

PLANNING AND DECISION-MAKING IN THE FISH AND WILDLIFE
BRANCH - A STUDY OF STEELHEAD FISHERMEN'S CHARACTERISTICS,
PREFERENCES, OPINIONS AND ATTITUDES

by

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ABSTRACT

Planning is concerned with understanding and relating both the physical and social aspects of an environment and arriving at alternatives which best satisfy the public for whom the resource is being managed. To plan so that maximum benefits are derived it is important to weigh benefits and costs to determine the feasibility of an alternative. However, public recreation is an area which operates outside the market mechanism and therefore methods using other than monetary measures must be developed to determine how maximum public benefits can be achieved.

The literature provides little help in overcoming this problem. The few studies undertaken on characteristics, preferences and attitudes of recreationists have not been carried out in the context of decision-making and therefore many of the findings of these studies are inapplicable in planning. This study suggests a methodology which could be used by the Fish and Wildlife Branch to enable more effective development of alternatives for planning of the steelhead sport fishery resource. A questionnaire was developed to enable assessment of the user public's characteristics, preferences, opinions and attitudes. By this method the public's desires can be taken into account in the generation of alternatives thereby approaching the goal of maximizing public benefits.

For the purpose of the study steelhead fishermen of the Lower Mainland of British Columbia were sampled. As the Fish and Wildlife Branch now assesses fishermen's views by ad hoc meetings with fishermen from organized clubs the sample of fishermen taken for this study were from two discernable groups; the organized and the unorganized fishermen.

The questionnaire was distributed to 117 organized and 378 unorganized fishermen. By this method it was possible to test if organized fishermen (about 5% of all steelhead fishermen) were representative of all steelheaders. From the organized sample 61 questionnaires were returned while 164 were included in the data analysis from the unorganized fishermen.

The questionnaire was distributed to 7 managers of the Lower Mainland steelhead fishery. The results obtained from this group, it was hoped, could be compared with those of the two fishermen groups. However, results from this sector have not been deeply analysed because of the small number in the sample and the difference in influence that the various members of this group could bring to bear on decisions.

Using the Statistical Package for the Social Sciences (S.P.S.S.) and crosstab format the fishermen were compared on their responses to the questionnaire. From analysis of these data a number of conclusions were forthcoming:

- Organized and unorganized fishermen were found to be different.
- There is a wide range of fishing experience desired.
- A systematic collection of information on resource users is feasible and desirable.

These conclusions have implications for the planning of this resource. By establishing that organized and unorganized fishermen are different it is clear that the collection of information on the desires of both groups of fishermen is needed. The Branch already collects information on catch and release statistics by questionnaire and this vehicle could be extended to gather fishermen's opinions, attitudes and desires.

The wide range of experiences desired by the fishermen suggests that a range of alternatives must be provided in order to increase user benefits. The Fish and Wildlife Branch then must not look for single solutions in planning for the resource but adopt a flexible approach. The geographical diversity of the resource offers the Branch many opportunities for experimenting with programs which would deliver to different groups of fishermen the various types of experiences they desire.

These general conclusions are applicable to other agencies charged with providing outdoor recreation services in a non-market context. These agencies currently devote most of their energies

to managing the physical resource independent of any systematic feedback from the public. The practice of questionnaire analysis as a method of determining user preferences for planning alternatives has become commonplace in the urban areas of planning. In recreation and resource planning, there is a large potential for involving the public in a systematic manner to establish a better basis for developing alternatives which will increase users satisfaction.

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CHAPTER ONE

INTRODUCTION

A. The General Purpose of the Study

The freshwater fishery of British Columbia is a valuable resource, both as a source of recreation for local residents and as an important element of the tourist industry. To secure the greatest practicable benefits from the resource it must be managed with due regard to its biological potentials, the user satisfactions that can be derived therefrom, and the costs of achieving different levels of satisfaction. This thesis is concerned with ways of measuring and taking into account the benefits or satisfactions derived from the resource in planning management programs. This objective is pursued through a case study of the steelhead sport fishery in the Lower Mainland of British Columbia.

B. The Nature of the Management Problem

Many public agencies face similar problems to those confronted by the Fish and Wildlife Branch of British Columbia. In particular, two of the most pressing problems are:

- (i) Taking into account the benefits or satisfaction derived from a non-market resource to ensure optimal benefit;

- (ii) The need for communication and co-ordinated decision-making between resource departments whose plans affect one another.

Although the latter problem is important and needs to be resolved the focus of this thesis will be concentrated on the former - the maximization of benefits.

The market mechanism which traditionally regulates supply and demand, and weighs benefits and cost, does not apply when considering the Fish and Wildlife sport fishery programs. Tradition has dictated that recreation to a great extent is a "public good" and therefore should be outside the market place in which investment in supply is governed in large part by public demand. The cost to the public of partaking of the resource, then, is difficult to measure, as the admission or licence fees, where they exist, bear little relationship to the benefits enjoyed. Therefore, the public official or agency who theoretically pursues the goal of making decisions which maximize benefits to the public, faces the problem of determining benefits other than by traditional economic means.

Because the market mechanism is not applicable, another method is needed to ensure that the management and planning of the fishery resource is carried out in the public's best interest. In recreation planning this has been attempted by assessment of public desires.

In theory, the desires of the public are expressed through the electoral process, and resource management decisions taken by the legislative branch of government thus reflect the public's wishes. This, of course, assumes that the elected official understands the desires and preferences of his constituents, and that the public in turn are continually and accurately informed about the issues addressed by government. However, the complexity of society today no longer allows for the regular communication between the public and the elected official on all governmental activities. Moreover, the elected official does not have time to deal personally with the diversity of decisions that must be made by government in modern society. The result of these factors has been the rise and expansion of government bureaucracies. In theory, the role of the planner and administrator is to aid the politician in arriving at optimal decisions. In practice, they have supplanted the politician in decision-making for many of the questions that arise in their agency.

If decisions are made that the public feels are best, then the agency is maximizing net benefits to the public it serves. However, agencies often lack information on what the public desires and, therefore, cannot know if they are optimizing net benefits. Because of this, there tends to be a breakdown in the democratic process. The agency makes decisions for the public in a growing number of areas, yet the public has little input into these decisions. The result has been widespread dissatisfaction and a sense of alienation among the public. Colin Vaughan (1971) states:

"The failure of the remote bureaucrat to administrate and legislate for the real needs of people has become a crisis in our society. The educators have lost contact with those who wish to learn, the authorities have lost contact with the public; the politician has lost contact with his constituents the people are unable to relate to the forms of government they have inherited and governments are unable to perform the responsibilities they would fulfill." (p. 7)

If it is possible to assess public wants, and the agency does so in its planning, "good" or optimal decision should result. However, the public often believes that decisions are not maximizing social benefits, a belief rising from the absence of effective communication mechanisms. Compounding this problem is the unsuitability of the traditional organizational arrangements of natural resource agencies for evaluating these benefits.

C. The Decision-Making Process

Because of the nature of the problem which faces many resource agencies, that is, expanding their decision-making process to enable assessment of social efficiency, it is instructive to examine an idealized system of decision-making to see where the Fish and Wildlife Branch may be failing in its desire to maximize social benefits.

An ideal public decision-making process in an agency trying to achieve social efficiency in its planning and management of a resource outside the market mechanism must have, among other things, public participation. Not only must this participation come from the organised and more aware groups, but also from the unorganised and perhaps less articulate segments of the public.

The ideal decision-making process could be constructed in the following sequential form allowing for all groups to participate:

1. Identification and definition of the problem to be solved.
2. Determination of the range of preferences that members of society hold. (This step is necessary to assure the generation of alternatives that reflect the desires of different members of society.)
3. Generation of alternative solutions.
4. Application by each individual (or his representative) of his own measurement system to each alternative to determine which alternative he considers to be preferable.
5. Balancing of individual preferences against one another.
6. Selection and presentation of the better alternatives to elected decision-makers.
7. Selection of the socially optimal solution.

The foregoing steps envisage an integrated process under which alternatives are identified by the professional staff, preferences are indicated by users and the final choices are made by elected representatives.

Traditionally agencies like the Fish and Wildlife Branch have developed a pool of staff, who, by their training in biology or engineering, have given their agency a certain perspective on management problems. Obviously people are needed in such agencies who understand the biological and physical aspects of the problem to generate alternative solutions and assess their biological aspects. However, since a resource such as the sport fishery, is managed for the general public, it is necessary that the preferences and attitudes of the user group determine which alternatives will produce the greatest satisfaction.

In practice fishermen preferences have come to the Fish and Wildlife Branch rather sporadically as there has been no systematic effort to contact members of the public who are concerned with use of the resource. Indications are that the professional staff has its most regular contacts with organized groups of fishermen. Although sporadically, this limited contact with organized groups of fishermen allows fisheries managers to develop a feel for the attitudes and desires of some fishermen. However, the resource user who joins clubs such as the Steelhead Society may be atypical, and therefore may not be representative of all fishermen. As a result the views of the unorganized user are neglected. The lack of

systematic determination of the views of sports fishermen, and in particular the evident lack of communication between the professional staff of the Fish and Wildlife Branch and the unorganized fishermen, indicate that essential steps in the idealized decision process are not being met.

Views of unorganized fishermen should be considered when planning for the future of the fishery as this group forms the largest proportion of the fishing public, and it is fundamental in a democracy that the preferences and attitudes of all parties affected by a public program be taken into account. The Fisheries Branch is well aware of the problem, but as yet, has not the staff with expertise in this area, or the money to undertake a comprehensive participation program.

A recent study on Research Needs for Intensive Management of British Columbia Steelhead by Fred Withler (1972) recommended:

"That methods of communication be developed to reveal what it is that anglers desire for their sport, so that management can be directed toward satisfying those desires. At the same time information techniques should be developed which reveal to the angler how steelhead populations may be maintained or increased, and how intrusion of human population and industrialization into the environment of the fish and fisherman may be prevented or ameliorated." (p. 26)

The foregoing observations have led to selection of the following objectives for this study:

To develop and test a methodology for determining the preferences, attitudes and opinions of sports fishermen that would have practical use in planning sports fishery programs so as to maximize user satisfactions.

The ideal of arriving at solutions to problems which maximize social benefits is not unique to fish and wildlife management, but applicable to a range of government agencies. To examine the problem, however, this study will specifically focus on the recreational fishery.

D. The Significance of the Recreational Fishery

"Angling is a use of leisure that holds the interest of between 20 and 25 percent of the entire Canadian population and therefore deserves serious consideration." (Macdonald, 1967, p. 226) In British Columbia during the 1969-1970 season a total of 383,300 freshwater fishing licences were sold and over three million angler days were recorded. Reportedly this resource is worth approximately \$395 million in total benefits to British Columbia. (Pearse, Bowden, 1971, p. 31)

The Outdoor Recreation Resources Review Commission (O.R.R.R.C.) in the United States (1962), discovered that of all outdoor recreation activities fishing was the most spontaneously mentioned as the activity

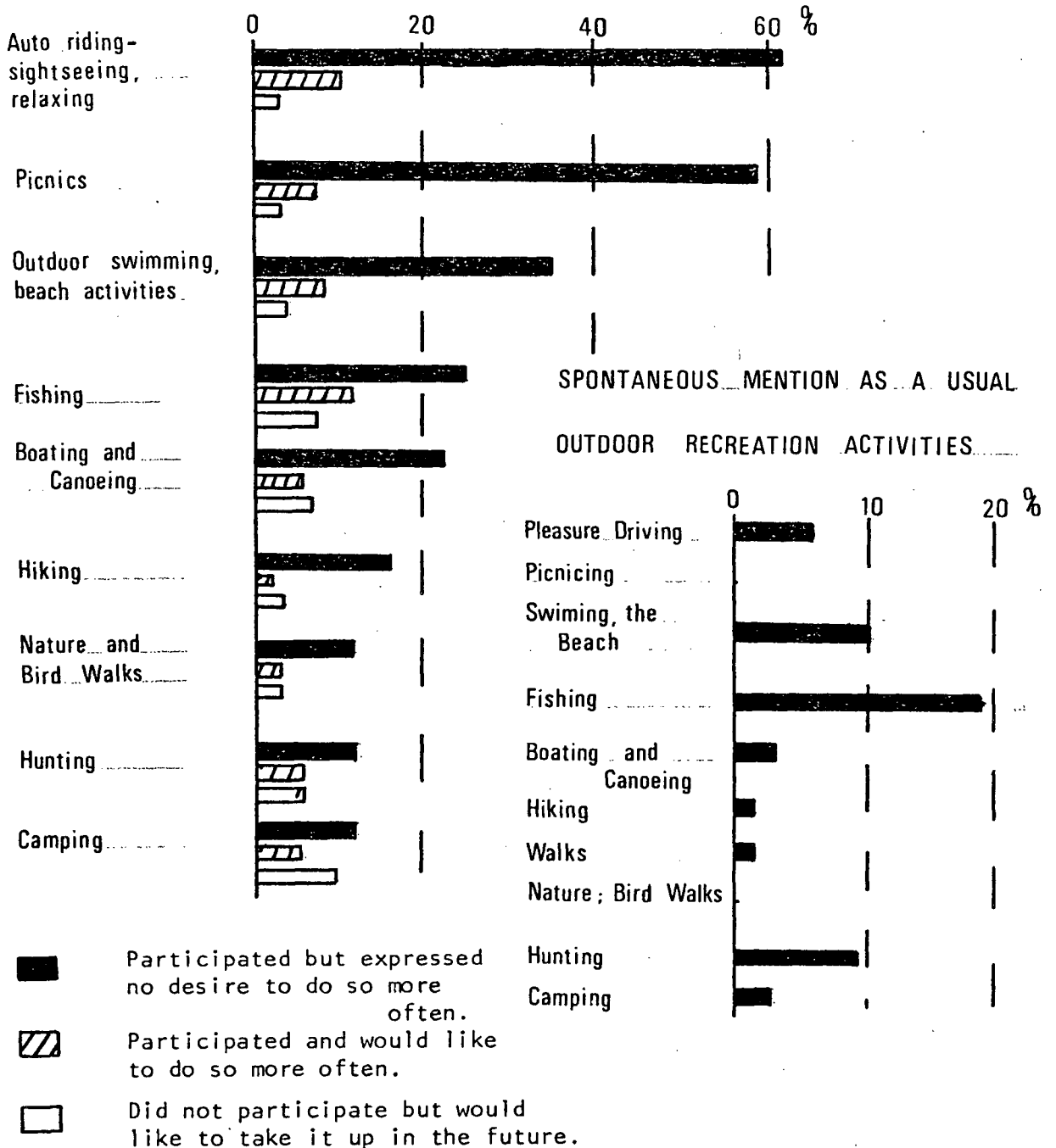
in which people intended to participate. (Figure 1). In addition, it must be remembered that several types of demand are present. The first is actual participation; another is latent demand, that is, demand that is brought out by learning or by new and better opportunities. A further category is option demand; demand expressed by those who wish to preserve the option to participate in the future or who wish to see a recreational resource maintained for future generations.

In British Columbia there is evidence that latent demand exists within the recreational fishery. It appears that there are two distinct groups of recreational fishermen. For, while there are those who buy licences every year, there are also those who purchase a licence only when it is reported that a good supply of fish is expected. It is suggested, therefore, that programs designed to improve the supply of fish could lead to more consistent participation by this latter group. The demand for the recreational fishery is, thus, not fixed but fluctuating, being governed to some degree by the quality of the experience, which includes success ratios, and also accessibility. Option demand also exists, but its extent is problematical. Present social trends of increased leisure time, greater disposable income and improved transportation also indicate an increasing future demand for fishing opportunities. Thus, in focussing on the problems of managing the sport fishery, a significant resource management problem is being addressed.

Despite the large number of anglers, and the value of the fishery, very little research has been directed toward measuring the benefits that accrue to society from planning the development of this resource.

FIGURE 1: RECREATION ACTIVITIES AND PARTICIPATION

PREFERENCE OF PARTICIPANTS AND
NON-PARTICIPANTS IN OUTDOOR ACTIVITIES



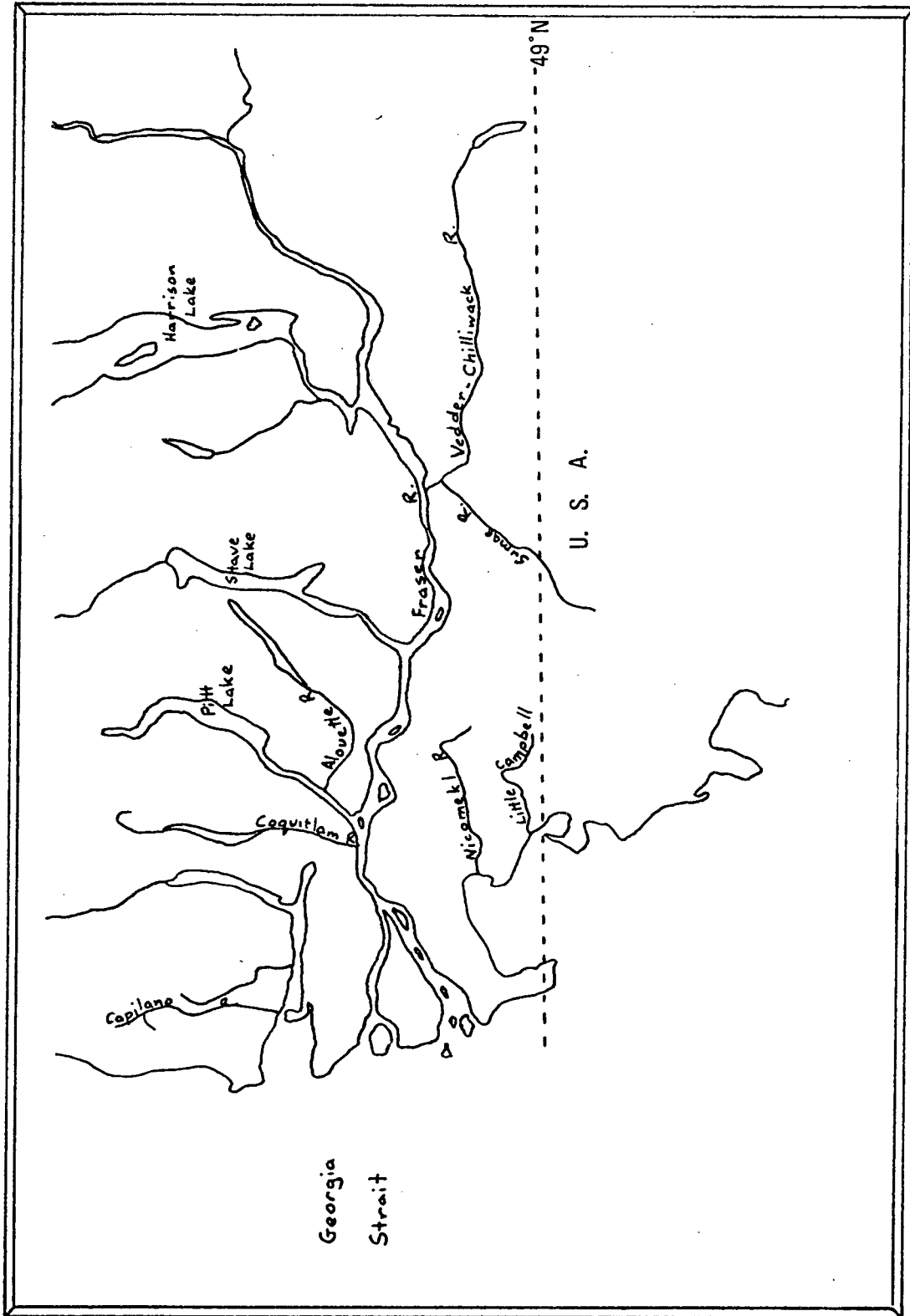
SOURCE: United States Department of Interior Outdoor Recreation Review Commission, Report 7, 1962.

Assessing the nature of the fishermen, what he wants from his experience, and his attitudes and preferences toward future management alternatives has not been done systematically. Of course, biological considerations are paramount in the sense that without fish there is no fishery, but fishery managers are increasingly coming to the view that the fishermen themselves need to be consulted for effective management of the resource. If we assume that the resource is being managed for the recreational fishermen then assessment of his desires and preferences in a systematic fashion is one of the major challenges facing this resource planning agency today.

For the purpose of this thesis, only a portion of the total British Columbia recreational fishery will be investigated: the steelhead fishery in the Lower Mainland. (Figure 2). The Lower Mainland supports both a trout and salmon sport fishery of which the anadromous trout, the steelhead (*salmo gairdnerii*), is considered by many to be the best of the freshwater sport fish. The steelhead frequents most of the streams of this area and represents a special attraction to local anglers as well as those from out of the Province.

"The steelhead is regarded as an exceptionally fine sportfish - a true test of an angler's skill for it is difficult to hook, and, when hooked, is difficult to land." (Pearse-Bowden, 1971, p. 36). This fish spawns in freshwater rivers and streams where the young fry remain for two to three years before migrating to the sea, returning in another two to three years to spawn. Unlike the salmon, a steelhead may return a number of times to freshwater to spawn. Steelhead runs occur on different

FIGURE 2: LOWER MAINLAND REGION OF B.C.



rivers at different times with two distinct types of fish running at different seasons of the year. The winter run fish is by far the most numerous, yet the summer run is regarded highly as a sport fish because of the relative scarcity, increasing the challenge of the catch.

Data are available on the biological aspects and use of this specific sport fishery resource from the Fish and Wildlife Branch. Licence data held by the Branch also permits the identification of all licenced steelhead fishermen in the Province. Organized groups, such as the Steelhead Society, have as their primary concern the management of the steelhead fishery in the best interest of their members. Thus, it is possible to test the objective specified earlier in this chapter as it applies to one important part of the sport fishery. Not only should it be possible to ascertain the fishermen's opinions, attitudes, and preferences but it can be done on the grounds of membership in organizations interested primarily in management of this fishery and those fishermen who are not organization members. Therefore, information on fishermen's desires will be available and it will be possible to determine the differences between the views of the two groups.

Chapter two reviews studies that have been carried out on the assessment of user preferences and satisfactions in various recreational activities. Very few of the studies were carried out on fishermen but the methodologies assessments and recommendations bear on this thesis.

In the subsequent chapters an assessment is made of Lower Mainland steelhead fishermen's preferences and attitudes from results of a questionnaire. Three identifiable groups who influence decision-making in different ways are examined; the organized fishermen, the unorganized fishermen and the fishery resource managers. The latter group's views are of interest because of the key role which they have in influencing decisions in this resource area.

Like responses from all three groups would suggest that there are few communication problems and it would be anticipated that social benefits are in some sense being maximized. On the other hand, if a great diversity of preferences and attitudes exist then it will be clear that benefits are not being maximized. The data from the questionnaire and the methodology of the thesis should provide guidance as to the direction in which the planning in this agency should be moving. In analyzing the data it will also be determined whether identifiable sub-groups within the user group have similar preferences.

Tabulation and interpretation of results will be done in accordance with their implications for planning and management. By doing this it is possible to demonstrate a methodology for determining the fishermen's preferences and incorporating them into the decision-making process. The final chapter draws conclusions from the results presented and suggests avenues for extending the work.

CHAPTER TWO

LITERATURE REVIEW OF USER CHARACTERISTICS, OPINIONS, PREFERENCES AND ATTITUDES

A. Introduction

This chapter consists of a review of literature which bears upon the assessment of recreationists', and in particular, fishermen's preferences and attitudes. The literature is rather limited, as this area of behavioural research is relatively new in the field of recreation planning. However, to give the available information some order it will be reviewed in the broad sense of recreation studies and then become more specific to the fishing experience. From these studies will be drawn some of the preferences and attitudes which are already identifiable or believed to exist, but mainly the review will be used to indicate appropriate methodologies.

As yet "preferences and attitudes" have not been defined in any formal way. This thesis will use these words in simple fashion. Preferences relate to the "choice" of one thing over another as the result of experience, learning or whim. Attitude is a more complex term and involves perceptions, learning and understandings over a considerable period of time. Properly designed attitudinal questions incorporated into a questionnaire can aid in assessing the strength of a given attitude. At times reference will be made to "opinions". This refers to views about factual matters which may be open to dispute. Attitudes, preferences, and opinions will be related to such "characteristics" of the fishermen as age, income level, and education.

B. Recreational Studies Involving Preferences and Attitudes

(i) General Review of Recreation Literature

Clawson (1966, p. 33) has suggested that the recreational experience consists of a number of components which when grouped together form a total experience: thinking about the experience, the journey to the site, the on-site experience, the journey home and the remembrance of the trip. All influence the recreationists' attitudes and preferences toward a recreational pastime or the way in which he participates in the activity. Clawson therefore suggests that preferences and attitudes can span a number of different subsections of the whole experience. Most of the studies conducted, however, largely concern themselves with the on-site experience.

Hendee et al (1968) conducted a study of wilderness users in the Pacific Northwest region of the United States. The aim of the study was to find out what kind of people visited wilderness areas of the region and to find out what values and codes of behaviour they associated with wilderness use. They also tried to assess how the users felt about certain policies that could be applied in management of such an area. The demographic information compiled on users, Hendee suggests, would be helpful in indicating future trends in wilderness area use. On the basis of income, education, and occupation information, future use of areas could be estimated by extrapolating present trends of upward mobility of socio-economic groups.

By attitudinal responses to certain questions posed, Hendee identified one sub-group of wilderness user: the purist. He found the purists more perceptive to wilderness values and, therefore, suggested that their opinions should receive greater consideration than other users. One might view the steelhead fishermen the same way Hendee does the purist wilderness user. This can be suggested because of the difficulties involved in making the catch and the fact that the species is most plentiful in the less favourable season of the year for outdoor recreation. Therefore, amongst the fishing population the steelheader appears to be a unique, not to say eccentric, phenomenon.

Hendee, Gale and Catton (1971) in discussing age and its relation to activity preference also allude to this "purist" philosophy. They suggest that recreationists move through different stages in the type of experience desired as they grow older. One stage which they characterize as the "extractive-symbolic" has relevance for fishing. This could best be described as the stage where the ideal is the taking of the large trophy fish. However, Meeson (1972) suggests that this could be carried a step further to what could be called the "non-extractive symbolic". In fishing this would be the real purist who derives satisfaction from the catch, yet releases the fish.

Burch and Wenger (1967) also identify the wilderness-purist camper who perhaps is much like the fisherman who does not like crowding but enjoys his surroundings as much as he does catching the fish. The wilderness purist would be diametrically opposed in attitudes and

preferences, it is assumed, to the easy access camper (La Page, 1969) who goes camping to meet people. This latter type of camper has forced the less gregarious further afield. (Hendee and Campbell, 1969). Presumably a similar thing happens with fishermen. The more purist would move from crowded areas to those offering the quality of experience which he seeks. This could be particularly true near heavily populated urban areas.

Stanky (1971) attempted to determine the attitudes of recreationists to solitude and crowding by a questionnaire approach. He also identified the "purist". Lucas (1964), on the other hand, was able to group recreationists' perceptions and attitudes on the basis of equipment being used in the Boundary Water Canoe Area. People travelling by canoe had different attitudes and preferences to those using motorcraft. Fishing with different types of equipment may tell something of fishermen's preferences and attitudes. It could also be that fishermen who fish for similar species may exhibit similar traits to one another yet when compared to other recreationists or fishermen angling for other species there may be differences.

Thorsell's (1971) dissertation on the wilderness recreation user in British Columbia identifies a number of preferences and attitudes held by wilderness users which may be equally applicable to recreational fishermen. They included:

Doing something different
Being with family and friends
Solitude
Feeling close to nature
Relaxing
Escaping from civilization

Hendee (1967) developed a list which reflected the reasons for area preference by user type which in this case refers to campers and wilderness users:

Features of the natural environment
Types of facilities
Activities inherent to the preferred area
Insulation from people
Type and amount of supervision in area
Availability of interpretive services
Accessibility
Hunting or no hunting allowed
Less restrictions (on activities)

The foregoing studies indicate that the recreationist is seeking a distinctive type of experience and that preferences of individuals vary significantly. This confirms the view underlying this study that to maximize user benefits it is necessary to offer the kinds of experiences that accord with the range of user preferences.

(ii) Characteristics, Preferences and Attitudes of Fishermen

Although recreational fishing is an extremely popular pastime, few researchers have attempted to examine this resource user in any depth. The hiker, the camper, the wilderness user are receiving their share of research attention yet fishing and the fisherman remain neglected.

Obviously it is important that the recreational planner know something about the recreationist or fisherman clientele. Research to date, however, has in general, concentrated on establishing the fisherman's social and economic status. Gray (1961) identified user groups in forest recreation, of which the fisherman was one. Bevins et al (1968), Sofranko and Nolan (1970), and Bond and Whittaker (1971) conducted similar studies on fishermen in eastern United States, using similar sets of socio-economic criteria. The information developed in these studies is a step in determining who it is that fishes but it is of little help to the manager and planner. Hendee's idea of using education and income levels as a basis for projecting the numbers of people likely to participate in various recreation activities in the future may be the only instance in which the research has direct application to planning and management.

Suggestions on fishermen's preferences and attitudes seem more likely to be found in rather undocumented form in a variety of fishing books and newspaper articles and through general contact with fishermen. The B.C. Game Fish is of particular interest as a reference as it covers the wide variety of fish in the Province. As the articles

in the book are contributed by different writers it is interesting to note that each author credits the fish he describes with certain desirable qualities. Lee Straight describes the "tackle smashing chinook", while Dave Hurn describes the brown trout as "exotic and beautiful" and Pete Broomhall alludes to the "superiority" of the steelhead. The type of fish one fishes for, therefore, could suggest the quality one seeks in the fishing experience.

While some fishermen are discerning as to the species they fish, others angle for whatever will bite. At the price of beef today one can sympathize with the latter. Perhaps the taking of the fish to eat is the initial stage through which fishermen pass.

Roderick Haig-Brown (1959) in his book Fishermen's Summer describes preferences of steelhead fishermen when he suggests the six aspects which are important components of an experience: size of river, catch/success, accommodation, local population, local use and accessibility. He also suggests that steelhead fishermen search for "more and more difficult and romantic circumstances for catching steelhead" (p. 159). Mike Cramond (1964) goes on to describe the steelhead fisherman in particular as dedicated to one fish species, who likes to fish by himself, yet when he catches a steelhead he will not eat it.

Gordon (1971) conducted a study of Idaho fishermen by questionnaire to determine characteristics of their preferences, opinions and behaviour. He found that anglers utilizing the Idaho

sport fishery resources had varied but strong and specific preferences, opinions and behaviour patterns that were significantly influenced by age and income. Although Gordon does not analyse his data to any depth to draw out planning alternatives he does suggest some fishery management preferences and attitudes expressed by fishermen. Some of his findings are summarized below:

- Fishermen were as much in favour of hatchery fish as they were of maintaining wild stocks.
- Smaller bag limits were preferred over restrictions on length of season.
- A range of fish sizes would be needed in a hatchery produced fishery.
- A majority of anglers expressed the opinion that catch and release fishing was worthwhile and that they would be willing to participate.

(iii) Local Studies on Fishermen

Research done with fishermen in British Columbia includes a study by Sewell and Rostron, (1971). This study was concerned with saltwater fishermen in the Victoria area. Their aim was to:

- (a) Identify the characteristics of sports fishermen,
and
- (b) Identify factors that appear to affect their
decisions.

It was shown that there was little comparability between saltwater sports fishing and other outdoor activities. It was also shown that fishermen did not use their boats for other water oriented activities. Rather, they would attempt to sell their boats if they could not fish. Freshwater fishing was found to be an important pastime for 50% of the saltwater fishermen population. "Possible interpretation is that other outdoor recreation activities were mentioned as important because they were regarded as activities which enable the discharge of family responsibilities. In contrast, saltwater fishing appears to be an activity for the man in the household and not for the wife or family as a whole." (Sewell and Rostron, 1971, p. 91). Freshwater steelhead fishermen are expected to exhibit the same preferences - the fishing experience being male dominated.

Stevens (after Sewell, 1971, p. 14) assumed that "the thrill of catching a fish was the major value involved in the recreational experience of fishing. This is expressed in his measure of success per unit of effort." Sewell's study reveals that although the anticipation of catching a fish may be motivation for going fishing, it is not a satisfactory indicator of the overall recreational experience

involved. The possibility of getting away from the work-a-day world, enjoying the companionship of others and so on may be more important as measures of the value of the recreation experience than the actual catching of a fish. (p. 95). Although the Sewell and Rostron's (1971) study "suggest" other motivations for fishing, the questionnaire issued in this study to steelheaders attempts to "document" the complementary motivations to catching of the fish to enable assessment of attitudes and preferences.

The series of reports entitled The Steelhead Trout Sport Fishing Analysis by G. Peterson and R. Thomas of the Fish and Wildlife Branch is an important source of information for steelhead policy formulation in British Columbia. This study has been conducted on an annual basis since 1966-1967 season to enable resource managers to assess where pressure has occurred in the form of anglers, how many fish were caught, where the angler resided, and if in fact, they fished for steelhead. In this manner it has been possible to estimate the numbers of fishermen that fished and to estimate the annual catch.

Since 1966 steelhead fishermen have been obliged to purchase a licence additional to the regular freshwater fishing permit. Through the licencing scheme it has been possible to survey the fishermen by means of a questionnaire. The respondent is aided in completing the questionnaire by reviewing his punchcard on which he has recorded when and where he caught a steelhead that season. This method has

proved efficient and the information has been useful to the resource managers in assessment of impact on the physical resource. It would be possible to use this vehicle to determine aspects of fishermen's attitudes and preferences toward future direction of the fishery.

The Pearse-Bowden study on the Value of Freshwater Fishing in British Columbia (1971), was concerned with the economics of fishing. Besides establishing an economic worth of the fishery they attempted "to find out who anglers are and indicate roughly the directions of some of the pressures acting on angler participation" (p. 16). Basically they drew comparisons in age-sex breakdowns, occupation, education and income. Some attempt was then made to look at regional differences. It was learned that freshwater fishermen, in general, were proportionally in higher income brackets. This was partially suggested by the fact that education level was also high in relation to the average male in the Province. Perhaps this suggests steelhead fishermen, in general, could afford to travel further afield for their sport, a fact which may have significant management implications. If the "purist" has alternatives, should special efforts be made on his behalf on the Lower Mainland?

Beside the major emphasis of the Pearse-Bowden study, the economic worth of the resource, the study also explored some of the qualitative aspects with regard to fishermen's comments and opinions. Of the comments from freshwater fishermen, excluding steelheaders, 50% felt that the quality of their experience was declining. They felt the experience could be improved by greater enforcement of regulations.

The management programs felt to be best were natural spawning grounds and the addition of hatchery bred fish. Fishermen were not receptive to non-resident anglers with more than half of all resident anglers combined recommending that non-residents be discouraged in some way from fishing in British Columbia.

The steelheaders believed that pollution was the biggest problem facing the fishery and for the protection of fish, 64% thought this is where the greatest effort should lie. "Many fishermen were in favour of developing a hatchery program for steelhead as has been done successfully for its freshwater cousin, the rainbow trout. Others were concerned about protecting and enhancing the natural habitat of steelhead through stricter control over logging, and effluent discharges into streams and through the creation of spawning channels. Some felt that more should be done to prevent the netting of steelhead at sea by commercial fishermen" (p. 49).

Resident steelheaders in this study were asked about five elements important to them for a high quality fishing experience. Unspoiled natural environment was ranked first by 54% of fishermen (Table 2). The other categories were: good chance of catching steelhead, regardless of size; solitude, absence of other fishermen; chance of catching very large steelhead; and ease of access.

TABLE I

ELEMENTS IMPORTANT TO HIGH QUALITY STEELHEAD FISHING

<u>Element</u>	<u>Rank</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>
Unspoiled natural environment	54	21	15	7	3
Good chance of catching steelhead regardless of size	27	29	26	12	6
Solitude, absence of other fishermen	11	32	24	19	14
Chance of catching very large steelhead	4	11	15	30	40
Ease of access	4	8	20	30	38

Pearse-Bowden (1971) p. 51

With regard to restricting activity to fly fishing on some rivers, 44% thought it was a good idea. Other fishermen thought steelhead were hard enough to catch at present without increasing the difficulty by imposing these restrictions. Those who felt fly fishing was a good idea thought it would reduce pressure on these areas and tend to "induce better fishing habits and more sporting behaviour on the part of steelhead anglers" (Pearse-Bowden, 1971, p. 51).

This study arrived at various pieces of information which are important to the decision-maker but did not suggest how to organize these findings to utilize them in the decision-making process. Information generation is basic to rational decision-making but is relatively meaningless unless it feeds into a structure which is able to make use of the information.

Pearse-Bowden have attempted to identify some of the qualities that steelhead fishermen desire. This is a first step in identifying the range of opportunities that fishermen want. Some fishermen prefer good fishing above all else, with the prime motivation of their experience being to catch a fish. Others are concerned with the challenge; fishing only with fly and releasing many of the fish caught.

Solitude is another feature which the Pearse-Bowden study identified. An understanding and some quantitative measure of how many people would want this type of experience would encourage planners

to preserve this experience, preferably in close proximity to urban areas. The fisherman who wants to catch a fish and have easy access is perhaps the easiest to satisfy but the percentage of fishermen who fall into this category is as yet unknown.

Pearse-Bowden (1971) also identifies two other interesting aspects with regard to the steelhead fishing: firstly they found that the total catch of steelhead is declining yet the number of active steelhead fishermen is not declining in proportion. In fact, in the final year reported there was a drop in numbers caught yet a rise in number of anglers over the previous year (Figure 3). Secondly, they identified two distinct groups of "successful steelheaders" and "active steelheaders" (Figure 4).

The chance to catch a large fish or trophy sized fish is also indicative of some fishermen's desires. Haig-Brown, Mike Cramond and other writers extol the virtues and thrill of taking a large fish and often returning them to the stream. Nothing has been written to suggest why this "catch and release" attitude has arisen. Could it be that long-time fishermen lose interest in taking the catch home, or gain a love of nature and their sport fish which results from a long association with the fishery?

FIGURE 3: ACTIVE STEELHEADERS: TOTAL CATCH 1966-69

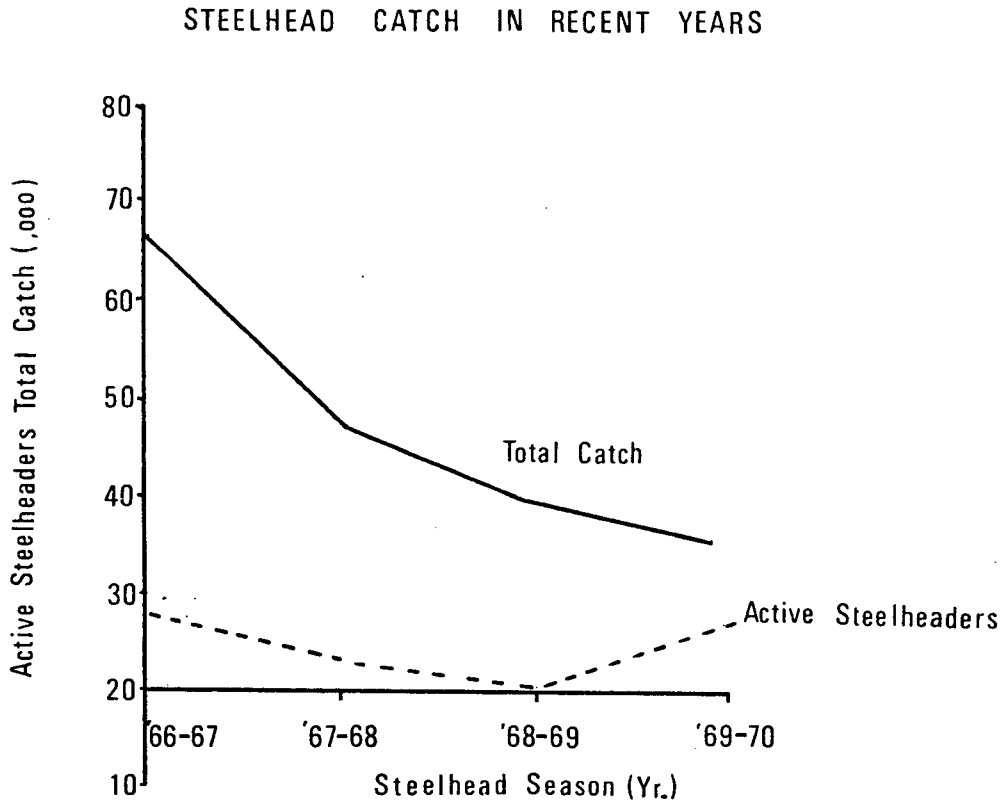
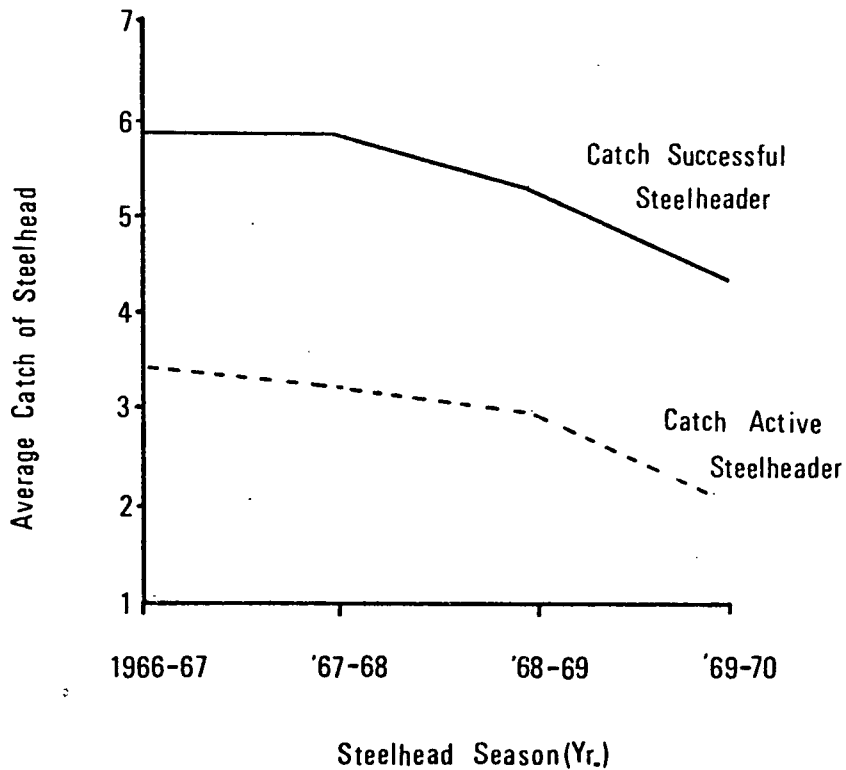


FIGURE 4: COMPARISON BETWEEN "SUCCESSFUL" AND "ACTIVE" STEELHEADERS



SOURCE: Pearse-Bowden Economic Consultants Value of Fresh Water Sport Fishing in British Columbia, Report 5, 1971

C. Implications for Preference and Attitude Studies of
Fishermen

Preferences and attitudes of fishermen are of little use to the planner and manager unless they can be examined systematically, as one would expect to receive a range of responses to any type of question. Therefore, it is proposed to select from the literature possible fishermen types who can be identified and ascertain their preferences and attitudes. The organized fisherman as opposed to the unorganized, the purist and the catch-anything-anywhere fisherman, the easy access angler and those who could be grouped by preference for certain types of equipment.

Equipment, meaning the manner by which a fisherman angles, can be simply classified as lure, bait or fly. The type of equipment, then, could correlate to the type of experience desired. The work of Lucas (1964) in the Boundary Water Canoe Area perhaps best illustrates this possible grouping:

Different equipment

Different preference for experience

Different attitudes to the surroundings.

Attitude and preference of fishermen probably vary with the type of fish they angle for, their success, their effort and the number they keep. Some fishermen attempt to catch as many fish as they can,

in some cases, regardless of fish size or the regulation limit. This type of fishermen may be in the minority. Most fishermen, however, according to the literature strive to catch "the big one".

There are other fishermen who exhibit different attitudes again toward the fishery. These fishermen, although regarding the catch highly, will also release many that they catch, thereby receiving a great deal of pleasure. This attitude is perhaps closely related in experience and attitude to fishing as Hendee's (1967) purist in the wilderness setting. If the proportion of fishermen in this group and the total experience they desired were known, maintenance of this kind of experience by suitable planning and management could be justified.

Meeson (1972) has suggested that the purist is one type of fisherman. He also identifies the easy access fisherman and the angler who swings between these two differing types. On the Lower Mainland, the easy access fisherman is probably most common as there are greater time constraints on attempting to find a more purist experience.

Meeson suggests purist fishermen prefer to be able to fish in aesthetic and pleasing surroundings. He may journey to the site with friends but during the fishing experience does not like to meet many other people. He can perhaps be identified by the type of

equipment he uses; with fly fishermen being more often than not found in this grouping. In socio-economic terms he rates higher than average in education and income.

The easy access fisherman is usually the most interested in the catch. He probably spends much of his fishing time on the Lower Mainland because of its accessibility, if he lives in this area, and will be the most indignant about the poor catch/effort ratio. To this end he will favour a hatchery program as long as the result is more fish.

The combination fisherman, Meeson suggests, would fish in either manner and could be classified in different camps at different times. As a resident of the Lower Mainland he probably fishes streams with easy access on weekends. On holidays, however, he would fish streams more in accord with the purist ideals.

The literature has provided the basis for the questionnaire issued as part of this study to determine steelhead fishermen's opinions, preferences and attitudes. It has also given a number of methods by which it may be possible to group fishermen in accordance with their characteristics and attitudes. In the following chapters the characteristics, preferences and opinions of steelhead fishermen and managers are analyzed on the basis of the questionnaire survey.

CHAPTER THREE

CHARACTERISTICS OF STEELHEAD FISHERMEN

A. Introduction

The steelhead questionnaire was issued to both organized and unorganized steelhead fishermen, resident on the Lower Mainland of British Columbia (Appendix A). The organized fishermen were sampled by distributing the questionnaire at the Steelhead Society's Annual General Meeting and by distribution to members of the Kingfishers and Totem Fly Fishing Clubs. The total membership of these groups is approximately 200 and of these 117 were sampled. The unorganized fishermen were randomly sampled through the licence tag stubs held by the Fish and Wildlife Branch in Victoria. 11,500 licences were sold to residents of the Lower Mainland and of this number 410 were sent questionnaires. Of those sampled 56 (52%) of the organized fishermen responded while 122 (43%) of the unorganized could be included in the analysis. Some of the randomly selected fishermen were organized fishermen (4%), and as only unorganized were wanted through this particular sampling procedure, the organized were excluded when data were processed.

The following pages deal with the two fishermen groups on an individual basis; the organized and the unorganized. This has been done to determine what characteristics, preferences and opinions are exhibited by each group. Because of the nature of the questionnaire

and the small sample size the data presented are not meant to be definitive but rather to suggest broad differences between these two groups and areas for further research. Coupled with this is the fact that attitudes and preferences will change constantly and, therefore, data gathered here will change over a period of time. However, the analysis is meant to indicate the type of person who fishes for steelhead, who joins organizations, and it suggests preferences and opinions which fishermen held at the time of completing the questionnaire.

Comparison between the two groups will be done firstly on socio-economic grounds. Secondly, an analysis of preferences towards experience desired and management alternatives will be carried out. Through an analysis of these data it is hoped that it will be possible to (a) determine the range of experiences which the fishermen in general desire and (b) suggest the differences which can be drawn between organized and unorganized fishermen on the basis of socio-economic characteristics, experience desired, and opinions stated.

The managers' opinions and preferences were also gathered using the same questionnaire as the one used for fishermen with a covering letter asking them to fill in only certain questions if they were not steelhead fishermen. It was felt that the managers' opinions

and preferences would indicate the likely direction in which this agency would move in the future and would also enable comparison between their opinions and attitudes and those of the fishermen. Only seven questionnaires were issued to this group as this was believed to be the universe of managers influencing decisions on the Lower Mainland.

B. Socio-Economic Characteristics

The socio-economic characteristics will be used, in this study, as a method of classifying sub-groups or as a method of determining characteristics of people who join clubs. This will be an aid to planners in determining just whose attitudes they are sampling and what proportion of the population these views are likely to represent.

(i) Sex

The literature on socio-economics of fishermen (Bevins, (1968), Bond et al (1971)) conclude that fishing is dominated by males. Fishing and steelheading in particular, in British Columbia, is no exception. Of organized fishermen, women represented 3% of those sampled, while in the unorganized group, women represented 4% of those sampled. As a result of this all comparisons are therefore made with the male population of the Province as shown in Table 2. Pearse-Bowden (1971) followed a similar pattern in their research, and therefore it is possible to compare results with the findings of that study.

(ii) Age

Using both the male population of British Columbia and the age distribution of fishermen, it is interesting to note that the unorganized steelheader sample corresponds closely to the figures generated by the Pearse-Bowden study for the whole fishing population of British Columbia (Table 2). As age increases a greater percentage of the male population appears to take up fishing: whereas 8% of the male population is over 60, 16% of unorganized fishermen are found in this group.

The organized fishermen, however, are apparently quite different. Participation in steelhead clubs and the Society is largely confined to those between the ages of 20 and 50 with the majority of members in the younger age brackets. One could postulate a number of reasons for such a distribution, such as the younger public's growing concern for the environment, and the awareness among young people of how to exert political pressure - through strong articulate groups.

TABLE 2

AGE DISTRIBUTION OF STEELHEAD FISHERMEN

(Percent)

	<u>Under 30</u>	<u>31-40</u>	<u>41-50</u>	<u>51-60</u>	<u>Over 60</u>
*Male Population of B.C.	29	25	23	15	8
*Average Fishermen	22	21	20	16	21
Unorganized	22	22	21	19	16
Organized	43	32	19	5	1

* From Pearse-Bowden (1971)

Chi Square .005

(iii) Income

Income distribution suggest similar findings as above. The organized fishermen, in general, earn more on the average than the unorganized fishermen. (Table 3). In the \$12,000+ bracket there are 44% in the organized group and 36% for the unorganized.

TABLE 3

INCOME LEVELS OF STEELHEAD FISHERMEN

(Percent)

	Less Than <u>\$3,000</u>	<u>\$3,000</u> -5,999	<u>\$6,000</u> -8,999	<u>\$9,000</u> -11,999	<u>\$12,000</u> -14,999	<u>\$15,000</u> -17,999	<u>\$18,000+</u>
Unorganized	4	8	15	37	20	7	9
Organized	5	0	18	33	22	17	5

Chi Square .100

(iv) Education

Studies previously done on the socio-economic aspects of fishermen such as Bishop's (1967) study, reveal on the average fishermen have higher education levels than the general population. Education attainments of steelheaders is interesting in the way the distribution occurs (Table 4). The unorganized fishermen tend to fall at either end of the scale with 20% having university degrees (which may reflect inadequate sample size). Organized fishermen centre on the high school graduate and post-secondary education levels.

TABLE 4

EDUCATION LEVELS OF STEELHEAD FISHERMEN

(Percent)

	<u>Less than Grade 8</u>	<u>8-11</u>	<u>Grade 12</u>	<u>Some Post Secondary</u>	<u>University Degree</u>
Unorganized	5	35	26	14	20
Organized	3	27	29	30	11

Chi Square .100

(v) Occupation

The classification system of occupation used by Pearse-Bowden was also used in this study for the sake of comparability. The unorganized fishermen closely resemble the profile of occupations that were developed in the previous study. Major differences, however, were discovered in the make-up of organized fishermen with a noticeably higher proportion of occupations, by comparison, being in sales and the salaried professional categories (Table 5).

TABLE 5

OCCUPATION OF STEELHEAD FISHERMEN

(Percent)

	<u>Wage Earner</u>	<u>Salaried Prof.</u>	<u>Sales</u>	<u>Cleri- cal</u>	<u>Self- Employed</u>	<u>Farm</u>	<u>Not in Work Force</u>
*B.C. Fishermen	47	22	5	4	4	1	17
Unorganized	49	20	6	2	4	2	17
Organized	41	26	18	6	2	0	7

* From Pearse-Bowden (1971)

Chi Square .010

(vi) Origin

A number of writers, including Bevins et al (1968) and Bond and Whittaker (1971) determined the percentage of fishermen from rural and urban backgrounds. This study also assessed where the fisherman was first living when he took up fishing. It was postulated that it would be possible to suggest a correlation between this sport and ruralness as it was expected that fishermen may have learned the sport in the rural setting where amenities of the city were not available. However, the information from this study suggests that a large proportion of steelheaders were urban dwellers when they first took up fishing. The higher proportion of organized steelheaders in the urban classification could be due largely to the fact that the organized clubs sampled are city based.

TABLE 6
ORIGINS OF STEELHEAD FISHERMEN
(Percent)

	<u>Urban</u>	<u>Rural</u>	<u>Small Town</u>
Unorganized	46	23	27
Organized	64	17	20

Chi Square .025

It appears from general observation that the origin of the fishermen may have very little to do with the fishing experience. The writer suggests that no matter when a person took up fishing, whether living in an urban, rural or small town environment, the major factor influencing participation is the availability of the opportunity. If the resource is not available people will not fish and if the fishing experience cannot be achieved in close proximity to the urban area, urban residents will not fish as regularly, or in as large a number, as they currently do on the Lower Mainland.

(vii) Summary of Socio-Economic Data

The socio-economic data enables planners and managers to define more accurately the clientele being served. The method of gathering and presenting data in this section clearly indicates that at least two clientele groups are identifiable; the organized and the unorganized steelhead fishermen.

The organized fisherman is younger on average than the unorganized fisherman, has a higher income than the unorganized, and on the average has a better education.

In the unorganized group there appears to be a sub-population of highly paid and educated fishermen. This group tends to skew the average figures for the unorganized fisherman category.

This sub-population would be an interesting group to explore further to see if their views and fishing habits correspond with others in the unorganized category. However, in analysis of other data they are unidentifiable.

C. Characteristics of Fishermen

The differences between organized and unorganized fishermen are even more clearly demonstrated when their fishing characteristics are viewed. Such things as the number of days they fish, the number caught, equipment used, and the type of fish angled for, according to Lucas (1962) and Meeson (1972) could be a way of grouping anglers. This study acknowledges the possibility of grouping anglers along these lines, but, because of the study's sample size and the exploratory nature of the exercise, only the differences between the views of organized and unorganized steelhead fishermen will be dealt with in any depth.

(i) Years Fished for Steelhead

Fishermen were asked how many years they had fished and then how many years they had steelheaded. In this way, it was hoped that some idea as to the time lag which might be expected between taking up fishing and progressing to steelhead fishing could be determined (Table 7). This was based on the premise that one would tend to progress to steelhead fishing from other fishing because of

its requirement for greater skill. By being able to determine the number of people taking up fishing through the fishing licence sales, it was hoped that if a time lag is apparent this would facilitate more accurate prediction of steelhead licence sales at some future date. If this were possible managers would have a lead time to plan.

And there does appear to be an indication that people graduate to steelhead fishing. This can be seen in both organized and unorganized with a range of 1 - 20 years between taking up fishing and fishing for steelhead.

TABLE 7
DIFFERENCE IN YEARS BETWEEN THE TIME FIRST FISHED
TO THE TIME OF TAKING UP STEELHEADING
(Percent)

	<u>Same</u>	<u>1-10</u>	<u>11-20</u>	<u>21-30</u>	<u>31-40</u>	<u>41-50</u>	<u>50+</u>
Unorganized	17	34	21	13	8	4	3
Organized	12	45	27	11	5	0	0

Chi Square .050

The number of years fished for steelhead also shows differences between the organized and the unorganized fishermen (Table 8). Perhaps, however, this is an indirect correlation with their age distribution with, as shown in Table 1, the organized fishermen being younger.

TABLE 8
NUMBER OF YEARS FISHED FOR STEELHEAD
(Percent)

	<u>Under 1</u>	<u>1-10</u>	<u>11-20</u>	<u>21-30</u>	<u>31-40</u>	<u>41-50</u>
Unorganized	5	23	17	21	16	18
Organized	2	20	35	30	7	6

(ii) Days Fished

The distribution of unorganized and organized fishermen in relation to the number of days fished shows that the unorganized fisherman fishes for steelhead much less than does the organized (Figure 4). Sixty-three percent of the organized fishermen fish more than twenty days as compared to twenty-five percent of the unorganized fishermen. It can also be seen that forty-six percent of all unorganized fishermen who fished did so ten or less days per season.

FIGURE 5

DISTRIBUTION OF FISHERMEN BY DAYS FISHED FOR STEELHEAD

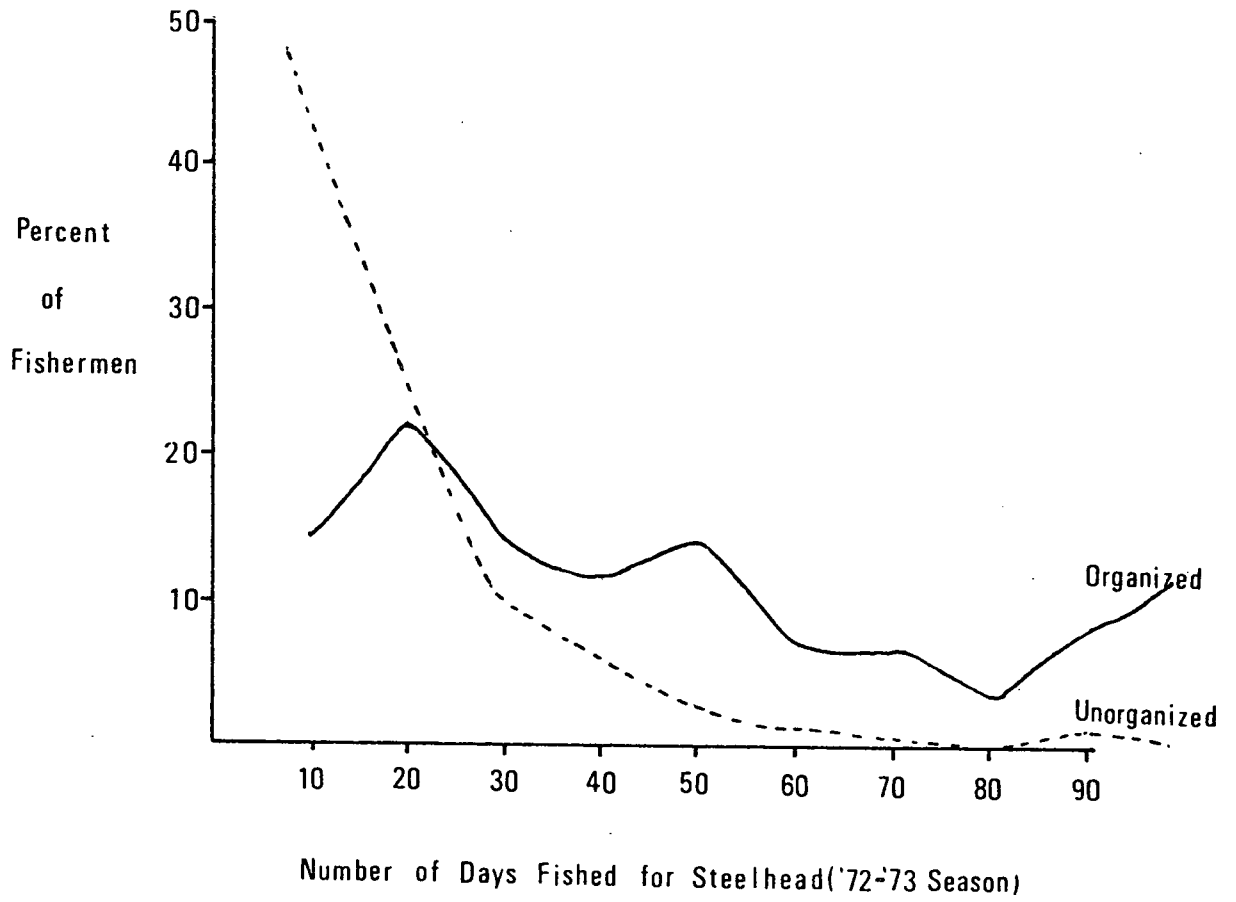
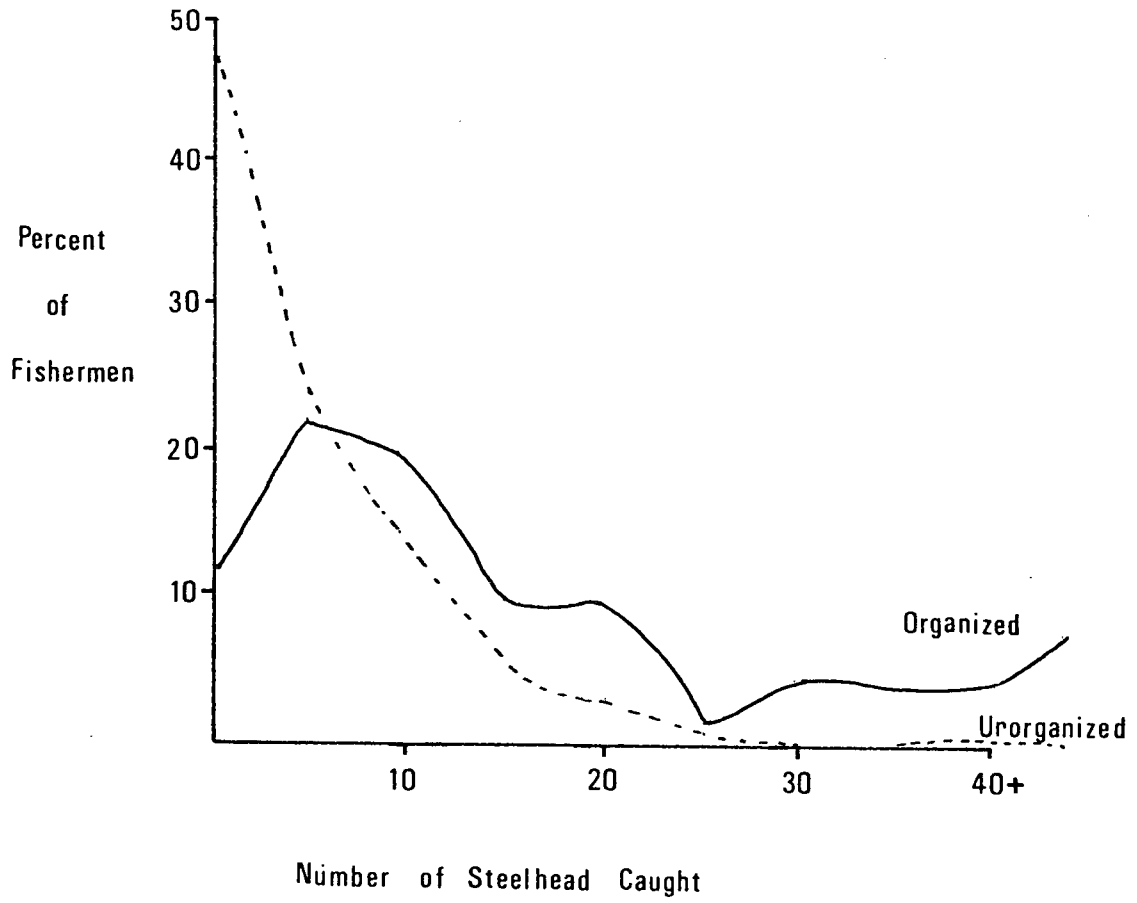


FIGURE 6

THE NUMBER OF FISH CAUGHT BY PERCENTAGE OF TOTAL POPULATION



(iii) Number of Fish Caught

The organized fisherman was a great deal more successful than the unorganized fisherman (Figure 5). This is obvious when comparing the number of fishermen from each group who caught 25 or more fish: 24% of the organized as compared to 4% of the unorganized. In fact, over half the unorganized fishermen were completely unsuccessful as compared to under a quarter of the organized fishermen in the same category.

The comparative figures on success rate does give an indication to the manager as to the number of people who would be affected by a lowering of the present catch limit of 40 fish per season. If, for example, catch was lowered to 30 fish per season it would have minimal affect on unorganized fishermen while 20% of the organized fishermen would be concerned. The higher numbers of fish caught by organized fishermen could be directly due to the high number of days fished per season.

(iv) Equipment Used

Lucas (1962), in his Boundary Water Canoe Study, suggested that different recreationists who use different equipment seek a different experience. This could be true of people who use different fishing equipment or spent differing amounts of time fishing for one or other fish species. In the following pages a comparison of organized and unorganized steelhead fishermen is made on the basis of type of equipment used (Tables 9, 10 & 11).

TABLE 9

PROPORTION OF STEELHEAD FISHING TIME SPENT USING FLY

(Percent)

	<u>25% or less</u>	<u>50%</u>	<u>75%</u>	<u>100%</u>	<u>Don't Fish This Way</u>
Unorganized	30	13	7	3	47
Organized	18	6	9	17	50

Chi Square .005

TABLE 10

PROPORTION OF STEELHEAD FISHING TIME SPENT USING LURE

(Percent)

	<u>25% or less</u>	<u>50%</u>	<u>75%</u>	<u>100%</u>	<u>Don't Fish This Way</u>
Unorganized	26	34	21	7	12
Organized	33	23	21	2	21

Chi Square .100

TABLE 11
PROPORTION OF STEELHEAD FISHING TIME SPENT USING BAIT
(Percent)

	<u>25% or Less</u>	<u>50%</u>	<u>75%</u>	<u>100%</u>	<u>Don't Fish This Way</u>
Unorganized	42	22	12	7	17
Organized	32	21	17	0	30

Chi Square .100

In this section fly, lure and bait are examined as ways by which the fishermen attempt to catch the fish. Each of these methods have a different quality of experience associated with them and, therefore, could be a basis for classifying fishermen. An examination of the numbers of fishermen and amount of time spent fishing by each group will be important to ascertain if in the planning and management of this resource an attempt is made to cater to the different experiences.

Only half of all steelhead fishermen use a fly at all in steelheading with most of these using it 25% or less of their fishing time. The organized fishermen have one group of particularly avid fly fishermen (17%) who fish all their fishing time in this manner. At the other end of the scale a large proportion (30%) of unorganized fishermen fish this way 25% or less of their time.

The largest proportion of fishermen who use lures 25% or less of the time are in the organized group (33%). On the other hand, 46% of organized fishermen fish this way 50% or more of the time. This compares with 12% for the unorganized groups.

The bait fisherman is less distinguishable between organized and unorganized groups. The only major differences appear to be that 70% of the organized fishermen fish by this method whereas 83% of the unorganized fish with bait. Of the unorganized that do fish with bait, a high proportion do so only 25% or less of their time.

(v) Species Angled For

TABLE 12

PROPORTION OF FISHING TIME SPENT ANGLING FOR SUMMER RUN STEELHEAD

(Percent)

	<u>25% or Less</u>	<u>50%</u>	<u>75%</u>	<u>100%</u>	<u>Did not fish for this species</u>
Unorganized	28	7	0	4	60
Organized	45	2	3	3	47

Chi Square .050

TABLE 13

PROPORTION OF FISHING TIME SPENT ANGLING FOR WINTER RUN STEELHEAD

(Percent)

	<u>25% or Less</u>	<u>50%</u>	<u>75%</u>	<u>100%</u>	<u>Didn't Fish for Winter Run</u>
Unorganized	36	28	13	15	9
Organized	11	32	33	21	3

Chi Square .005

TABLE 14

PROPORTION OF FISHING TIME SPENT ANGLING FOR OTHER TROUT

(Percent)

	<u>25% or Less</u>	<u>50%</u>	<u>75%</u>	<u>100%</u>	<u>Don't Fish for Other Trout</u>
Unorganized	43	19	10	10	18
Organized	29	9	3	3	49

Chi Square .100

TABLE 15

PROPORTION OF FISHING TIME SPENT ANGLING FOR SALMON

(Percent)

	<u>25% or Less</u>	<u>50%</u>	<u>75%</u>	<u>100%</u>	<u>Don't Fish for This Species</u>
Unorganized	46	13	4	7	30
Organized	44	9	3	8	36

Chi Square .500

The species of fish angled for is another method by which fishermen can be grouped and is a further example of the difference between organized and unorganized groups. Organized fishermen are more likely to fish summer run steelhead than are unorganized, (Table 12), but for the majority it is 25% or less of their fishing time. Most (86%) organized fishermen spend 50% or more of their time fishing for winter run fish (Table 13) and other trout. Approximately half of the organized fishermen do fish, but usually this is 25% or less of their total fishing as is salmon fishing (fresh or salt). (Tables 14 & 15). Other species are rarely fished for. The data suggest that some fishermen (25% of all organized fishermen) fish exclusively for steelhead as was previously suggested by the literature.

The unorganized fishermen are less likely to fish for summer run than are the organized, but are more likely to fish for other species, particularly other species of trout. It appears that the unorganized fisherman is more inclined to vary his fishing experience in the type of fish he angles for on a more regular basis. The exception may be in the pursuit of other trout. It is also interesting to note that 36% of all unorganized fishermen spend 25% or less of their angling time in pursuit of winter run steelhead. When compared to organized fishermen in this group (11%), it can be seen that many unorganized fishermen are not avid winter run steelheaders. In fact, only 28% of all unorganized fish for steelhead 75% or more of the time as compared to 54% of the organized fishermen in this category.

(vi) Teaching Other People to Fish for Steelhead

The question of teaching other people to fish for steelhead was asked to see if fishermen were willing to teach others their sport or whether they refrained from teaching others as a means of protecting the resource from increased pressure. It appears from the response to this question that the organized fishermen instruct more people than do the unorganized (Table 16). Nearly 70% of all organized fishermen have taught two or more people to steelhead compared with 43% for the unorganized groups.

TABLE 16

NUMBER OF PEOPLE TAUGHT TO STEELHEAD FISH

(Percent)

	<u>None Taught</u>	1	2	3	4	5	6	7	8+
Unorganized	44	13	8	5	5	6	2	0	17
Organized	23	8	25	8	5	4	5	0	22

Chi Square .010

(vii) Other Leisure Activities of Steelheaders

An understanding of the mix of recreational activities that the fisherman participates in is helpful in further understanding the importance of steelhead to his outdoor recreation. The organized fisherman often mentioned, as leisure activities, two parts of his fishing experience; tying flies and fishing. In relation to fishing the next activity of camping received a low rank. The unorganized fisherman, mentioned fishing most often, but also included boating, hunting and camping amongst his other recreation activities.

The organized fisherman's failure to attach importance to the other recreational activities indicates that he has less activities to substitute for fishing. The unorganized fisherman appears to have substitutes but regards fishing as his most important recreational activity. This suggests the possibility of reducing the pressure upon the fishing resource by determining the kind of recreational experiences that fishermen seek and then supplying a wider range of non-fishing recreational opportunities to meet user preferences.

(viii) Summary of Fishermen's Characteristics

The organized steelhead fisherman spends a good many more days fishing for steelhead than does the unorganized fisherman. One result is that he catches more fish. The greater interest shown by the organized fisherman in steelhead is clearly evidenced in the tables

showing the type of fish angled for. The characteristics displayed by the organized fisherman appear to reflect a greater dedication to the sport than is the case of the unorganized. Because of this it is logical to suggest that the organized fishermen appear to use this resource a great deal more than the unorganized and would as a result have a larger stake in its management than his number would indicate. Therefore, it could be as Hendee (1968) suggested with his "purist wilderness user", that his preferences should be given greater weight than his number would suggest because of the greater loss this person would face if the resource were impaired or destroyed. We can compare this to a market situation where few individuals can "vote" effectively by paying higher amounts for goods they desire and thus continue to encourage supply.

CHAPTER FOUR

PREFERENCES & OPINIONS OF STEELHEAD FISHERMEN & MANAGERS

A. The Experience Desired by Steelhead Fishermen

A number of questions were put to steelhead fishermen to assess their preferences for the fishing experience they desired. By examination of the experience the fishermen found most enjoyable and the aspects that detract from the experience, suggestions can be made as to the qualities which should be regarded as important in the generation of future planning alternatives. While some of the preferences expressed may be utopian, such expressions can be tempered by asking about actual fishing experiences and why the fisherman likes particular locations.

The questions relating to experience by necessity needed to be left open-ended. The steelhead fishing experience, it was suspected, is different in important ways from other types of sport fishing, and since few behavioural studies have been conducted on fishing, there was no basis upon which to determine where steelhead fishing fits into the range of experiences.

Inasmuch as narrative answers were encouraged the method of analyzing the experiences reported proceeded as follows: A scan was made of the responses for words that suggested how the fisherman achieved his enjoyment. For each respondent his key ideas were selected and recorded. Then the number of times each idea was

expressed were added together and taken as a percentage of the total number of times all responses were mentioned. (See Appendix A).

It was clearly evident that both groups of fishermen were in agreement that the most enjoyable aspect of fishing was the quality of their surroundings. Fishermen clearly viewed the outdoors experience and the aesthetics of nature as the prime gratification from their sport (Table 17). Catching fish would be assumed to be a prime motivation to fish, therefore, it was not surprising to find that the experience of catching the fish ranked highly. If Clawson's (1961) breakdown of a recreational experience were used; the before, the after, and the on-site experience, it appears the on-site experience is by far the most important.

TABLE 17

STEELHEAD FISHERMEN'S PREFERENCE FOR ENJOYMENT IN FISHING EXPERIENCE

(Percentage of all responses)

	<u>Unorganized</u>	<u>Organized</u>
Companionship	8	11
Get away - Relax	17	16
Outdoor Aesthetics	26	28
Catching a Fish	14	19
Chance for a Large Fish	3	4
Challenge	13	13
Eat	8	1
Memories	7	6
Everything	4	2

From comments written by fishermen responding to the questionnaire it appears that the chance of getting away from home and everyday surroundings is also a major driving force to fish.

(i) The Lower Mainland Experience

Steelhead fishermen were asked to list their favoured streams and to give reasons for their choices. (The streams selected on the Lower Mainland are listed in Appendix C). However, by asking reasons for their selection it was hoped to gain insight into the qualities they felt the Lower Mainland streams held.

TABLE 18
REASONS FOR CHOOSING LOWER MAINLAND STREAMS
(Percentage of all responses)

	<u>Unorganized</u>	<u>Organized</u>
Convenient	38	28
Accessibility	13	17
Personal Knowledge of an area	6	2
Not crowded	7	9
Good Fishing	17	20
Good for Certain Types	9	8
Other	1	6
Aesthetics	9	11

A list of streams and reasons why the streams were favoured was developed by the respondent to the questionnaire. This enabled the "utopian" ideal of "what it is" that is enjoyable in the fishing experience to be put into more practical terms. From this an understanding of the reasons why fishermen are drawn to certain streams on the Lower Mainland can be examined. (Table 18).

Nearness, accessibility and good fishing were ranked, in that order, by both groups as reasons why they fished certain Lower Mainland streams. Not crowded was ranked fourth, perhaps because this quality is difficult to find on the Lower Mainland rivers today. The favoured streams, ranked on the number of times mentioned, were for the unorganized fishermen, the Vedder, Cheakamus and the Alouette. For the organized fishermen the first two rivers mentioned were the most favoured but the third selection was the Chehalis River.

For areas other than the Lower Mainland the qualities regarded most highly by organized fishermen was good fishing, in that the rivers were productive, and that the stream possessed qualities that enabled a specific type of fishing to take place on it, such as fly fishing. The unorganized fisherman prized productive qualities of streams and the lack of crowds.

The unorganized fisherman was the greatest user of the Lower Mainland streams in terms of numbers in that an unorganized fisherman, on the average, spent most of his fishing time in this area. (Table 19). Fifty-nine percent of all unorganized fishermen

as compared to only 18% of organized fishermen spent all their fishing time in this region.

TABLE 19
PERCENTAGE OF TIME SPENT FISHING LOWER MAINLAND STREAMS
(Percent)

	<u>0%</u>	<u>1-19%</u>	<u>20-39%</u>	<u>40-59%</u>	<u>60-79%</u>	<u>80-99%</u>	<u>100%</u>
Unorganized	10	4	1	7	6	13	59
Organized	5	4	3	12	26	32	18

Chi Square .005

A large percentage of the fishermen who did not fish the Lower Mainland can be accounted for by those who purchased licences for vacation fishing in other areas of the Province. However, the breakdown suggests that organized fishermen are prepared to travel further to fish than the majority of unorganized fishermen. On the other hand, the Lower Mainland may no longer offer the experience they seek in that aspects such as crowding detract significantly and cause them to go elsewhere.

If the Lower Mainland is not offering some steelheaders the quality of experience they desire then what is it that is changing on the Lower Mainland? Fishermen were asked to view the problem from two sides - the experience; and the changes in the fish: By

this method it was hoped to break the experience into its social and biological aspects. A large number of people failed to answer this question, especially those who had not fished for a long period of time or those who had purchased a licence in the hope they may land a steelhead while fishing for other varieties. Approximately half of the organized fishermen who replied felt Lower Mainland fishing was declining because of the lack of fish, while approximately one-third of the unorganized fishermen felt the same. With regard to changes in experience it was felt by both groups that there was more crowding and more fishermen. Also, the organized fishermen believed that some fishermen had a poor attitude toward the resource.

The responses from the unorganized fishermen showed little awareness of the poor attitude problem of other recreationists.

As it appears that a majority of fishermen do fish the Lower Mainland, for at least a portion of their fishing time, the writer suggests that if this area becomes further restricted in its ability to provide the desired fishing experience, a problem may arise for other areas receiving added pressure. It could also result in some fishermen giving up the sport altogether.

The responses indicate that Vancouver Island and the Interior would be the next areas to come under pressure (Table 20).

Although fishermen would drift to these areas a greater time constraint would result and fewer days of fishing would be possible. The unorganized fishermen also would be much more likely to give up fishing than the organized steelheaders. Many fishermen could not conceive of the Lower Mainland not being available for steelhead fishing, but felt if it were not, they would have to complain to someone.

TABLE 20

SUBSTITUTIONS FOR STEELHEAD FISHING ON THE LOWER MAINLAND

(Percentage)

	<u>Unorganized</u>	<u>Organized</u>
Give up fishing	17	7
Go to the U.S.	3	13
Vancouver Island	11	26
Interior	15	14
Unspecified Elsewhere	29	31
Other Species	14	3
Complain	11	6

(ii) Detractions

The major detraction identified was crowding of fishermen. A large number of fishermen in one area would obviously detract from the already stated motivations of the fishermen - that of getting away to relax and enjoy the outdoors in peace and quiet. Another frequently mentioned aspect was that of the inconsiderate angler who either left litter or failed to observe the ethics of fishing.

Some suggestions as to what the detractors would be were noise, taking undersize fish and casting indiscriminately.

The organized fishermen also ranked crowding highly in the features that detracted from their experience, while they also regarded pollution of the water as being another prime factor. It was indicated that water clarity is an important aspect in choosing an area to fish.

(iii) Summary of Experience Desired

This selection of the study was unique in that the fishermen were largely in agreement in what they enjoyed from their experience and what detracted from it. The outdoors and being able to get away to relax were clearly the most attractive aspect cited by fishermen, while crowding was regarded as the biggest detraction.

The differences between the organized and unorganized fishermen were only clearly evident with regard to the percentage of time each group spent on the Lower Mainland. The organized fisherman, because he fishes more, looks for a greater variety in experience, and therefore tends to seek other areas.

The experience desired, although difficult to isolate because of utopian ideals being expressed, is nevertheless important to ascertain. Planning and managing a resource to maximize user satisfaction requires an understanding of user desires. Only by planning to meet these desires can the social benefits be maximized.

B. Steelhead Fishermen's Preferences and Opinions for
Management Alternatives

Argument continues on the issue of what are the best management alternatives for fisheries managers to use in the fight against increasing pressure on a limited resource. On the Lower Mainland, management problems are magnified by an urban population in close proximity to fishing rivers, with a loss of river bank access and the destruction of streams by pollution and damming.

The Federal Government Hatchery is already in operation on the Capilano River and is now producing steelhead for planting in rivers as yet unspecified. The Provincial Government has plans to provide a steelhead raising capability in the Abbotsford Hatchery. However, there are sharply differing opinions on the suitability of hatchery raised fish as a solution of the problem facing the fishery. Roderick Haig-Brown, the noted B.C. conservationist, is vehemently opposed to hatchery programs and stocking of streams, calling it a "last resort". He points out that the actual cost of producing the fish to be caught is about \$8 per fish, genetic pollution can result, in that weakness of the artificially raised stock become magnified, and hatchery programs really do not solve the problem. (Address, B.C. Steelhead Society, 1973). Many writers point out that the reason hatchery fish are often needed for stocking is because of pollution or diversion of streams. Hatchery fish do not solve these problems and, neither do they solve the problem of over fishing because as more fish are available by this artificial means, pressure from fishermen increases.

Those in favour of hatchery programs are of two types: (a) those who just want more fish, and (b) those who see such a program as a means of stocking streams which have had stocks eliminated or largely depleted because of natural or manmade obstacles such as dams or pollution.

In the States of Washington and Oregon, steelhead hatchery programs are reported to be operating very successfully. Which road does British Columbia take: natural rearing, hatchery fish or a combination of the two? The biological aspects of stocking streams with fish reared in hatcheries is an important consideration. In addition the attitudes and preferences of fishermen should be taken into account in deciding what course to pursue. It does not follow that the responses of the fishermen should be followed blindly. The responses of the fishermen may indicate that they lack knowledge of the biological consequences of one or more alternatives. If this is the case, the test of fishermen's preferences indicates a need for the Fish and Wildlife Branch to communicate its knowledge more effectively to fishermen.

(i) Preferences for Management Alternatives

To test the fishermen's preferences on management alternatives they were asked various questions relating to this subject. The first question was open-ended and asked the fishermen to suggest management alternatives which should be emphasized on the

Lower Mainland. Thus the fishermen defined, in their own way, the Lower Mainland's problems and they were then able to suggest what they felt would aid in achieving solutions. Where regulations were suggested they were broken down to get an idea of the types of regulation being suggested.

TABLE 21
MANAGEMENT ALTERNATIVE PREFERENCES
(Percentage of all responses)

	<u>Unorganized</u>	<u>Organized</u>
Hatchery Fish	12	5
Natural Raising	8	16
Protect Resource	20	27
Green Strip Public Access	6	9
Enforcement	11	10
Protect Young Seagoing	8	7
Regulation	28	20
Other	7	6

It is interesting to note from Table 21 that there are strong feelings for protection of the resource from logging, damming, pollution, and the imposition of regulations. The figures on natural raising as opposed to hatchery fish shows that there appears to be disagreement between organized and unorganized steelheaders. The

question of hatchery raised fish opposed to natural runs is examined in a later question.

Twenty-six percent of the organized and twenty-seven percent of the unorganized supported the use of some type of regulations to deal with the problem. These fishermen, in the majority of cases, recommended a reduction in catch either on a per day basis or seasonally. Some also suggested that catch and release fishermen should only be allowed to catch their limit, forty, as opposed to releasing fish and maintaining their place on the river. There was also some support for longer closed seasons to allow more fish to migrate.

(ii) The Hatchery Program

To refine the feeling and preferences of fishermen toward the hatchery program, the steelhead fishermen were asked if they agreed or disagreed with such a program for the Lower Mainland. In general terms both groups were for the scheme but the organized fishermen appear to favour the stocking of some streams only.

TABLE 22
PREFERENCES FOR HATCHERY BRED FISH

(Percent)

	<u>For</u>	<u>Against</u>	<u>Argues Both Sides</u>	<u>Yes - on some Stream Only</u>	<u>Argues for one With Best Promise</u>
Unorganized	78	9	3	7	3
Organized	17	30	8	43	2

Those who were "for" the hatchery program felt that there was a lack of fish and the hatchery would increase the amount of fish available. Those who voted "against" hatchery bred fish intimated, amongst other things, that there was still more that could be done to improve the fishery without resorting to artificial propagation.

If the hatchery program were to go ahead, Roderick Haig-Brown (1973), suggests that an investment of \$8 would have gone into each steelhead by the time he was caught. The question is: Who should bear the cost? To ascertain who the steelheader thought should pay, the question was asked, "Who should pay for the hatchery program?" Those who were against the scheme, in general, did not answer this question. However, those who did answer have had their responses recorded in Table 23.

TABLE 23
WHO SHOULD PAY FOR THE HATCHERY PROGRAM?
(Percent)

	<u>Taxpayer (A)</u>	<u>Fishermen in General (B)</u>	<u>Steelheaders (C)</u>	<u>A&B</u>	<u>A&C</u>	<u>B&C</u>
Unorganized	42	42	9	6	1	0
Organized	41	30	20	0	7	2

Chi Square .025

Opinions were expressed that a hatchery would benefit all and since recreation normally is paid for out of general revenue so should a hatchery program. Others asserted that perhaps an added tax could be placed on sporting goods to enable the facility to be established.

Steelhead fishermen were then asked what rivers they felt should be stocked. To see if there was a rationale behind choosing certain streams for stocking, they were asked why they chose the particular streams they did.

TABLE 24
REASONS FOR STOCKING CERTAIN STREAMS
(Percent of all responses)

	<u>Unorganized</u>	<u>Organized</u>
Current lack of fish	26	32
Heavy fishing pressure	13	8
Close	15	18
Take pressure off other streams	6	10
Sparing area destroyed	4	2
Not polluted	17	0
Large stream	9	0
Cannot recover	5	28
Can be monitored	5	2

The unorganized fishermen feel, in broad terms, that the rivers to be stocked are those which have few fish, are large streams, and which are relatively unpolluted. The organized fishermen, on the other hand, agree that the streams to be stocked are those with a lack of fish, but feel it should be those that have little chance of recovery. Such streams would be those that have been dammed, have no spawning areas, or those suffering from severe agricultural runoff problems which may eventually be cleaned up.

(iii) Summary of Steelhead Fishermen's Preferences
and Opinions on Management Alternatives

The data reviewed in the preceding pages indicate some of the differences which can be attributed to the organized and the unorganized fishermen with regard to their characteristics, preferences and opinions. The management alternative which appears to bring all problems into focus is that of the hatchery question. Not only is there diversity in the attitudes toward this scheme amongst organized and unorganized fishermen, but there is also conflict as to where such fish would be stocked. As this type of program is envisaged for the Lower Mainland it is important that the planners and managers be aware of the reaction of fishermen. The approach taken by management may appear biologically sound, but may not appear to the resource user as being in his best interest. Some way must be found to resolve this conflict.

C. Preferences and Opinions of Managers

An assessment of managers' preferences and opinions should indicate the direction of thinking in regard to planning the resource. If there are good channels of communication a comparison of the preferences and opinions of managers and fishermen would indicate a high degree of similarity. Internal communication could also be assessed to some degree since a similarity in responses from managers would indicate that policies have been defined and agreed upon.

(i) The Experience

The experience that fisheries managers favour either through what they believe the fishermen want or through their own experience, is firstly the challenge followed by getting away to relax and the outdoor experience. The major detraction, on the other hand, was considered to be crowding. Spoilage of banks by logging and inconsiderate angling were also mentioned.

(ii) Management Alternatives

The management alternative focused on in the study was the hatchery program and it was interesting to note that management also believed that it should be emphasized along with protection of the resource from deleterious consequences such as logging off banks or pollution. However, in the following question on the hatchery program the managers were split on the issue: 50% favoured the stocking of some streams with hatchery stock while the other 50% were

opposed to the hatchery program. The reason that stocking was felt to be needed in certain streams was because there is a current lack of fish and many of the streams have no possibility of providing a steelhead run in the future.

The majority of the managers were fishermen but in general their steelhead catch was low last season. Many did not fish the Lower Mainland and therefore did not comment on this section of the questionnaire. Further analysis of the fisheries managers' responses would not produce information pertinent to this study and therefore was not carried out.

CHAPTER FIVE

ATTITUDINAL RESPONSES OF FISHERMEN AND MANAGERS

A. Introduction

In an attempt to ascertain attitudes of fishermen and managers a number of statements thought pertinent to management decisions and the experience desired were inserted in the questionnaire. The respondents were given a scale from 1 to 5 to record the answer which best represented their attitude toward the statement. The five grade scale ranged from strongly agree, through agree, not concerned either way, disagree to strongly disagree. Therefore, the analysis of data in this chapter will differ from the preceding one in that the strength of feelings for and against the statements can be ascertained.

The statements were examined independently, but to give some order to the analysis they have been broadly classified into statements concerning management and those concerning fishermen's attitude toward a certain type of experience. The statements were also looked at as an overall attitude of fishermen and then how the responses varied between organized and unorganized fishermen. The variation was assessed by means of a chi-square test. (Appendix B).

B. Management Statements from Fishermen

(i) Fly Fishing Restrictions

The statement was posed as to whether the respondent would like to see "fly fishing only" restrictions on the Lower Mainland. This statement attempted to ascertain the feasibility of adopting a management program for a specific type of steelheading experience - an experience largely pursued by organized fishermen and then only by 50% of this group to any degree.

In terms of percentage of fishermen responses organized fishermen are divided in their attitude toward this management policy. Thirty-nine percent of the organized fishermen agree or strongly agree to such a restriction, while thirty-two percent of the unorganized fishermen are classified in the agreement group. Comparing these results with Pearse-Bowden (1971) findings to a similar question it can be seen that results are not dissimilar with Pearse-Bowden findings; forty percent of fishermen feeling such restriction is a good idea. However, with regard to this particular statement the majority of fishermen were in disagreement. Because this statement's responses were not found to be statistically significant, further analysis was not carried out.

(ii) Attitude Toward Hatchery Fish

Much argument has gone on over the quality of hatchery raised fish as compared to the wild variety. Some fishery managers will argue that this policy works in Washington and Oregon and is the only way to save the sport fishery. Others call hatchery programs an admission of defeat. Regardless of the arguments of the experts, the fishermen have built up an attitude towards hatchery raised fish. By trying to gauge this attitude something can be said about acceptance of hatchery bred fish over the wild variety.

Organized fishermen strongly disagree (45%) with the statement that hatchery bred fish are as good a game fish as the wild variety. (Table 25). This corresponds to responses to another question about whether fishermen are for or against the hatchery program. The organized fishermen, at present, appear unconvinced of the merits of the hatchery fish. The unorganized fishermen, however, are in agreement with the statement. Their attitude suggests that they are more interested in catching a fish rather than in the character of the fish caught.

(iii) Fish and Wildlife Experimental Programs

It has been suggested to the Fish and Wildlife Branch that they should conduct various management programs on an experimental basis and monitor the results. Fly fishing only restrictions on three interior lakes were introduced as an experiment and continued when fishermen responded positively. This is a useful method of testing new policies and their impact on sport fishermen, and should

be practiced much more widely and imaginatively. However, unless fishermen agree in principle with more widespread use of such experiments the Branch may create more problems for itself than it solves.

Basic agreement was expressed for such a scheme but one statistically relevant group emerged which was in opposition. Within the organized fishermen is a group which strongly disagree with such a program (17%) involving experimentation. Further exploration of the reason for this may be needed, but it would appear that either the fishermen do not want their experience tampered with by the Fish and Wildlife Branch, or they have a distrust of the agency. The unorganized fishermen, in general, are in agreement (81%). There would, therefore, be little need to convince this group that a policy of experimentation to gauge fishermen's views would be desirable.

(iv) Attitude Toward Access Restrictions

The statement was posed: I would be opposed to regulation which would restrict my access to Lower Mainland streams even if it resulted in less crowded conditions. Through this question management could ascertain if the fishermen would be willing to take less days fishing to improve the fishing experience with respect to crowding. Response to this statement depends on the fisherman's attitude toward crowding and his attitude toward the resource and its availability.

The replies indicate that both groups oppose the idea of regulation to restrict access. Organized fishermen, in particular, strongly opposed (45%) the idea of limiting access. This could be because organized fishermen know where to go to avoid crowding anyway, and therefore do not wish to be restricted. On the other hand, it may result from the attitude that the resource should be available for anyone to use at anytime: The public resource for the public to use.

Unorganized fishermen also did not want access restricted. Naturally it would depend on just how this access restriction was imposed, but for the fishermen who fish only a few days per season, an access restriction at certain times may be a severe handicap.

(v) The Non-Resident Angler

"More than half of all residents combined thought that non-residents should, in some way, be discouraged from fishing in British Columbia, 31% thought that the present policy should be continued and only 10% wished to see more non-residents fishing in the province." (Pearse-Bowden, 1971, p. 48).

Although fishery managers are aware that non-resident anglers really have only minor effect on the resource, resident anglers do not favour admission of these fishermen. This was true in Pearse-Bowden's studies and is also true here. Forty-two percent of the organized fishermen strongly disagreed with the statement

TABLE 25

ATTITUDINAL RESPONSES OF FISHERMEN AND MANAGERS

<u>Management Statements</u>		<u>Strongly Agree</u>	<u>Agree</u>	<u>Not Concerned</u>	<u>Disagree</u>	<u>Strongly Disagree</u>
(i) Fly Fishing Restrictions:						
I would like to see fly fishing only restriction on some steelhead streams in the Lower Mainland.	Org.	23	16	16	14	31
	Unorg.	15	17	18	32	18
	Managers	17	50	33	0	0
		Chi Square .025				
(ii) Attitude Toward Hatchery Fish:						
Hatchery bred fish are as good a game fish as the wild variety.	Org.	7	10	7	31	45
	Unorg.	15	38	21	18	8
	Mangers	0	0	75	0	25
		Chi Square .005				
(iii) Fish & Wildlife Experimental Programs:						
The Fish & Wildlife should try various management programs to see how fishermen react and to see what effect it has on the fishery.	Org.	23	43	3	14	17
	Unorg.	35	46	11	5	3
	Managers	50	50	0	0	0
		Chi Square .005				
(iv) Attitude Toward Access Restrictions:						
I would be opposed to regulations which would restrict my access to Lower Mainland streams even if it resulted in less crowded conditions.	Org.	45	20	5	19	11
	Unorg.	30	30	9	20	11
	Managers	25	0	75	0	25
		Chi Square .500				
(v) The Non-Resident Angler:						
Non-resident anglers of the Province have little effect on the Lower Mainland steelhead fishery and therefore should not be restricted from obtaining a steelhead licence.	Org.	9	21	11	16	43
	Unorg.	6	27	8	22	37
	Managers	0	80	20	0	0
		Chi Square .750				

Chi square given only for organized and unorganized groups

that since the non-resident has little effect on the Lower Mainland streams he should not be restricted. Thirty-seven percent of the unorganized concurred with the organized fishermen's attitudes.

C. Attitude Toward the Fishing Experience

(i) Fishing with Other Fishermen in Sight

It appears that the organized fisherman is more gregarious than the unorganized in that the organized fisherman (45%) strongly agrees with the statement that: "I would prefer to fish with no other fishermen in sight". By the same percentage the unorganized fisherman agrees that he likes to fish with no other fishermen in sight.

The organized fisherman's answer may suggest that he enjoys companionship in his fishing experience and perhaps can fish streams which are relatively uncrowded. On the other hand, the unorganized fisherman may only have knowledge of a limited number of streams and these are always crowded. His response may be the result of being crowded continually in his fishing experience.

(ii) The Catch or the Outdoors

Some fishermen did not respond to this statement that, catching a steelhead is not as important to me as just getting away for the outdoor experience, because they felt that both catch and outdoors were important. It is interesting to note that both these

factors rated highly in the response of fishermen when asked about what it was they enjoyed about the fishing experience. Most fishermen, in both groups (36% of the organized and 46% of the unorganized), agreed that the outdoors was more important than the catch with a minority group strongly disagreeing (11% of the organized fishermen).

(iii) Catch and Release Programs

The catch and release program is advocated by some managers as a means of giving the fisherman the opportunity of catching a fish yet maintaining the supply, as all fish are released. This appears feasible as some very proficient fishermen have already reached the point where they receive gratification by being able to catch a fish and then release it. This is Meeson's (1972) non-extractive stage. The organized fishermen strongly agree to agree (80%), perhaps because many of the fishermen do this already, and it appears that this type of program would be ecologically sound in enabling a finite number of fish to satisfy more than just one fisherman's aspirations.

The unorganized fisherman, although in large part favouring such a scheme, (54%) has a statistically important group who disagree (22%) and strongly disagree (13%). This may consist of the extractive fishermen who like to take the fish home; the fishermen sometimes described uncharitably, as 'meat hungry'.

(iv) The Regular Catch

The statement, "I would prefer to catch steelhead regularly, even if small", was designed to see if the catch is an important part of the fishing experience. The response to the question may reflect the degree of success a fisherman has and may correspond to whether he would fish for hatchery raised, standard-sized fish. Fifty-seven percent of the organized fishermen disagreed or strongly disagreed that they would prefer to catch steelhead regularly, even if small, while 34% of the unorganized could be classified in the same group. At the other end of the scale for this statement, only 8% of the organized strongly agreed as compared to 15% of the unorganized.

(v) Trophy Sized Fish

The statement that, "The only steelhead worth catching is a trophy-sized fish", was meant to attract the elitist to respond in the affirmative. However, the result was that a very large majority of both organized (91%) and unorganized fishermen (87%) disagreed or strongly disagreed. It appears that most fishermen do not gain ultimate satisfaction from catching a trophy-sized fish.

(vi) Days Fishing or an Improved Experience

Although responses to an earlier statement suggested that in general fishermen would not be willing to have their access restricted to limit crowding, both groups favoured fewer days if their experience would be of a higher quality. This suggests that the experience

improvement may revolve around the tranquil, pleasant experience in the outdoors where the chance of catching a fish was ever-present. In large part, then, the experience would have to do with the natural surroundings and improvement of the bank-side aesthetics and water quality. In discussions with fishermen and in comments on the questionnaire, the major problems they saw were log booms, garbage and crowding, all of which spoiled the experience.

D. Attitudinal Responses of Managers

Because only a few members of the Fish and Wildlife Branch influence steelhead management, the sample of this group was small. The influence of the various managers who responded would not, of course, be equal. Attitudes expressed, therefore, are difficult to quantify and to extrapolate. However, they indicate the direction in which management in general feels the resource should be moving.

(i) Management Statements

Responses to statement on management alternatives showed that in three out of five statements management were of a similar mind. However, it was also evident that in a number of cases the response was non-committal.

With "fly fishing only" restriction on some streams of the Lower Mainland (Table 25), 67% of the managers agree to strongly

agree. This may stem from realization that the fishery is a system, and within the system, different experiences have to be provided for a range of resource users.

There was a largely non-committal response on the game qualities of hatchery fish. Although one manager strongly disagreed that hatchery bred fish are as good a game fish as the wild variety, it is a safe assumption to make that no one really knows if there are differences.

There is general consensus that the Fish and Wildlife Branch should be trying various management programs to assess how well they work. Responses to this statement were all on the agree side. However, when asked about restriction of access by regulation the managers either clustered on the non-committal response (75%) or were at either end of the scale. It would appear then, that views on possibly limiting the number of licence holders able to fish on a certain day, for example, has not been discussed so that attitudes have not been formed.

The analysis of licence holders clearly indicates that the non-resident has a negligible effect on the fishery. This is particularly true on the Lower Mainland of British Columbia. Managers appear to be aware of this and therefore agreed (80%) that non-residents should not be restricted from access to the resource.

E. Summary and Comparison

The responses to the attitudinal statements bear examination in that they not only point out attitudinal differences between the organized and unorganized fishermen but they distinguish differences in attitude between fishermen and manager. In this summary the most obvious differences will be pointed out to enable conclusions to be drawn in later chapters.

Within the management statements, for example, the largest percentage of fishermen both organized and unorganized disagree, and in some cases strongly disagree, with the idea of "fly fishing only" regulations on some streams. This juxtaposition between management and fishermen also exists in attitude toward the non-resident fishermen. Perhaps it is that management have gauged the effect of the non-resident on the resource while the fishermen perceives an effect which does not really occur.

As far as attitude statements with regard to fishing experience it appears that fishermen and managers are closely aligned in their attitudes. Therefore it could be said that there is little debate about fishing experience desired. The problem arises when looking at management alternatives.

TABLE 26

ATTITUDINAL RESPONSES OF FISHERMEN AND MANAGERS

<u>Attitudinal Statements - Fishing Experience</u>			<u>Strongly Agree</u>	<u>Agree</u>	<u>Not Concerned</u>	<u>Disagree</u>	<u>Strongly Disagree</u>
(i)	I prefer to fish with no other fishermen in sight.	Org.	20	25	43	9	3
		Unorg.	17	20	38	18	6
		Managers	17	49	17	17	0
			Chi Square .500				
(ii)	Catching a steelhead is not as important to me as just getting away for the outdoor experience.	Org.	17	36	15	21	11
		Unorg.	22	45	11	16	4
		Managers	33	33	0	33	0
			Chi Square .250				
(iii)	I would be willing to participate in a catch and release fishery ("fishing for fun")	Org.	38	42	8	8	4
		Unorg.	22	32	11	22	13
		Managers	33	50	0	17	0
			Chi Square .005				
(iv)	I would prefer to catch a steelhead regularly, even if small.	Org.	8	23	12	39	18
		Unorg.	15	32	19	26	8
		Managers	0	40	20	40	0
			Chi Square .050				
(v)	The only steelhead worth catching is trophy-size.	Org.	2	3	4	44	47
		Unorg.	3	4	6	40	47
		Managers	0	0	25	75	0
			Chi Square .900				
(vi)	I would accept less days fishing if I could get a higher quality experience.	Org.	14	43	9	20	14
		Unorg.	16	38	11	26	9
		Managers	33	67	0	0	0
			Chi Square .750				

Chi Square given only for organized and unorganized groupings.

CHAPTER SIX
CONCLUSIONS OF THE STUDY

A. Introduction

The preceding three chapters presented the data from this study. In this chapter the salient aspects of these data will be reviewed in light of conclusions which can be drawn. As the conclusions are restricted by the study's limitations a brief review of these follows.

B. Limitations of the Study

This study does have a number of limitation which must be kept in mind. Firstly, the sample sizes must be recognized. A sample of only 4% of all unorganized steelhead fishermen was taken. The organized fishermen because of their smaller numbers and ready identification enabled approximately 60% to be sampled.

The study was conducted on the Lower Mainland of the Province and with a specific group defined as unorganized and organized steelhead fishermen. Therefore, conclusions can only be drawn about the Lower Mainland Steelhead angler, and about the groups based on how they were defined for sampling purposes.

It should be remembered that the major comparison between organized and unorganized fishermen resulted in analysis being carried out along these lines. Possibilities exist for looking at the data based on other criteria such as number of fish caught last season, experience desired, and equipment used. This would be the next step, using a larger sample size, to gain a fuller understanding of the components which make a specific experience.

Managers were also asked to complete the questionnaire. However, the major limitation to these data was the fact that different managers have different powers of influence on alternative management decisions which may be generated. Obviously the Chief of Fisheries would be a great deal more influential than a conservation officer. Also, the views which they expressed were their own rather than a perception of what they believed the fishermen wanted. Therefore, it was difficult to assess the responses and compare them to the fishermen's views to see if diversity of views were apparent as the number sampled was small and response may have been given as fishermen and not as managers. This section of the study, then, is regarded as inconclusive.

Studies of perceptions and attitudes obviously are not a panacea for information on which policy decision can be based. Particular problems of this study have been discussed above. Other limitations which must be identified are bias, dating of information, over sampling and the effect of information on response.

Biasing of a study is always possible when one is concerned with human behaviour. This danger is especially acute in perception and attitude studies because the respondent is asked to react to a question he may not have perceived as being a problem. An example of this would be in the question relating to detractions from the fishing experience. When a response is received that crowding detracts from the experience, does this really detract from his experience, or would the same response be forthcoming if he fished with one or one hundred fishermen in close proximity? Crowding could also be a conditioned response in that the fisherman believes this is the response expected. Only by observing at the site could a better assessment be made.

This leads to another difficulty associated with these types of studies. The problem of interpretation. The attitudinal responses are examples where "strongly agree" through to "strongly disagree" could mean different things to different individuals. Basically the response would depend on aspects of "awareness" and "concern". Respondents aware of a particular problem would react more strongly than those who were unaware. Also the person who is more concerned may be the person who understands more clearly the effect of a situation or can see direct implications for himself.

Out of date information is a further problem. People's attitudes, opinions and perceptions are continually changing over time. Interpretation of results of a study, therefore, must take into account the circumstances prevailing at the time of the investigation. An implication of this limitation is the need for continuous monitoring.

Conversely, continuous monitoring does have its drawbacks in that groups can be over-interviewed. Although only one return was received where objection to the questionnaire was expressed, it is an ever present difficulty which could arise.

The provision of information influences perceptions and attitudes and thereby responses. Members of clubs and the Steelhead Society receive information through their organizations. Others may be influenced through articles in the news media. Therefore, responses may be the result of education on a topic rather than experience. Perhaps the information if given wide enough publicity will result in a majority of people responding in a particular manner.

Finally, it should be recognized that there is a continual danger in studies of this type, that they can be used to justify what planners and managers have already decided upon. If this occurs, such studies will fall into the same disrepute that has befallen such techniques as cost-benefit analysis, where the study is done to justify the project rather than to equate its merits.

C. Conclusions Arising from the Study

The following are the conclusions arrived at by this study:

1. Organized and unorganized fishermen are different.

2. There is a wide range of experiences desired and therefore a need for the provision of a diversity of recreational fishing experiences.
3. A systematic collection of information on resource users is feasible as well as desirable.

Each of these conclusions is discussed below and suggestions as to planning implications are made where appropriate.

(i) The Organized and Unorganized Fisherman

The analysis of data was carried out in such a manner that it would be possible to compare the responses from the organized and unorganized steelhead fishermen. The differences between these two groups were noted on a number of occasions throughout the data analysis. Socio-economic characteristics, attitudes toward statements on management and the experience desired, the type of equipment used and the time spent fishing all tended to differentiate one group from the other.

The socio-economic aspects were one area in which the difference between the two groups was easily discernible. The age distribution, for example, between organized and unorganized fishermen was noted to be substantially different. The organized fishermen sampled were much younger than the unorganized. From this starting

point variations between the two groups could be seen in other socio-economic data. Age and education reflected in large part, the characteristics observed in income and occupation: The organized fishermen being younger, better educated on the average, and often holding a professional occupation or in sales.

Another distinguishing factor between these two groups was the amount of time the fishermen spent fishing and the number of fish caught last season. The organized fisherman, as a general rule, fished more days and was more successful than his counterpart, the unorganized fisherman. In fact, it appears that the organized fisherman fishes twice as much as the unorganized fisherman.

The equipment used was another distinguishing difference in that the organized fisherman is more inclined to specialize. A high proportion of organized fishermen fish more than half of their fishing time with either fly or lure and to a lesser extent with bait, while the unorganized fisherman is more apt to try the range of angling methods. A similar specialization can be seen in the fish angled for. The organized fisherman basically fishes for winter run steelhead and occasionally for salmon. The unorganized fisherman fishes as much for other trout as he does for steelhead.

The two groups also had discernible differences in their opinions on management alternatives. The organized fisherman is much more likely to hold a similar attitude to those of his fellow club or society members. This is evidenced in the percentage scores on the attitudinal scale. In nine out of the twelve statements the organized fishermen's responses group around a specific reply which gave this response the highest percentage of both organized and unorganized groups. This is understandable to some degree, in that one would expect the organized fishermen's attitudes to reflect the views of the club or society on many of the issues presented. The organized fishermen's attitudes tended also to be more strongly held in that they polarized at either end of the scale. This was evident in response to the protection of wild species over introducing hatchery bred steelhead. Attitudes differed significantly again when it came to the qualities they looked for in the fish they were attempting to catch. In response to the attitudinal statement on hatchery bred fish as opposed to the wild variety, on their qualities as a game fish, the majority of the organized fishermen were strongly of the attitude that the hatchery variety is not as good a game fish. Unorganized fishermen felt that the hatchery variety is as good a game fish. Unorganized fishermen felt that hatchery bred fish were as good and that the size of fish caught could be small as long as the catch was regular. The organized fishermen disagreed with the latter statement. This probably reflects the success ratio of these fishermen. If the unorganized fisherman has caught very few

fish he would be more inclined to opt for the regular catch, even if small, while the organized fisherman who can catch fish more regularly is more in favour of a quality sized fish.

In gathering opinions on management alternatives it also appeared that organized and unorganized fishermen had fundamentally different views. The unorganized fishermen tended to have a much shallower view of management needs than did the organized fishermen in that they were more in favour of regulation and hatchery fish than were the organized. This is an example of management techniques which do not aim at solving problems at their source. The organized fishermen on the other hand were mostly in favour of protecting the resource and rated natural raising highly.

From the summary of information on organized and unorganized fishermen it can be concluded that these two groups are different. Therefore, in decision-making both user groups must be taken into consideration if the alternatives generated at the planning and management stage are to reflect accurately the public's wishes.

In the past the Fish and Wildlife Branch has failed to do this in any systematic fashion and has relied upon contact largely with one group, the organized fishermen, for public reaction. As

the organized fishermen are only a small select group their views are not necessarily those of the majority.

(ii) The Need for a Differentiated Product

Within the categories of organized and unorganized fishermen there were ranges in the experience desired. It can be seen from the data that the type of equipment used, and the fish angled for, varies considerably. Some fishermen are prepared to fish in more crowded areas on one hand, and secluded streams on the other. Others travel away from the Lower Mainland on many occasions while still others never leave the area. The fishermen may enjoy catching anything, or he may like to catch large fish in the most challenging way possible.

These experiences represent a whole range of desires for fishing and to satisfy the majority of fishermen the resource must be thought of in holistic terms. Because of the limited sample size it is difficult to isolate the various desires of the fishermen in a meaningful way to give management an idea of the differentiated product desired. However, the understanding of what the products are that need to be provided is basic to future planning of the steelhead fishing resource.

A number of researchers, including Hendee (1968) and Stankey (1971) showed that different recreationists desired different forms of experience. The fisherman is no exception. Meeson (1972) suggested that fishermen actually progress through different stages; the more expert they become, thereby looking for a new experience which can only be provided if a differentiated product is available.

The unorganized fishermen fish less and catch fewer fish than do the organized fishermen. The unorganized fishermen, then, are the most ardent supporters of the hatchery program as it is believed, by this group, that they will have a much higher possibility of catching a fish. Organized fishermen, on the other hand, believe the hatchery program would be effective only if it stocked streams depleted because of spawning areas already destroyed or polluted.

It can be suggested that unorganized fishermen would be satisfied to catch a fish regularly, and would participate in a hatchery program supplying fish of a relatively uniform size, as they also believe the hatchery fish to be as good a game fish. Many organized fishermen could not be expected to have a satisfactory fishing experience in a more artificial and more crowded environment.

By inventory of streams based upon the experience which can be provided, the management and planning of the fishery could be more effective. Firstly, if we are to provide a differentiated

experience for steelheaders it should be decided if steelhead fishing, in itself, is a specific fishing experience, an experience that is challenging because of the scarcity of the fish. Secondly, it must be known how many fishermen want a particular type of experience and attempt to weigh this against the river system's potential for providing what is desired.

Sample size, in this study, seriously hampered the possibility of determining range of experience. Although it was obvious that different fishermen required different experiences, future studies in this area are needed.

(iii) A Systematic Method for Information Generation

In accord with the Withler (1972) report, steelhead fishermen's views must be sought to achieve better planning. This study concludes that a systematic gathering of fishermen's preferences, characteristics and opinions is feasible. This assessment of the fishermen's preferences, attitudes, characteristics and opinions enables the planners of the resource to include information in the decision-making process which was not previously available. By taking into account user preferences the agency is better able to maximize benefits to society, which must be its ultimate goal.

By understanding why people fish, the methods they use and the qualities they desire, the whole resource can be viewed as a system and the desired quantities of certain types of experience can be supplied. Future studies may attempt to go further in this field of identifying the sub-populations so a clearer understanding of the range of experience desired, and the numbers requiring it, can be identified.

The questionnaire approach used in this study may not be feasible as a regular practice in that it was attempting to establish a basis from which to work; a methodology on which to build. It also contained open-ended questions which require more time to code and interpret and may, therefore, be impractical because of these factors.

It would appear that the steelhead questionnaire on catch and effort presently used by the Fish and Wildlife Branch is a ready-made vehicle which could be used to obtain public feedback. At present the questionnaire is merely a postcard but could be extended to form an arrangement similar to an aerogram. Questions asked could relate to general aspects or to specific programs which the agency is contemplating introducing. This would enable the Branch to test ideas before becoming committed to a policy by determining if they have the support of fishermen.

Larger questionnaires may have a place, on occasion, if a large amount of data is required. Such questionnaires could be administered in person by summer students or by mail. It would appear that either way the benefits of a good questionnaire in information generated would far outweigh the cost.

Assessment of the views of fishermen, or for that matter anyone, requires that the person expressing the view or opinion is well informed. From this study it appears that the organized fisherman is well informed while the unorganized is less so. This has led to a number of suggestions being made on keeping the public informed.

The idealized decision-making process (p. 5) does envisage the generation of alternatives which can be modified by public input. It does require a two way communication system then for this to happen in a realistic fashion. The first two recommendations below suggest a system for feedback whereby the agency is kept informed of the resource users' wishes. However, in the other direction there must be an information flow from the agency to the people as an ill-informed clientele makes it impossible for the agency to do its job.

Therefore, keeping the public informed of reasoning behind decisions and the choices that can be made, is vital to a good decision-making process. This can be easily done through the mechanisms that are already available to the Branch. Some suggestions are as follows:

- (a) Licences are sold throughout the Province in a variety of locations. Literature such as the Pearse-Bowden studies could be sent on consignment to these vendors to sell at a price to cover handling. Perhaps even as a money raiser for the Branch. The information in these booklets and other publications of the Branch would be of great educational value.

- (b) In future questionnaires it would be possible to determine the source of the fishermen's information on recreation. Once information sources had been located the Fish and Wildlife Branch could encourage people to place articles in these publications. One article may be by an advocate of hatchery programs and on the other page could be one taking an opposing view.

- (c) The regulations could also be used as a method of disseminating information. By expanding this into a small booklet various aspects of the fishery could be pointed out.

- (d) Education is also possible through night school courses. New fishermen should be exposed to the ethics of fishing and its management problems as well as the skills associated with the sport. Night school courses are run by School Districts so would be of no monetary cost to the Branch

yet it would be a means of ensuring that the new angler becomes informed about the resource and is familiar with sources of information. Fishing club personnel could be encouraged to run such courses.

- (e) Questionnaires can also be educational by stating the alternatives and the expected result of adopting a certain policy. When using a questionnaire to assess fishermen's views on a specific topic such as a particular management alternative, the question can be designed to be informative. Such questions can be beneficial but wording is clearly important as they can often become overly long. An example of an educational question may be:
- "Hatchery stocking of some streams may result in better catch but a great deal more crowding. Would you fish for these fish even if conditions were quite crowded (one fisherman every 15 feet)?

In concluding this section on educating the public, the Branch needs to educate the fishermen to the fact that the manager does not know all the answers and as it is for the public that the resource is managed, it is the public whose desires must be met. Systematic information flow in both directions is obviously required.

D. Summary

The study focuses on a method which could be used by the Fish and Wildlife Branch to assess user preferences which would, in turn, assist in generating alternatives in the decision-making process. By the use of a questionnaire technique and the systematic sampling of different user groups useful information is obtained.

The technique used here has application in many areas of planning where benefit derived by the public can only be determined by ensuring that public wishes are being followed. Many public agencies especially those concerned with recreation therefore would do well to consider such a methodology. This is a way in which the numbers desiring a certain experience can be determined and where feasible accommodation for these desires can be made. It has been shown in this study that a range of experiences are desired and only by this type of systematic methodology can they be assessed and viewed as part of a system of experiences which the agency should be aiming to provide.

Recreation and Resource Planning has, in the past, concentrated on assessment of the physical qualities of a resource without considering the resource user and his preferences. Planning, as a discipline, considers both the physical and the social aspects in decision-making in a systematic manner attempting to include all

aspects and all publics. This type of planning approach, now evident in the urban spheres, must become a more integral part of the management of recreation resource. It is hoped this study will contribute to the process.

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APPENDIX A

STEELHEAD FISHERMAN QUESTIONNAIRE

1. Where were you living when you first took up fishing? _____
Was this an urban area, rural or a small town? _____
How many years ago was this? _____
2. How many years have you fished for steelhead? _____
3. How many others have you taught to steelhead fish? _____
4. Do you feel that existing steelheading areas are overcrowded? _____
5. How many days (approx.) last season did you fish for steelhead? _____
Approximately how many did you catch? _____
Approximately what % of your steelheading time was spent on on the Lower Mainland? _____
6. List your favourite steelhead streams in order of preference giving reasons for your choice.

Stream	Reasons
1.	
2.	
3.	
4.	
5.	

7. (a) Have you noticed any changes in Lower Mainland Steelhead fishing over the last few years? _____
If so, what? With respect to fish.

With respect to fishing experience.

- (b) What would you do if the Lower Mainland was not available to you for steelhead fishing?

8. What are the things which you enjoy most about your steelhead fishing? Please describe them in as much detail as you wish in the space below. (Think about the planning of the fishing trip, the on-site experience, the remembrance of the trip, eating the catch, etc).

9. What detracts from your fishing experience. (Crowding, pollution or poorweather may be some of the factors you would consider).

10. Please rate the following statements by the way you feel about steelheading. The numbers beside each statement are for ease of answering. Circle the one you feel applies.

- 1. Strongly Agree 3. Not concerned either way 5. Strongly Disagree
- 2. Agree 4. Disagree

- a. I would like to see 'fly fishing only' restrictions on some steelhead streams on the Lower Mainland. 1 2 3 4 5
- b. I prefer to fish with no other fishermen in sight. 1 2 3 4 5
- c. Catching a steelhead is not as important to me as just getting away for the outdoor experience. 1 2 3 4 5
- d. Hatchery bred fish are as good a game fish as the wild variety. 1 2 3 4 5
- e. The Fish and Wildlife Branch should try various management programs to see how fishermen react and to see what effect it has on the fishery. 1 2 3 4 5
- f. I would prefer better protection of wild species more than the introduction of hatchery bred steelhead. 1 2 3 4 5
- g. I would be opposed to regulations which would restrict my access to Lower Mainland streams even if it resulted in less crowded conditions. 1 2 3 4 5
- h. I would be willing to participate in a catch and release fishery. ('Fishing for fun' only). 1 2 3 4 5
- i. Non-resident anglers of the Province have little effect on the Lower Mainland steelhead fishery and therefore should not be restricted from obtaining a steelhead licence. 1 2 3 4 5
- j. I would prefer to catch steelhead regularly, even if small. 1 2 3 4 5
- k. The only steelhead worth catching is trophy size. 1 2 3 4 5
- l. I would accept less days of fishing if I could get a higher quality fishing experience. 1 2 3 4 5

11. Please check the boxes which best apply. Percent of my angling time.

<u>I fish with:</u>	100%	75%	50%	25%	0%
Flies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bait	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>I fish for:</u>					
Summer Run Steelhead	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Winter Run Steelhead	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other Trout	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Salmon	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other Species	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12. There are various alternatives open to the fisheries manager in their attempt to better manage this recreation resource, both from the point of view of the fish and of the fishermen.
What do you feel should be emphasized in the managing of the steelhead fishery in the Lower Mainland?

13. One management alternative is about to be initiated by giving the Abbotsford and Capilano hatcheries a steelhead production capability.

(a) Do you agree with the steelhead hatchery program?
Give reasons 'for' or 'against'.

If yes, who do you think should pay?

(i) taxpayers in general (ii) all fishermen (iii) steelheaders only

(b) What rivers of the Lower Mainland would you suggest are suitable to stock with hatchery bred fish.

(c) Why?

PERSONAL INFORMATION

(please check ones which apply)

- | | | | |
|-----------------|--------|---------------------|--------------------------------------|
| a. Male | Female | e. Household Income | f. Where do you live? |
| b. Age Under 20 | | Below 3000 | North & West Van. _____ |
| 21 - 30 | | 3000 - 5999 | Vancouver _____ |
| 31 - 40 | | 6000 - 8999 | Richmond-Delta-Surrey _____ |
| 41 - 50 | | 9000 - 11,999 | Coq. -Pt.Moody-Bby. -New West. _____ |
| 51 - 60 | | 12,000 - 14,999 | Maple Ridge-Mission _____ |
| 61 + | | 15,000 - 17,999 | Langley-Abbotsford _____ |
| c. Occupation | | 18,000 + | Chilliwack _____ |
| _____ | | | Agassiz-Hope _____ |
| | | | Other (specify) _____ |

- d. Education
- Less than Gr. 8. _____
- Grade 8 - 11 _____
- High School Grad. _____
- Some Post. Sec. Ed. _____
- University degree _____

g. List your favourite leisure time activities. _____

h. Are you a member of a sport fishing club? _____

If 'yes' which one?

APPENDIX B

THE USE OF THE CHI SQUARE TEST

In analysis of the data obtained the chi square test has been used. This test enabled two nominal-scale variables to be cross-classified. In this case responses from organized and unorganized fishermen groups. The number following chi square at the base of tables in actual fact indicates the degree of significance that can be attached to this table as a result of differing opinions and attitudes being expressed by the two groups being tested. The number given following chi square represents the probability of this type of distribution occurring. The closer the number is to 1.0 the greater the significance.

Importance of individual cells in the matrix can be determined by the equation $\frac{(f_o - f_e)^2}{f_e}$ (f_o and f_e refer to observed and expected frequencies of each cell.) Obviously if both f_o and f_e are identical we accept a null hypothesis that the same distribution would occur for both groups. In most cases they will not be the same and we can obtain a chi square score. By determining degrees of freedom according to the number of cells in the matrix the significance level of the cell can be ascertained. This helps to identify specific areas of significance within the sub-populations.

APPENDIX C

STREAMS SUGGESTED FOR STOCKING

<u>NAME OF STREAM</u>	<u>ORGANIZED</u>	<u>UNORGANIZED</u>
Bear River	1	-
Brunette River	2	-
Capilano River	24	22
Cheakamus River	2	10
Cheekeye River	-	1
Chehalis River	2	23
Coquihalla River	14	13
Coquitlam River	15	26
De Boville Slough	-	1
Emory Creek	-	1
Fraser River	1	4
Harrison River	-	6
Indian River	4	3
Kanaka Creek	4	2
Little Campbell River	4	8
Lynne Creek	13	5
Maurquam River	11	2
Nahatlatch River	-	1
Nicomekl River	14	9
Pitt River	-	4
Rainy River	-	2
Ruby Creek	-	1

<u>NAME OF STREAM</u>	<u>ORGANIZED</u>	<u>UNORGANIZED</u>
Salmon River	-	3
Serpentine River	6	7
Seymour River	15	23
Silver Creek	8	7
Alouette Creek	14	27
Stave River	12	7
Suicide Creek	2	3
Vedder-Chilliwack	8	46
	<hr/>	<hr/>
TOTAL	194	267
	<hr/>	<hr/>