPORTS FISHING

INTERVIEWER'S NAME

TELEPHONE NUMBER

Please complete the following questions and return in the stamped addressed envelope at your earliest convenience. Your co-operation in this matter will be greatly appreciated. ALL INFORMATION YOU GIVE WILL BE KEPT STRICTLY CONFIDENTIAL.

1. Sex
1. Male _____
2. Female _____
2. How long have you lived in Victoria? _____ years
3. What were the reasons for your locating in Victoria, if you have moved here from elsewhere?
- _____
- _____
- _____
4. If you have moved to Victoria, did the availability of salt water sports fishing have any bearing on your decision to locate here?
1. Yes _____
2. No _____
5. If you have always lived in Victoria, has the availability of salt water sports fishing played an important part in your decision not to move out of the city?
1. Yes _____
2. No _____
6. If salt water sports fishing has influenced your decision not to move out of Victoria in the past, what were some of the benefits you forfeited in your decision not to move?
- _____
- _____

7. About how many years have you been salt water fishing?

_____ years

IF YOU PERSONALLY DO NOT OWN A BOAT USED FOR SALT WATER FISHING,
OMIT QUESTIONS 8 to 10 AND PROCEED TO QUESTION 11.

8. On how many days in 1968 did you use your boat for other than salt water fishing?

(a) In salt water for such activities as cruising, water skiing, skin diving, and so on.

_____ days

(b) In fresh water for such activities as fresh water fishing, water skiing, hunting, pleasure boating, and so on.

_____ days

9. What is your boat(s) made of, and how old is it?

CONSTRUCTION
(Wood, Aluminum, Fiberglass)

AGE

1. _____ years old

2. _____ years old

10. When you originally purchased or built your boat(s), what were the main purposes you intended to use it for? Please list in an order from most important to least important.

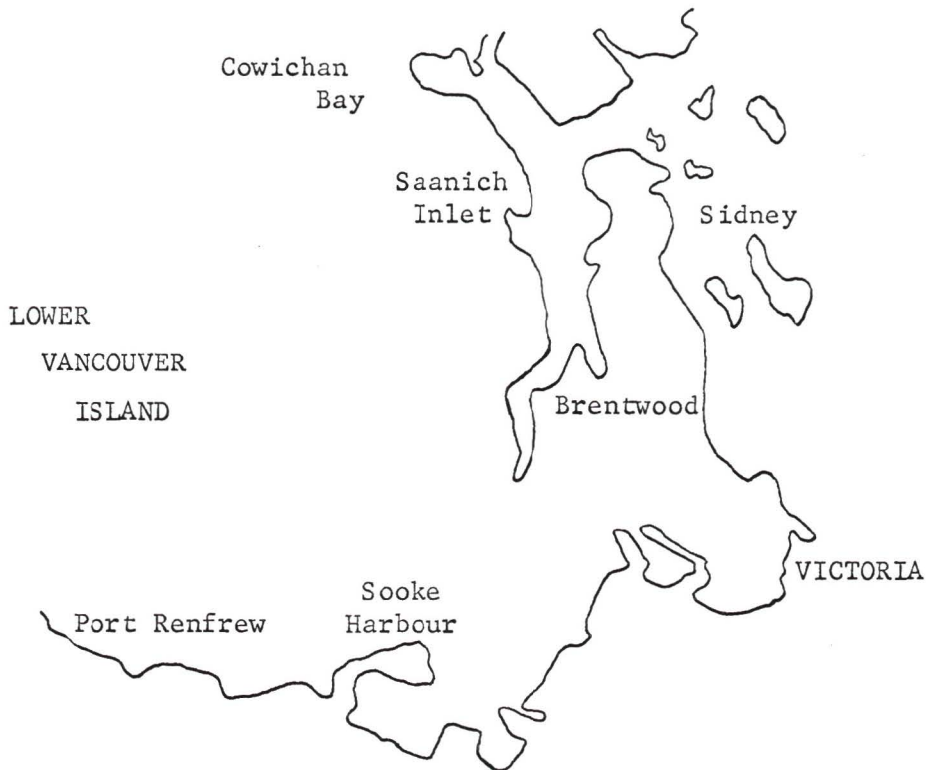
1. _____

2. _____

3. _____

ALL SPORTS FISHERMEN ANSWER THE FOLLOWING QUESTIONS

11.



From the above map, please list those salt water fishing areas in an order from the area you fished most to the one you fished the least in 1968. Also list the major reason(s) why you choose each of the regions you indicate. Record the region by its name and the reason(s) by its number according to the following table:

- | | |
|-------------------------------|--|
| 1. ease of access | 6. calm water |
| 2. caught a fish there before | 7. chance of catching a certain type of fish |
| 3. suggested by a friend | 8. own a summer cottage nearby |
| 4. newspaper publicity | 9. other reasons, please specify |
| 5. saw others fishing there | |

REGION(S)	REASON(S)
1st _____	_____
2nd _____	_____
3rd _____	_____

12. Outside of the Southern Vancouver Island area as shown on the map, where else did you engage in salt water fishing in 1968?

- | | |
|----------|----------|
| 1. _____ | 3. _____ |
| 2. _____ | 4. _____ |

13. Approximately how many salmon and grilse did you catch in salt water in 1968? (Do not include those fish caught by others fishing with you).

Number _____

14. How much leisure time do you have during daylight hours? Remember leisure time is that time not devoted to employment or household chores.

(a) How many leisure time hours during your weekly working days? (Normally Monday through to Friday)

_____ leisure time hours

(b) How many leisure time hours during your weekly days off? (Normally Saturday and Sunday)

_____ leisure time hours

(c) How many weeks do you have for your annual vacation?

_____ weeks

15. Please estimate the expenses you incurred on behalf of yourself or your family in 1968 on salt water sports fishing. (This includes all trips taken solely for the purpose of salt water fishing and NOT vacations during which you happened to go salt water fishing.)

- Rental of boats, trailers or motors: \$ _____
- Rental of fishing tackle: \$ _____
- Bait and fishing lures: \$ _____
- Food, refreshments, and accommodation if directly related to fishing \$ _____
- Transportation costs to get to the fishing sites: \$ _____
- Guide services: \$ _____

BOAT OWNERS: How much did you spend in 1968 on the following:

- Boat and engine maintenance repairs: \$ _____
- Boat operating expenses (fuel, oil, etc.): \$ _____
- Moorage, launching & boat cartage fees \$ _____

16. What fraction of the above expenses were specifically for yourself? For example, if you are the head of the household and your wife usually accompanies you on your salt water sports fishing trips, half of your expenses would be specifically for yourself and half for your wife.

Percentage applicable to you _____%

17. Please estimate the present value of your salt water fishing rods and tackle.

\$ _____

18. Please help us record your present investment in salt water sports fishing equipment. We realize that it will be necessary to charge only part of certain costs to fishing but we believe that you can do this better than we can. Take a piece of fishing equipment and calculate the percentage of use solely for salt water sports fishing. For example, if you own a boat and you used it only one-half of the time for salt water sports fishing, this would mean 50% of its use is for salt water fishing.

	Approximate cost when <u>you</u> purchased or built the item	Year purchased	% of use devo- ted to sea fishing in 1968
<u>Boating Equipment</u>			
- Boat(s):	\$ _____	_____	_____ %
- Boat trailer or car top carrier:	\$ _____	_____	_____ %
- Inboard and/or outboard motor:	\$ _____	_____	_____ %
<u>Special Clothing</u>			
- Boots:	\$ _____	_____	_____ %
- Coats:	\$ _____	_____	_____ %
- Rainwear:	\$ _____	_____	_____ %
- Other:	\$ _____	_____	_____ %
<u>Special Equipment</u>			
- Tents:	\$ _____	_____	_____ %
- House trailer:	\$ _____	_____	_____ %
- Campers:	\$ _____	_____	_____ %
- Sleeping bags:	\$ _____	_____	_____ %
- Lantern:	\$ _____	_____	_____ %
- Stoves:	\$ _____	_____	_____ %
- Other:	\$ _____	_____	_____ %

19. Here are a few questions about yourself. First, are you married?

1. Yes _____

2. No _____

20. If yes--

If you have children living with you now, what is the age of each child?

Number of children _____

Age of each child _ _ _ _ _

21. What is your approximate age? Please put the number of the appropriate age bracket in the space provided.

1. 24 years and under
2. 25 - 34 years old
3. 35 - 44 years old
4. 45 - 54 years old
5. 55 - 64 years old
6. over 65 years old

Number _____

22. What is your occupation? or What is the occupation of the head of the household? Please put the number in the space provided.

1. Managerial
2. Professional and technical
3. Clerical
4. Sales clerk
5. Service and recreation
6. Transport and communication
7. Primary industry (fishing, logging, etc.)
8. Labourer
9. Craftsman, production process and related works

Number _____

23. What is the last grade you completed in school on the basis of the following categories?

1. Elementary School (Grades 1 - 7)
2. Secondary School (Grades 8 - 10)
3. Secondary School (Grades 11 - 12)
4. Some University
5. University Degree

Number _____

24. Which of the following income groups comes closest to your family's income--that is, your income from all sources before taxes and deductions? Please place the number in the appropriate space.

- | | |
|----------------------|-----------------------|
| 1. Less than \$2,999 | 4. \$7,000 - \$8,999 |
| 2. \$3,000 - \$4,999 | 5. \$9,000 - \$12,000 |
| 3. \$5,000 - \$6,999 | 6. over \$12,000 |

Number _____

THANK YOU KINDLY FOR COMPLETING THE QUESTIONNAIRE. YOUR COOPERATION IN RETURNING IT WILL BE GREATLY APPRECIATED.

APPENDIX C

UNIVERSITY OF VICTORIA
VICTORIA, BRITISH COLUMBIA

Department of Geography

Outdoor Recreation Study

Dear

The Department of Geography at the University of Victoria is presently engaged in research concerning the outdoor recreation activities of Greater Victoria residents. As part of this study we are anxious to determine the extent of activity in different recreational pursuits. To this end we would be very grateful if you would permit one of our researchers to interview you and ask a few questions on your use of leisure time.

One of our researchers will contact you in the near future. We would be very appreciative of your cooperation in this venture.

Yours sincerely,

John Rostron,
Graduate Student.

APPENDIX D

UNIVERSITY OF VICTORIA
VICTORIA, BRITISH COLUMBIA

Department of Geography

Dear

We would like to take this opportunity to thank you for your cooperation in our study on the recreation activities of Greater Victoria residents. Through your efforts an attempt is being made to study the value of salt water sports fishing to both the residents of the area and to those who visit the City each year.

Yours sincerely,

John Rostron,
Graduate Student.

APPENDIX E

UNIVERSITY OF VICTORIA
VICTORIA, BRITISH COLUMBIA

Department of Geography

Dear

Outdoor Recreation Study

Recently you cooperated in a University of Victoria study on the outdoor recreation activities of Greater Victoria residents. Included in this study was the interview conducted at your home and the questionnaire that was left with you. To date, we are missing a number of the questionnaires left with the participant to complete. Without this information the study itself will suffer.

If by chance you have mislaid the questionnaire another is included here for your convenience. However, if you have already forwarded your answers please ignore this request and accept our thanks for your time spent and the information you have given us.

Your cooperation in this matter is greatly appreciated.

Kindest regards.

Yours sincerely,

John Rostron,
Graduate Student.

APPENDIX F

CODING FORMATS USED IN THE STUDY

A. Independent or Explanatory Variables--Socio-Economic, Demographic and Miscellaneous Characteristics

Most of the following variables were coded according to their classification in the questionnaire.

List of Variables	Coding Format
Income	Increasing Ordinal Scale 1 to 6
Age	Increasing Ordinal Scale 1 to 6
Retired	1 if Retired; 0 if not Retired
Education	Nominal Scale 1 to 5
Skilled Employee	1 if Unskilled; 0 if Skilled
Unskilled Employee	1 if Unskilled; 0 if Skilled
Married	1 if Married; 0 if not Married
Family Size	Simple Recording of the Number of Children
Length of Residence in Victoria	Increasing Ordinal Scale 1 to 4
Years of Salt Water Sports Fishing Experience	Increasing Ordinal Scale 1 to 4
Boat in 'Other' Salt Water Activities (1968)	Increasing Ordinal Scale 1 to 9
Number of Days One Used His Boat in Fresh Water Activities (1968)	Increasing Ordinal Scale 1 to 9

B. Independent Variables--Leisure Time Activities

Visiting with Friends, Parties, Dancing	(1 if important in 1968 (0 if not important in 1968
Reading or Watching T.V.	"
Going to Plays, Concerts, Lectures, Museums	"
Driving for Pleasure	"
Participating in Clubs and Other Organizations	"
Gardening, Working in the Yard	"
Photography	"
Workshop or Homemaking Hobbies	"
Sports	"
Nature of Sport Enthusiast	1 if participant; 2 if spectator; 3 if both

List of Variables	Coding Format
Outdoor Swimming or Going to the Beach	(0 if did not participate at all in 1968 (1 if participated 1-4 times in 1968 (2 if participated 5-10 times in 1968 (3 if participated more than 11 times in 1968
Boating and Canoeing	"
Fresh Water Fishing	"
Hunting	"
Skiing and Other Winter Sports	"
Water Skiing	"
Driving for Sightseeing or Pleasure	"
Nature Walks	"
Picnics	"
Camping	"
Horseback Riding	"
Going for Walks in the City	"
Hiking	"
Fishing (Fresh and Salt Water)	(1 if participated in in 1968; (0 if did not participate in in 1968
Camping	"
Hiking, Beachcombing, Exploring	"
Boating	"
Sunbathing and Swimming	"
Home and Garden	"
Sports (Lawn Bowling, Golf, Curling, etc.)	"
Hunting	"
Driving and Family Outings	"

C. Independent Variables--Recreation Experience

Catching a fish provides both a pleasurable experience and a material product for one's efforts	0 if No; 1 if Yes
Salt water sports fishing is an activity that serves as a "sport" to the participant	"
Provides the opportunity to appreciate an environment which substitutes for the more typical environment of everyday life	"
Provides the opportunity for companionship with family or friends	"
Provides the opportunity to enjoy the aesthetics of the outdoors	"

List of Variables	Coding Format
Salt water sports fishing is a traditional form of leisure time use	0 if No; 1 if Yes
Provides the opportunity to pursue other leisure time activities	"
Recalling the experience of fishing trips to oneself or with friends	Ordinal rating scale 1-12
Enjoying the pleasures of boating	"
Getting away from the demands of the work-a-day world and the city environment	"
Travelling home from the fishing site	"
Appreciating the thrill of the actual catching of the fish	"
Taking it easy and getting rid of tensions	"
Enjoying the healthy atmosphere of the outdoors	"
Travelling to the fishing site	"
Enjoying the planning and the anticipation of a fishing trip	"
Having a change of pace by doing something different	"
Enjoying the easygoing companionship of friends or family while fishing	"
Observing the beauty of nature and the peaceful surroundings	"

D. Independent Variables--Restricting Factors on Participation

1. Why did you not participate in more recreational activities in 1968?

Variables	Coding Format
Lack of Time	0 if No; 1 if Yes
Weather Conditions	"
Quite Satisfied	"
Lack of Friends to Go With	"
Sickness; Old Age	"
Family Responsibilities	"
No Fishing Partner	"
No Boat	"
Cost	"

2. What was it, mainly, that prevented you from engaging in more salt water sports fishing in 1968?

Variables	Coding Format
Lack of Time	0 if No; 1 if Yes
Weather Conditions	"
Quite Satisfied	"
Old Age; Sickness	"
Other Competing Activities	"
Family Responsibilities	"
No Fishing Partner	"
No Boat	"
Cost	"

3. Could you identify those factors that you consider when you are trying to decide whether to go salt water sports fishing or not?

Weather Conditions	0 if No; 1 if Yes
Tide Conditions	"
Availability of Fish	"
Amount of Time Available	"
Companionship	"
Family Responsibilities	"
Access to Fishing Area	"
Health	"
Cost	"

APPENDIX G

MULTIVARIATE ANALYSIS OF THE DEMAND
FOR SALT WATER SPORTS FISHING

It is possible from simple regression analyses, as described in Chapter Four, to determine the strength of the association between a given dependent variable, such as investment, and other attributes, such as income. Such analyses, however, do not enable one to assess how much the variations in the dependent variable are due to that particular attribute or to others. For this it is necessary to use more complicated techniques of analysis, such as multiple regression. In this study it was decided to use step-wise regression.¹

As noted in Chapter Four, the analysis was carried out in two stages. In the first stage the various independent variables were sorted initially into four groups: leisure time activities, socio-economic and demographic characteristics, recreation experience, and restricting factors, and coded according to the classifications that were used in the questionnaire. Income, for example, was classified on an ascending ordinal scale of one to six. The variables allocated to the various groups are noted in the coding formats set out in Appendix F. Next, these groups of variables were correlated in turn with each of the dependent variables--investment, participation, and value. From this analysis it was possible to determine levels of significance of the correlations between each of the dependent variables and the various independent variables.

The second stage consisted of an analysis of correlations between

groups of statistically significant independent variables and the three dependent variables. Those correlations with a significance above the five percent level in the first stage were used in the analysis in the second stage. This made it possible to assess which of the different variables, and groups of variables, provided the most satisfactory explanation of variations of a given dependent variable.

Like all multiple correlation techniques, the step-wise regression method has some deficiencies. For example, it cannot separate the individual values of sever^l inter-correlated variables with complete accuracy. However, the technique does yield reliable estimates of the relationship between a dependent variable and each set of independent variables. It is possible that a somewhat larger portion of the variance could have been explained by the use of more complicated techniques of analysis, but the method chosen seemed satisfactory for the purposes of this study.

ANALYSIS OF THE INFLUENCE OF SOCIO-ECONOMIC AND DEMOGRAPHIC CHARACTERISTICS

The first group of independent variables--socio-economic and demographic characteristics--was correlated with each of the various dependent variables. The results of the analysis are set out in Table One. A list of the independent variables that best explain the variance of investment are recorded in the table. During each stage of the analysis a different independent variable is entered into the regression equation, in a step-wise fashion, until no additional variable is capable of producing an increase in the R^2 exceeding .005. R refers to the multiple correlation between the independent variables and the dependent variable; R^2 indicates the percentage proportion of the total variance that is

explained by the independent variables; and, the increase in the R^2 simply reflects the effect of each sequentially entered variable. The T - Value provides the statistical test to indicate the level of statistical significance of the independent variables used.

Investment

Of the various independent variables, income appears to be the most important influence on investment in salt water sports fishing. As Table One shows, income alone accounts for over nineteen percent of the observed variation. When age is added, the regression co-efficient (R^2) is increased by .041 or about four percent. It should be noted in passing, however, that the positive correlation between age and investment suggests that as people get older, they have more money available to invest in recreation, and that sports fishing is one of a gradually narrowing range of recreational pursuits in which they are interested. It appears also from the high positive correlation between the use of the boat for non-salt water fishing activities and investment, that boats become more important as a focus for activities in addition to salt water fishing as people get older.

The socio-economic and demographic characteristics accounted for only twenty-seven percent of the variance. The implication is, of course, that factors in addition to those included here explain variations in the amount salt water sports fishermen spend on the pursuit of this form of recreation.

Participation

The rating of salt water sports fishing in a ranking of recreational activities is a good indicator of the probable extent of participation.

TABLE 1

THE PREDICTION OF THE DEMAND FOR SALT WATER SPORTS FISHING--
 SUMMARY OF STEP-WISE REGRESSION ANALYSIS USING SOCIO-ECONOMIC, DEMOGRAPHIC AND MISCELLANEOUS CHARACTERISTICS

Independent Variable Entering the Equation	Sign	R	R ²	Increase in R ²	T-Value		Level of Significance
					To Enter Equation	In Final Equation	
Prediction of Investment							
Income	+	.444	.197	.197	4.910	5.092	.005
Age	+	.488	.238	.041	2.265	2.106	.025
Used boat in 'other' salt water activities	+	.509	.259	.021	1.671	1.667	.05
Rating of salt water sports fishing as a recreation activity	-	.519	.269	.010	1.123	1.123	*
Prediction of Participation							
Rating of salt water sports fishing	+	.733	.537	.537	10.659	10.738	.0005
Unskilled employee	+	.758	.574	.038	2.948	2.665	.005
Used boat in 'other' salt water activities	+	.769	.591	.016	1.934	1.934	.05
Prediction of Value							
Income	+	.276	.076	.076	2.842	2.409	.01
Married	+	.350	.123	.047	2.268	1.951	.05
Age	-	.374	.140	.017	1.399	1.419	.10
Used boat in fresh water activities	+	.396	.157	.017	1.554	1.419	.10
Years of salt water sports fishing experience	-	.413	.171	.014	1.245	1.245	*
*Statistically insignificant							

This rating accounted for fifty-four percent of the observed variance in participation. The explanation of variations in participation is improved somewhat by the inclusion of a few other variables, such as the nature of occupation and the use of boats in non-salt water sports fishing activities. The R^2 is increased by .054 or approximately five percent. Even so, a considerable portion of the variance remains unexplained. This indicates, as in the case of investment, that factors in addition to those considered determine the extent of participation.

Value

Socio-economic and demographic characteristics do not account in any significant way for the value attached to sports fishing. These variables account for only seventeen percent of the observed variance. Here again, additional factors need to be taken into account.

Analysis of the Influence of Leisure Time Activities

Preferences for other types of recreation activities provide only a partial explanation for investment and participation in, and values attached to, salt water sports fishing (Table Two).

Investment

Only three variables provide useful indications of the influence of leisure time activities on investment in salt water sports fishing. These are boating, family outings, and hiking. Together these explain nineteen percent of the variance: boating by itself accounts for ten percent while family outings and hiking account for the other nine percent.

The negative correlation between investment and family outings, and

TABLE 2

PREDICTION OF INVESTMENT IN SALT WATER SPORTS FISHING BY LEISURE TIME ACTIVITIES--
SUMMARY OF STEP-WISE REGRESSION ANALYSIS

Independent Variable Entering the Equation	Sign	R	R ²	Increase in R ²	T-Value		Level of Significance
					To Enter Equation	In Final Equation	
Boating 1 (important 1968 activity)	+	.323	.104	.104	3.377	3.583	.0005
Family outings	-	.387	.150	.046	2.288	2.339	.025
Hiking	-	.435	.189	.039	2.149	2.345	.025
Camping 1 (important 1968 activity)	-	.459	.211	.027	1.620	1.557	.10
Sports (important 1968 activity)	-	.478	.228	.011	1.476	1.578	.10
Gardening, working in yard	+	.497	.247	.015	1.516	1.254	*
Boating or canoeing 2 (participation 1968)	+	.514	.264	.017	1.441	1.597	.10
Hunting	+	.527	.278	.014	1.376	1.045	*
Outdoor swimming	-	.543	.295	.017	1.473	1.475	.10
Picnics	+	.553	.306	.011	1.204	1.150	*
Skiing and other winter sports	-	.563	.317	.011	1.186	1.402	.10
Photography	-	.571	.326	.009	1.039	1.077	*
Driving for sightseeing	+	.578	.334	.008	1.073	1.249	*
Water skiing	-	.585	.342	.008	1.036	1.238	*
Nature walks	+	.591	.350	.007	0.906	0.942	*
Camping 2 (participation 1968)	+	.596	.355	.006	0.868	0.868	*

*Statistically insignificant

between investment and hiking, suggest that sports fishing is not usually a family activity. Typically, it seems, it is a recreational pursuit followed by the male members of a household. In addition, sports fishing competes directly with certain other outdoor recreation activities, such as hiking. Both are generally pursued in the summer and early fall. Greater participation in the one form of recreation necessarily means a reduction in participation in the other.

The addition of the remaining independent variables does not reduce the unexplained variance by very much. However, some comment upon the relationships of these variables to investment is merited. Those outdoor activities that do not have an age restricting factor are positively related--boating one and two, hunting, nature walks, and camping two. The discrepancy between camping one and two can only be accounted for by the fact that the degree of importance given to the activity and the actual amount of participation are measures of two different things. Those family responsibilities--gardening, picnics, driving for sightseeing--are positively related to investment indicating activity in these pursuits are related to higher investment. Those negative relationships--sports, skiing, photography, outdoor swimming, hiking--have in common the fact that they are activities which are either costly or participation is determined by physical fitness.

Participation

The nature of leisure time activities in which sports fishermen engage does not provide a satisfactory explanation of variations in participation in salt water sports fishing. Examination of the results presented in Table Three reveals that none of the independent variables considered

TABLE 3

PREDICTION OF PARTICIPATION IN SALT WATER SPORTS FISHING BY LEISURE TIME ACTIVITIES--
SUMMARY OF STEP-WISE REGRESSION ANALYSIS

Independent Variable Entering the Equation	Sign	R	R ²	Increase in R ²	T-Value		Level of Significance
					To Enter Equation	In Final Equation	
Sports (important 1968 activity)	-	.268	.072	.072	2.753	4.148	.0005
Boating or canoeing 2 (participation 1968)	+	.356	.127	.055	2.474	2.742	.005
Going to plays and concerts	+	.433	.187	.060	2.675	2.078	.025
Picnics	+	.462	.213	.026	1.768	2.377	.01
Outdoor swimming	-	.490	.240	.027	1.806	1.301	.10
Fishing (fresh water)	+	.510	.260	.020	1.613	1.918	.05
Camping 1 (important 1968 activity)	-	.526	.277	.017	1.429	1.595	.10
Sport, spectator and participant	+	.538	.289	.012	1.288	1.272	*
Boating 1 (important 1968 activity)	-	.548	.300	.011	1.172	1.465	.10
Nature walks	-	.560	.314	.014	1.350	1.320	.10
Water skiing	+	.566	.320	.006	0.865	0.865	*

*Statistically insignificant

explains very much of the variance, and that even when all of the statistically significant correlations are grouped together, only thirty-two percent of the variance is explained.

Value

Similar difficulties are encountered in trying to explain variations in value attached to salt water sports fishing. Of the different independent variables considered, camping provides a useful indicator, giving an R^2 value of .069. Even when combined with other statistically significant correlations, however, only thirty-nine percent of the variance is explained (Table Four).

Analysis of the Influence of Recreation Experience

One of the factors that may explain variations in the demand for salt water sports fishing is the kind of enjoyment the participant gets out of this activity. It seemed to the author that the nature of such enjoyment would be revealed by their ratings of various types of experience that might be derived from sports fishing, such as 'the thrill of catching a fish', 'having the opportunity to get away from the work-a-day world', or 'enjoying the pleasures of boating'. A basic difficulty, however, is that of identifying a small enough set of factors in the recreation experience. Because there are so many possible motivations for recreation, the potential list of influences is enormous. Hundreds of related but nevertheless different factors can be identified. Unfortunately, the larger the number of factors identified, the more complicated the analysis becomes.

A total of nineteen possible factors were identified in the present study. As noted in Chapter Four, an attempt was made to determine the

TABLE 4

PREDICTION OF PERSONAL VALUE FOR SALT WATER SPORTS FISHING BY LEISURE TIME ACTIVITIES--
SUMMARY OF STEP-WISE REGRESSION ANALYSIS

Independent Variable Entering the Equation	Sign	R	R ²	Increase in R ²	T-Value		Level of Significance
					To Enter Equation	In Final Equation	
Camping 2 (participation 1968)	+	.262	.069	.069	2.685	1.555	.05
Reading and watching T.V.	+	.330	.109	.030	2.104	2.551	.01
Going to plays and concerts	-	.375	.141	.032	1.877	2.668	.005
Gardening and working in the yard	+	.414	.171	.032	1.883	1.915	.05
Horseback riding	-	.440	.194	.021	1.610	1.349	.10
Boating 1 (important 1968 activity)	-	.467	.218	.024	1.712	1.733	.05
Driving for pleasure	+	.503	.253	.035	2.060	2.057	.025
Camping 2 (important 1968 activity)	+	.519	.269	.016	1.427	1.894	.05
Hiking	-	.535	.286	.027	1.476	2.061	.025
Photography	-	.553	.306	.020	1.582	1.069	*
Hunting	+	.566	.320	.014	1.378	1.830	.05
Going for walks in the city	+	.578	.334	.014	1.319	1.276	*
Outdoor swimming	-	.588	.346	.012	1.224	1.353	.10
Sports (important 1968 activity)	-	.594	.353	.007	1.006	1.164	*
Sports (spectator and parti- cipant 1968)	-	.602	.362	.009	1.009	1.490	.10
Skiing and other winter sports	+	.611	.373	.011	1.212	1.218	*
Nature walks	+	.617	.381	.008	0.969	0.976	*
Visiting friends, parties, dancing	-	.622	.387	.006	0.886	0.886	*

*Statistically insignificant

extent to which inter-relationships occurred between these motivational factors. This revealed no significant clusterings of reasons for participating in sports fishing. Each fisherman apparently has a distinct hierarchy of motivations, which is not ubiquitous to all fishermen, or even a majority of them, even though each motivation may be influential in all fishermen's desire to fish.

Despite the difficulties resulting from the fact that there are so many potential motivations, it is possible to determine which of these are the most significant in explaining variations in the demand for sports fishing. The multivariate analysis reveal that seven of the nineteen factors identified were significant (Table Five).

Investment

The results of the analysis presented in Table Five revealed first that there is only one independent variable relating to recreational experience that is significant beyond the five percent level. Second, through step-wise multiple regression only eleven percent of the variance in the investment can be explained by the independent variables selected.

It is possible that a greater amount of the variance could have been explained had there been fewer identified components of the recreation experience. There were seven main types of response to the open-ended question "Why do you like salt water sports fishing?" To these were added a further twelve categories derived from the forced choice question on recreational experience (Appendix F). There was no consistency in the way in which respondents established their rankings with respect to the open-ended question and the forced-choice question; i.e., in some instances a respondent ranked a particular motivational factor high in

TABLE 5
 PREDICTION OF THE DEMAND FOR SALT WATER SPORT FISHING BY THE RECREATION EXPERIENCE

Independent Variable Entering the Equation	Sign	R	R ²	Increase in R ²	T-Value		Level of Significance
					To Enter Equation	In Final Equation	
Prediction of Investment							
Alternative to everyday life	+	.135	.018	.018	1.345	1.512	.10
Getting away from the work-a-day world	+	.184	.034	.016	1.260	1.421	.10
Enjoying the pleasures of boating	+	.223	.050	.016	1.254	1.682	.05
Enjoying the easygoing companionship of friends	+	.246	.060	.011	1.051	1.060	*
Recalling experience with friends	+	.266	.071	.010	1.016	1.222	*
Opportunity to pursue other leisure time activities	+	.281	.079	.008	0.928	1.339	.10
Thrill of catching a fish	-	.301	.091	.012	1.071	0.934	*
Provides opportunity to enjoy aesthetics of outdoors	-	.313	.098	.007	0.871	0.994	*
Traditional form of leisure time use	-	.327	.107	.009	0.959	0.959	*
Prediction of Participation							
Change of pace by doing something different	-	.366	.134	.134	3.895	3.643	.0005
Provides opportunity to enjoy aesthetics of outdoors	+	.438	.192	.058	2.629	1.701	.05
Recalling experience with friends	+	.474	.225	.033	2.030	1.399	.10
Enjoying the planning and anticipation of fishing trip	-	.498	.248	.023	1.723	1.805	.05
Alternative to everyday life	-	.517	.267	.019	1.575	1.786	.05
Thrill of catching a fish	+	.531	.282	.015	1.374	1.159	*
Opportunity to pursue other leisure time activities	-	.543	.295	.013	1.279	1.607	.10
Traditional form of leisure time use	-	.556	.309	.015	1.354	1.324	.10
Travelling to the fishing site	-	.568	.323	.013	1.344	1.514	.10
Enjoying the healthy atmosphere of the outdoors	-	.573	.328	.005	0.884	1.043	*
Enjoying the pleasures of boating	-	.579	.335	.007	0.965	1.082	*
Opportunity for companionship	+	.584	.341	.006	0.868	0.961	*
Travelling home from the fishing site	-	.589	.347	.006	0.887	0.887	*
Prediction of Value							
Getting away from the work-a-day world	+	.302	.091	.091	3.141	2.316	.025
Travelling home from the fishing site	-	.356	.127	.036	1.976	2.351	.025
Enjoying the healthy atmosphere of the outdoors	-	.391	.153	.026	1.730	1.532	.10
Taking it easy and getting rid of tensions	-	.409	.167	.014	1.284	1.176	*
Travelling to the fishing site	+	.416	.173	.006	0.824	0.824	*

* Statistically insignificant

the open-ended question but ranked a similar factor low in the forced-choice question. A consequence was the factor analysis failed to establish inter-correlated groups of variables.

Participation

Recreational experience appears to be a better predictor of participation in that the variables entered account for thirty-five percent of the explained variance. Of these only four were statistically significant beyond the five percent level, namely 'change of pace by doing something different', 'provides the opportunity to enjoy the aesthetics of the outdoors', 'enjoying the planning and anticipation of a fishing trip', and 'provides an alternative to everyday life'.

Value

Recreational experience is not a good indicator of the personal value rating of salt water fishing. Only seventeen percent of the observed variance was accounted for, and only two of the variables entered were significant beyond the five percent level.

The difficulties here may not necessarily be rooted in the large number of motivational factors identified, but they may possibly stem from the problems of measuring 'personal value' of salt water sports fishing. As noted in Chapter Four, the rating scale approach provides only a partial indication of personal value. An attempt was made to overcome this problem by introducing additional measures of 'personal value' through a factor analysis. Even this, however, may not provide a completely satisfactory measure of such value.

TABLE 6

PREDICTION OF PARTICIPATION IN SALT WATER FISHING
 ON THE BASIS OF RESTRICTING FACTORS ON PARTICIPATION--
 SUMMARY OF STEP-WISE REGRESSION ANALYSIS

Independent Variable Entering the Equation	Sign	R	R ²	Increase in R ²	T-Value		Level of Significance
					To Enter Equation	In Final Equation	
Sickness; old age	-	.273	.075	.075	2.808	3.066	.005
Other competing activities	-	.377	.142	.067	2.771	1.798	.05
Poor weather 1	+	.436	.190	.048	2.370	1.991	.01
Does not own a boat	-	.470	.221	.031	1.953	1.976	.01
Lack of time	+	.496	.246	.025	1.762	1.953	.01
Poor access facilities	-	.515	.265	.019	1.546	1.091	*
Family responsibilities 1	-	.527	.278	.013	1.278	1.093	*
Weather conditions 2	+	.536	.287	.009	1.114	1.298	.10
Family responsibilities 2	-	.541	.293	.006	0.842	1.325	.10
Lack of friends to go with	-	.548	.300	.007	0.948	0.879	*
Quite satisfied	+	.554	.307	.007	0.914	1.073	*

*Statistically insignificant

Analysis of the Influence of Restricting Factors on Participation

Restricting factors refer to those directly associated with participation and not investment or value. The following review, then, refers only to the step-wise regression results related to participation.

Table Six indicates that 'poor health' is the best single predictor of sports fishing participation and, as might be expected, exhibits a negative correlation. 'Other competing activities' is the second best predictor, again having a negative relationship, but increasing the R^2 by .067 to fourteen percent. Of the three remaining statistically significant variables, which increase the explained variation to approximately twenty-five percent, only one of the correlations is clearly understandable. The fact that the fisherman does not own a boat results in a relatively lower rate of participation when compared with the other members of the sample. The remaining significant variables, 'poor weather' and 'lack of available time', however, have positive correlations with participation. Evidently, those who regard these factors as restrictors on participation do have a high rate of involvement, relative to other fishermen. The addition of the remaining variables increase the amount of variation explained to thirty-one percent.

Footnotes

- 1 For a detailed description of this technique, see H.M. Blalock, Social Statistics (Toronto, Ontario: McGraw-Hill Book Company, Inc., 1960), pp. 273-358.

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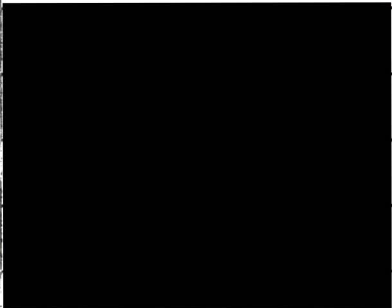
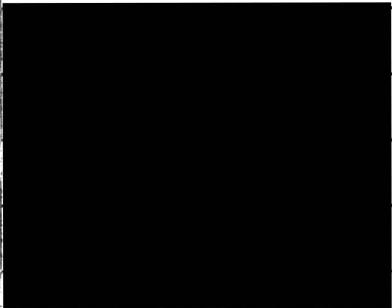
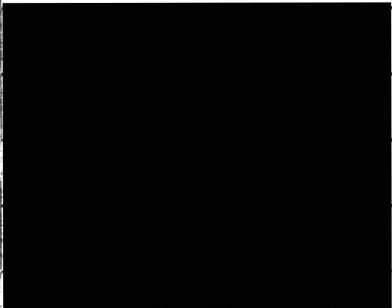
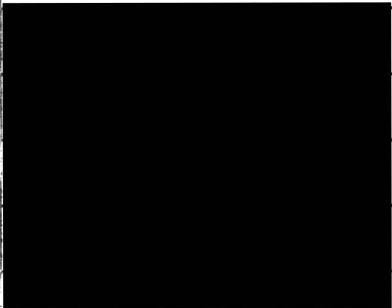
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