

THE ECONOMIC VALUE OF THE YUKON SPORT FISHERY

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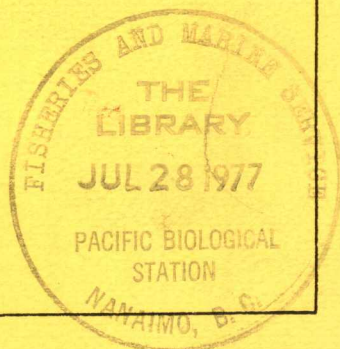
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by William F. Sinclair and Obert Sweitzer

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The economic value of the Yukon sport fishery

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THE ECONOMIC VALUE OF
THE YUKON SPORT FISHERY

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NANAIMO, BRITISH COLUMBIA
by CANADA V9R 5K6

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Northern Operations Branch
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NOB/ECON 2-73

April, 1973

FOREWORD

A series of base line studies designed to identify the economic and social benefits generated by the commercial, recreational, and subsistence fisheries has been commissioned for the Northern Operations Branch area. The Northern Operations Branch area includes the coastal waters of British Columbia northwest of Cape Caution, the northern interior of British Columbia, and the Yukon Territory. This report is the first dealing with the sport fishery of the Yukon. Since relatively little has been recorded about the value of fisheries in far northern waters and since there has been a tremendous increase in sport fishing effort throughout Canada's north, this report is a timely addition to existing sport fish literature.

It is clear from the experience in other parts of Canada that the value of the resource will continue to grow. A healthy fishery generally reflects a healthy environment. Through the preservation of the quality of aquatic habitats suitable for fish, man preserves a vital element in determining the ultimate quality of his own life.

Further studies will be conducted to tie in with an expanded biological program now being undertaken in the Yukon. The data contained herein will be updated, expanded, and made available to the public as occasion warrants.

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PREFACE

It is hoped that the study presented in this paper will contribute to a general appreciation of the Yukon sport fishery's role in the Yukon economy and what role this might be in future. It is further hoped that it will provide resource managers with some of the information necessary to make rational resource allocation decisions which are in the best interests of Yukon residents and the Canadian people.

It should be noted that despite the fact that a great deal of research into evaluating sport fisheries has been done in recent years, no satisfactory methods have yet been developed. Therefore, the information contained in this presentation cannot be considered perfect. It is hoped, however, that the reader will recognize that the approach used in this study is consistent with the economic approaches used by other agencies and other groups involved in the economic evaluation of sport fisheries.

Thanks are due to the many individuals who worked on this study. Sharon Dyck, Barbara Hodgins, and Peter Stent compiled and assembled much of the data gathered for this report. Considerable help was received from Al Gibson and other Whitehorse Fisheries personnel. David Reid of the Economics Unit in Vancouver was particularly helpful.

Valuable comment was received from Ron MacLeod, Bob Brown, Sandy Argue, and Dick Roberts. Dick Bryan made a substantial contribution to this report in its early stages.

Sharon Walker typed, helped edit, and took care of many of the necessary details that are so important when preparing this type

of presentation. Jerry Fung prepared the maps and figures contained herein.

All errors or omissions remain the responsibility of the authors.

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INTRODUCTION

In recent years, notably during the postwar period, interest in outdoor recreation has risen at a phenomenal rate. Participation in all types of outdoor recreation has increased so fast and to such an extent that remote or silent seclusion away from industrial operations, people, or evidence of their existence is virtually impossible. Perhaps the only major exception to this condition in North America is in the landmass north of the 60th parallel which includes the U. S. state of Alaska, the Yukon and Northwest Territories, Labrador, and northern Quebec. This part of the United States and Canada has long been recognized as possessing a considerable amount of the total untapped natural resources of North America. Recent oil discoveries on the Arctic coast of Alaska and the oil tanker trip from the Atlantic to the Beaufort Sea through the Arctic are two well publicized events which have brought to the public's attention the existence of the valuable resource endowments in this northern portion of the continent. The publicity related to these events not only drew the public's attention to the fact that this was virtually one of the last underexploited areas in the world but also to the fact that the environment of the north is fragile and that unless steps are taken to prevent degradation of the environment, some of the north's unique living resources could be lost forever.

Of the three distinct areas north of the 60th parallel, the Yukon Territory is the most vulnerable to environmental depredation. The reasons for this are threefold. First, the Yukon Territory, with its comprehensive highway network, its railroad connection to Alaska, and its connection with the rest of the continent via the Alaska Highway is relatively easily accessible to most of North America's population. In addition, the Yukon territorial government will soon complete a road which will allow travel all the way to Inuvik above the Arctic Circle. This suggests that certain areas and certain species of wildlife formerly shut off from the vast majority of North America's population will become easily accessible and vulnerable to man's excesses.

The second reason why the Yukon Territory is probably more vulnerable to environmental harm than other areas north of 60, is related to the Yukon's frontier outlook.¹ The economy of the Yukon is remarkably simple in its structure. Its economic base is tied directly to the mining industry. This remains true today as it has remained true for most of the Yukon's history. Income and employment provided by National Defence expenditures and such other government oriented activities have come to the forefront from time to time. However, mining has remained the main economic base. Thus the Yukon's resources have been exploited not for residents of the Yukon but for the benefit of - not always Canadian - "outsiders". This has probably contributed to the attitude that the Yukon was and is nothing more than a resource storehouse for the rest of the world. The objective is to extract mineral deposits as rapidly and cheaply as possible and leave. This attitude is in direct conflict with the philosophy that natural resources should be used for the benefit of all people and wherever possible one resource should not be used to the detriment of another. Unfortunately, the discovery of oil deposits in Alaska and in the Canadian Arctic suggest that this "take it and leave" attitude may continue to prevail in future.

The third and final reason why the Yukon is particularly susceptible to resource depredation comes as a result of its geographic location between Alaska and the more populated areas of North America. All overland traffic between Alaska and the continental United States must go through the Yukon Territory whose environment is no less fragile than other northern areas. Furthermore, oil pipelines or other transportation or communication systems between Alaska and the mainland United States do or will cross the Yukon. The amount of tourist and commercial traffic created because of the Yukon's strategic location is such that it adds considerably to the amount of disruptive activity imposed on the Yukon's resource endowments.

1. Many but not all of these same factors are present in Alaska and in the Northwest Territories.

These three factors together with the environmental difficulties which occur in any area where the economy is expanding and there is a tendency towards industrial growth, contribute to a situation whereby the public should be informed about the economic consequences of embarking on large scale developments without regard to the environment. For instance, when considering the fishery resource, all Canadians should be aware that the Yukon with its unspoiled natural beauty offers the sport fisherman a variety of unique opportunities. This natural beauty and the variety of fish available offers different benefits to different groups of people. To the Yukon resident the sport fishery provides an important recreational activity where alternative activities are less plentiful than in other parts of North America. To the non-resident on holiday, typically driving through to Alaska, or visiting friends in the Yukon, fishing is an important part of the total available leisure time activities. Therefore, despite the fact that it is important that the Yukon develop a stable and growing economy, it is also important that in the drive for economic growth the recreational needs of Yukon residents and Canadian visitors are not neglected. All Canadians must be made aware that developments which take place at the expense of the Yukon sport fishery do so only at tremendous social and economic cost.

This paper reports on a study conducted during the winter of 1971 and summer of 1972 to determine the economic value of the Yukon sport fishery to the people of the Yukon and other Canadians. It is intended that this presentation will give the reader an insight into what social and economic values are involved when depletion of the fishery resource or its habitat occurs. To this end ^{this} paper also presents information on the socio-economic characteristics of participants in the Yukon sport fishery and provides the reader with their opinion on what management approaches would add most to their enjoyment of the fishery resource.

The difficulties involved in assessing the economic value of a sport fishery are numerous. To a considerable extent these difficulties

are due to the fact that in virtually all areas of North America, indeed the world, sport fishing is free to the user. Thus, there exists no market mechanism - price structure - which would indicate what value an individual citizen places on sport fishing relative to all other goods and services available to him. As a result economists and others faced with the problem of determining the value of an outdoor recreational activity have developed certain techniques which, despite the fact they are not perfect, provide the public and resource managers with some method of determining the economic value of a sport fishery.² In this report we have adopted the approach used by Pearse and Bowden in their economic valuation of the British Columbia sport fishery.³ The reason for this is to provide values which are comparable for the two segments (British Columbia and the Yukon Territory) within the single management area of the federal Fisheries Service, Department of the Environment, Pacific Region.

Virtually all the data contained in this paper are based on two sport fish surveys conducted during late 1971 and the early part of 1972.⁴ Further, for the purpose of this presentation and to provide comparisons which are consistent with the type of licence available to sport fishermen in the Yukon, the following terms apply. The term "resident" sport fishermen is used to identify fishermen who live in the Yukon Territory, "Canadian non-Yukoner" sport fishermen is the term used to identify Canadian residents who do not reside in the Yukon, and the term "non-Canadian" fishermen refers to fishermen who do not reside in Canada. A further distinction is made among non-resident fishermen. The term "short-term" fishermen is used to identify non-resident sport fishermen who fished for 5 days or less, "full-term" refers to non-resident fishermen who fished for more than 5 days during a single year.

2. For an outline of the various methods involved please see Crutchfield, Clawson, and Pearse as noted in the bibliography.

3. The Value of Fresh Water Sport Fishing in British Columbia, "Economic Evaluation of Sport Fishing", Pearse Bowden Economic Consultants Ltd., 1971.

4. Appendix I provides a detailed breakdown of the survey, the methodology used, and the response.

CHAPTER ONE

THE YUKON SPORT FISHERY

The many lakes, rivers and streams in the Yukon offer the sport fisherman a wide variety of sport fishing opportunities. This not only provides year-round enjoyment for resident sport fishermen, but also for sport fish enthusiasts from all over the world.

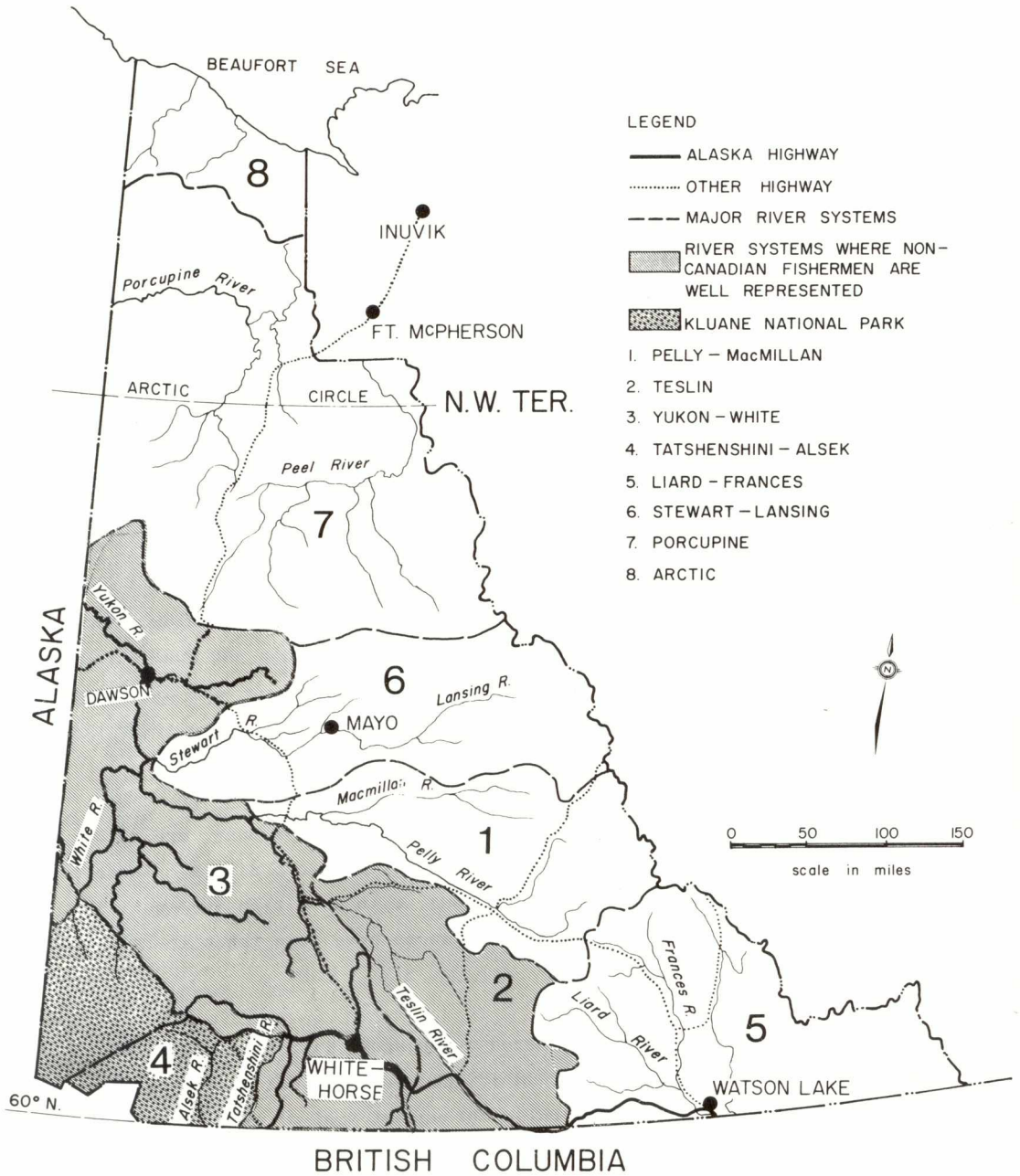
The development of the Yukon Territory has been such that most of the population is located in one centre. The city of Whitehorse not only contains in excess of 65 percent of the total Yukon population, it also is the main service centre, and the location around which most of the tourist activity takes place. Thus, those lakes, rivers and streams located near Whitehorse or close to roads leading to Whitehorse are the focus of most of the fishing activity (see Map 1). The following provides the reader with an outline of the variety and quality of fishing available in the Yukon.

Arctic grayling are the most common fish in the Yukon. While not a large fish, they exhibit good fighting qualities and make excellent eating. Since they are found in rivers and streams, as well as in lakes, they are particularly important to central Yukon areas where there are relatively few accessible lakes.

Lake trout, which are actually a variety of char, are well distributed throughout most accessible lakes and some rivers. These are generally a large fish, over five pounds, with good fighting qualities. In the Yukon, some of the largest specimens have been taken in relatively shallow rivers.

Northern pike, considered a top sport fish in northeastern United States and Canada, is held in considerably less esteem by Yukon residents. It is well distributed throughout most of the accessible

YUKON TERRITORY



sport fishery of the Yukon and is important to the non-resident angler.

Dolly varden are found primarily in the southeastern portion of the Yukon. Most lakes and streams in this area are within easy reach of the Alaska Highway. Consequently, anglers have reasonably good access to the lakes and streams where these fish are available.

Arctic char, which are very similar to dolly varden, are found only in the northern one-third of the Territory. Although not as accessible as other species in the Yukon, Arctic char can be found in reasonable abundance in areas which can be reached from Dawson by the new Dempster Highway.

Chinook and coho salmon are found in the southwestern portion of the Territory.¹ Chinook salmon are found in the Yukon-White river system, and both chinook and coho are found in the Tatshenshini-Alsek system. Salmon enter the Territory after travelling hundreds of miles up rivers running through Alaska from the Pacific Ocean.

Inconnu are distributed throughout the Territory. Little is known about these fish and relatively few are caught but their name invokes an almost magical connotation with the "Unknown North".

Rainbow trout have been introduced by the federal Fisheries Service into specific lakes close to population centres. They are thriving and are important insofar as their sport fishing qualities are highly prized by sports fishermen.

The scenic beauty of the Territory probably adds considerably to the quality of sport fishing experience in the Yukon. The fishing areas accessible from the Alaska Highway between Watson Lake and Haines Junction are in a plateau setting bounded by low mountains. The area is

1. Chinook salmon are also known by the names spring salmon, king salmon, and sometimes tyee. Coho salmon are also referred to as silver salmon.

lightly treed and offers innumerable opportunities for all varieties of fresh water fishing. To the west and north the mountain ranges become more spectacular and include the St. Elias Range (in which Canada's highest peak, Mount Logan is located), the Dawson, Anvil, and Big Salmon ranges, as well as the Selwyn Mountains. Further north are the Mackenzie, Ogilvie, Richardson, and British mountains.

While the central and northern areas are characterized by fewer large lakes there are many rivers and streams. Some of the major rivers include the White, Yukon, Peel, Stewart, Pelly, and Macmillan. With the exception of the Peel and Macmillan, each of these rivers has at least minimal road access.

Of the approximately 2,500 miles of unpaved highway in the Territory, about 600 miles is designated for summer travel only. Although designated for summer travel only, the Dempster Highway now provides access from the Dawson area to the Eagle River, north of the Arctic Circle. By 1974 this highway is expected to provide a link through to Inuvik in the Northwest Territories. This will provide access to many lakes and rivers which are presently accessible only by air or water. Subsequent improvements in the highway network will continue to expand the number of sport fishing opportunities.

Despite the fact that the bulk of the sport fishing activity takes place in the vicinity of Whitehorse, an expanded highway network and the opening of Kluane National Park suggests that fishing activity will probably increase substantially in future.

During the 1970-71 season a total of 8,504 sport fishing licences were sold in the Yukon Territory. Residents of the Yukon purchased 3,411 of these licences at \$3 each. Canadian non-Yukoners bought 1,055 licences at \$3 each and non-Canadians purchased 4,038 licences. Of the 4,038 licences sold to non-Canadians, 2,652 were sold to fishermen who fished 5 consecutive days or less at \$3.50 each, 1,386 full-term

licences were sold at \$10 a piece. Approximately 5 percent of those purchasing sport fish licences during the 1970-71 season did not fish at all.² All sport fishermen 16 years of age and older are required to purchase a sport fishing licence.

Table 1:1 shows the total number of sport fishing licences sold and the revenue collected each year from 1958 to 1973. As reflected in Table 1:1, an increase in the price of fishing licences during the 1970-71 season caused a drop in the number of licences sold. Yet, despite the decline in licence sales, total revenue more than doubled from the previous year. Figure 1 shows the change in sales and revenue over the 13 year period, 1959 to 1971.

Pattern and Type of Participation

Prior to the 1970-71 season, all non-Yukoners were required to purchase a non-resident sport fish licence. However, beginning in the 1970-71 season, the definition of resident was changed for licencing purposes and only non-Canadian residents were required to purchase non-resident sport fish licences. As a result it is difficult to tell from Table 1:1 what percentage of the total licences sold were sold to non-residents prior to the 1970-71 season. However, when the change in sport fish licencing is taken into account, it appears that non-Canadian participation in the sport fishery has increased at a faster rate than resident participation over the last 10 years. Moreover, from Table 1:1 it can be seen that during the last 3 years resident sport fishermen have purchased slightly more than half of the total licences sold and there does not appear to have been any significant decline in non-resident sport fish licence sales despite the fact there has been an increase in non-resident licence fees. From this it would appear that sport fishing continues to be important for residents of Canada and the Yukon and that non-resident participation in the Yukon sport fishery will continue to increase and be an increasing source of licence fee revenue.

2. Except for the non-resident short-term licence, all sport fish licences are valid from April 1 to March 31 of the following year.

TABLE 1:1

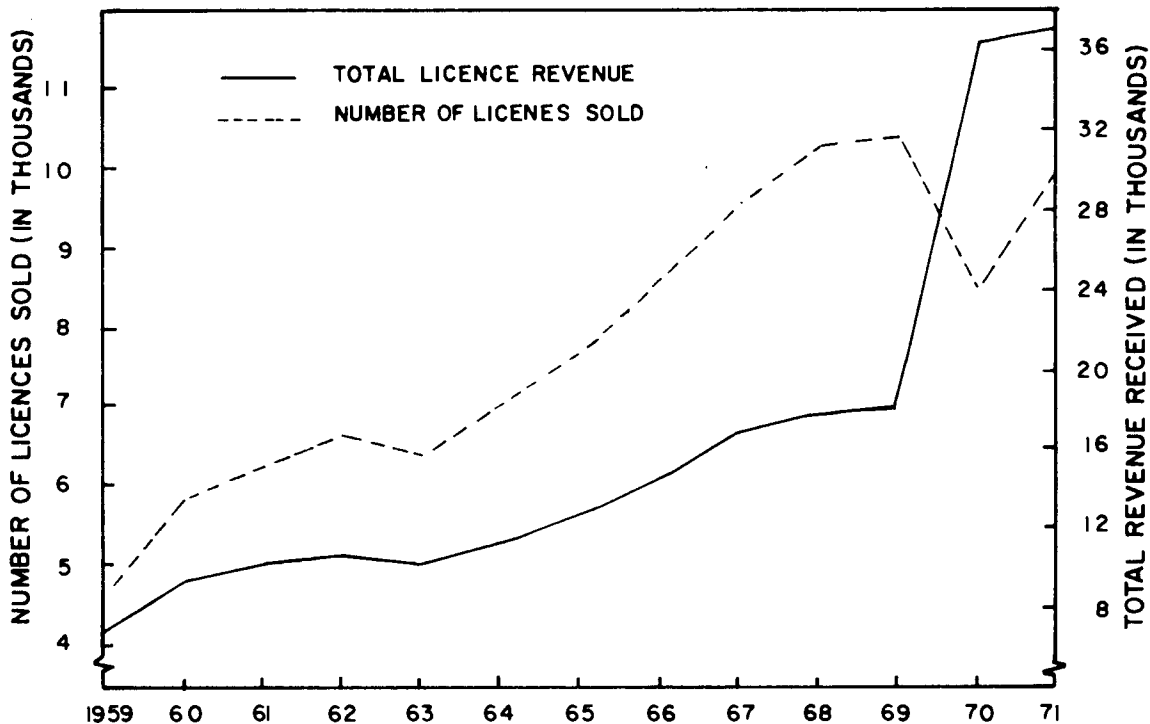
SPORT FISHING LICENCE SALES AND REVENUE
IN THE YUKON 1958-59 TO 1972-73

<u>Year</u>	<u>Resident Licences</u>	<u>Non-Resident Full-Term</u>	<u>Non-Resident Short-Term</u>	<u>Total Licences</u>	<u>Total Revenue \$</u>
1958-59	2,543	2,029	-	4,572	6,601
1959-60	2,473	3,336	-	5,809	9,145
1960-61	2,612	3,721	-	6,333	10,054
1961-62	2,600	3,960	-	6,560	10,520
1962-63	2,672	3,687	-	6,359	10,046
1963-64	2,851	4,229	-	7,080	11,309
1964-65	2,505	4,185	-	6,690	10,875
1965-66	2,543	5,109	-	7,652	12,751
1966-67	2,760	5,916	-	8,676	14,592
1967-68	2,679	6,969	-	9,648	16,617
1968-69	2,840	7,483	-	10,323	17,806
1969-70	2,978	7,513	-	10,491	18,004
1970-71 *	4,466	1,386	2,652	8,504	36,540
1971-72	5,585	711	3,853	10,149	37,351
1972-73	5,326	766	3,576	9,668	35,970

* Prior to the 1970-71 season residents included only those persons living in the Yukon. Canadians from outside the Territory were classified as non-resident fishermen. Prior to the 1970-71 season the licence fee schedule was \$1 for resident licences and \$2 for non-resident licences. In 1970-71 a \$3 fishing licence was introduced for all Canadians and a \$10 licence for non-Canadians who fished in excess of 5 days. Non-Canadians who fished for 5 days or less were granted short-term licences for \$3.50.

FIGURE 1

TOTAL SPORT FISHING LICENCE SALES AND REVENUE
IN THE YUKON FISHERY 1959-1971



FISHING YEARS ENDED MARCH 31, 1959-1971

The continued popularity of the Yukon sport fishery among resident sport fishermen together with the steady rise in non-resident participation has both good and bad implications. On the one hand, a rapid rise in non-resident participation implies that the sport fishery will be of even greater importance to the Yukon economy in future. More revenue could be earned directly through licencing and indirectly through sport fish oriented business enterprises and the tourist industry. On the other hand, even in the Yukon, the total amount of sport fishing area available to the population at any one time is limited. Resident sport fishermen often have to compete with non-resident anglers for choice sport fishing locations. Thus we have the potential for conflict between resident sport fishermen who wish to preserve sport fishing opportunities for themselves and the tourist industry which wishes to encourage non-resident sport fishermen to visit the Yukon.

The pattern of visits to the Yukon by non-resident sport fishermen in 1971 is shown in Figure 2. According to Figure 2 non-Canadian full-term licence holders arrived earlier than non-Canadian short-term licence holders or Canadian non-Yukoner fishermen. The total number of non-Canadian full-term licence holder visitors peaks in the latter part of June while both the total number of Canadian non-Yukoner and the total number of non-Canadian short-term holders present in the Yukon peaks one month later in July. This pattern of angler visits to the Yukon is probably influenced to a considerable degree by the number of retired visitors who travel to the Yukon each year. Free from time constraints and no longer affected by the school term, retirees are in a better position to come earlier, stay longer, and more actively participate in the Yukon sport fishery.

Table 1:2 provides the distribution of non-resident visits to the Yukon for the years 1962 and 1971. A comparison between the two years shown suggests that the pattern of non-resident angler visits to the Yukon has not changed over this nearly ten year period.

FIGURE 2

SEASONAL PATTERN OF SPORT FISHING IN THE YUKON
BY SAMPLED NON-RESIDENT SPORT FISHERMEN
OCTOBER 1, 1970-SEPTEMBER 30, 1971

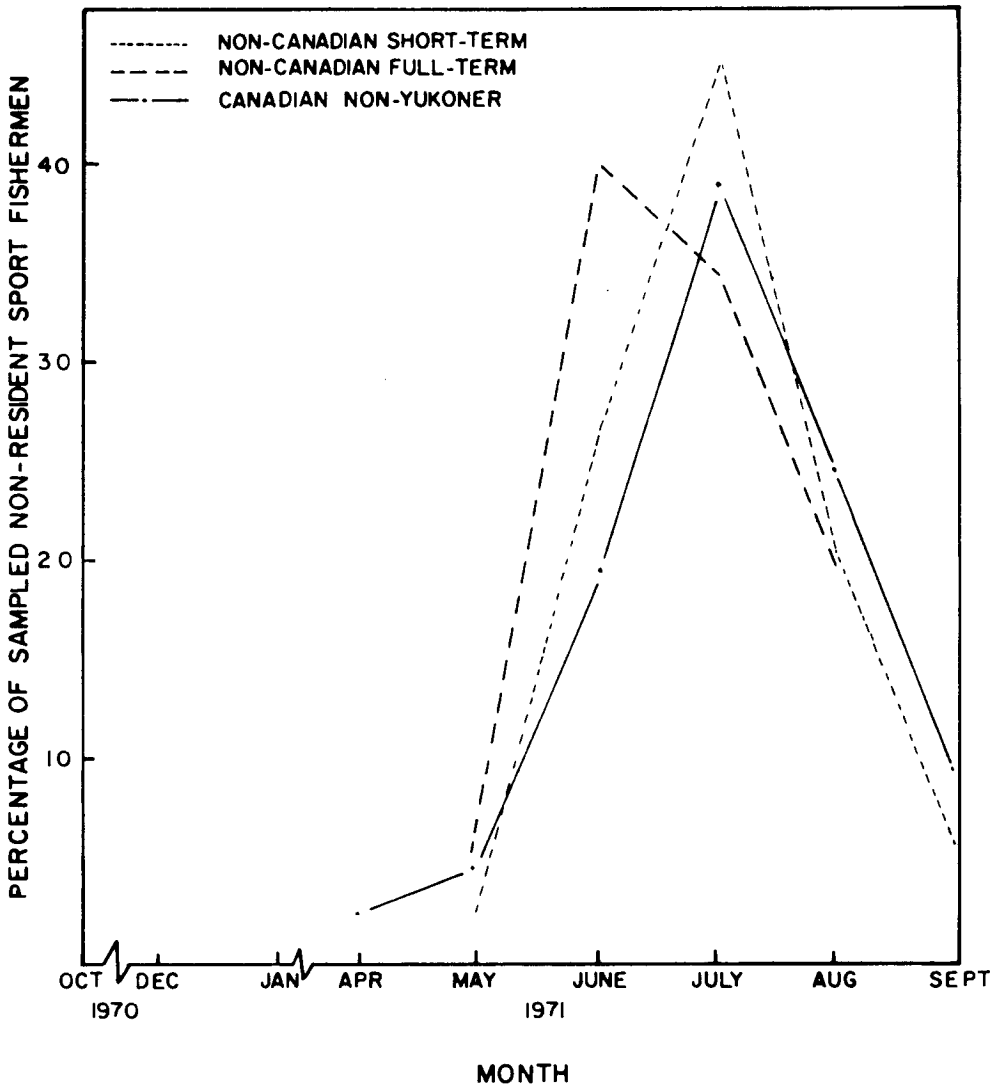


TABLE 1:2

SEASONAL PATTERN OF NON-RESIDENT ANGLER
VISITS TO THE YUKON 1962 AND 1971

	<u>1962</u> [*]	<u>1971</u>
	<u>%</u>	<u>%</u>
June	28.7	29.9
July	45.7	41.1
August	21.3	22.7
September	4.3	6.3
TOTAL	<u>100.0</u>	<u>100.0</u>

* Unpublished study of the Yukon sport fishery in 1962 by A. W. L. Tuomi.

The total non-resident sport fishing effort and duration of visit according to licence category is shown in Table 1:3. According to Table 1:3 non-Canadian short-term licence holders engaged in sport fishing during 7,956 days. This suggests that some sport fishing activity was undertaken on approximately 43 percent of their total days in the Yukon. The corresponding figures for non-Canadian full-term licence holders and Canadian non-Yukoners are approximately 41 percent and 22 percent respectively. On the basis of this information it appears that sport fishing is more important to non-Canadian sport fishermen than it is to Canadian non-Yukoners.

Since the majority of non-resident fishermen purchase short-term licences it can be concluded that most non-resident fishermen intended to fish 5 days or less while in the Yukon. This group of non-

TABLE 1:3

DURATION OF VISIT AND ANGLER EFFORT*
ACCORDING TO NON-RESIDENT LICENCE CATEGORY 1970-71

	<u>No. of Anglers</u>	<u>Duration of Yukon Visit (avg. no. of days)</u>	<u>Total Visitor Days</u>	<u>No. of Days Spent Fishing (average)</u>	<u>Total Angler-Days</u>
Non-Canadian Short-Term	2,652	7	18,564	3	7,956
Non-Canadian Full-Term	1,386	17	23,562	7	9,702
Canadian Non-Yukoner	1,055	18	18,990	4	4,220

* Any portion of a day spent sport fishing by a single fisherman is referred to as one "angler-day".

resident fishermen, on the average, fished less than either the non-Canadian full-term or the Canadian non-Yukoner licence holders. As would be reasonably expected non-Canadian full-term licence holders, on the average, fished a greater number of days (7) than the other two categories shown in Table 1:3. What appears to be less likely is that non-Canadian short-term licence holders spent an average of 3 days fishing while visiting the Yukon. This indicates that this group of sport fishermen utilized 60 percent of the sport fishing days they were legally permitted (on the basis of licence sales) to fish.

While Table 1:3 provides a breakdown of the number of licences sold to active non-resident fishermen according to licence category, this information does not necessarily imply that only 5,093 non-residents actually fished in the Yukon during the 1970-71 fishing season. Sport

fishermen, like other visitors to the Yukon, usually travel in parties of 3 or more persons and each party usually contains one or more individuals under the age of 16. Table 1:4 gives a breakdown of the total number of visitors in each party containing at least one fisherman for the year 1970-71. Non-Canadian short-term licence holders usually travelled in a party with 3.4 persons; non-Canadian full-term licence holders travelled in a party containing an average of 3.1 persons; Canadian non-Yukoners travelled in a party containing an average of 4.2 persons. Moreover, most of these parties contained at least one or more persons less than 16 years of age who were not legally required to purchase sport fish licences in order to participate in the Yukon sport fishery. Since it is generally accepted that individuals usually fish in groups of two or more

TABLE 1:4

TOTAL NUMBER OF VISITORS IN EACH PARTY WHICH CONTAINS
AT LEAST ONE LICENCED FISHERMAN 1970-71

<u>Licence Category</u>	<u>No. of Non-Resident Anglers</u>	<u>Total No. of Visitors in Anglers' Parties</u>	<u>Average Per Party</u>	<u>No. of Visitors Less Than 16 Yrs. of Age</u>	<u>Total Potential Fishermen</u>
Non-Canadian Short-Term	2,652	9,017	3.4	2,836	5,488
Non-Canadian Full-Term	1,386	4,297	3.1	257	1,643
Canadian Non-Yukoner	<u>1,055</u>	<u>4,431</u>	4.2	<u>622</u>	<u>1,677</u>
TOTAL	<u>5,093</u>	<u>17,745</u>		<u>3,715</u>	<u>8,808</u>

people, it is likely that a significant number of non-resident visitors under the age of 16 actually sport fish while visiting the Yukon. Thus a true estimate of the total number of non-resident sport fishermen is probably closer to 8,808 as indicated in Table 1:4. It therefore follows that out of a total of nearly 18,000 people who visited the Yukon with licenced sport fishermen, there were approximately 9,000 potential sport fishermen.

It is also interesting to note in Table 1:4 that of the total number of visitors in non-Canadian short-term licence holders' parties about 31 percent were under the age of 16, while non-Canadian full-term licence holders travelled in parties where only 6 percent of the individuals were under the age of 16. This information is consistent with a point made earlier suggesting that non-resident full-term licence holders have more time and are not influenced by the school term as much as other non-resident sport fishing groups.

Just as the 5,093 non-resident licence purchases are not fully indicative of the total number of non-resident participants in the Yukon sport fishery, resident sport fish licence sales cannot be considered a true indication of total resident participation. Residents under 16 years of age are not required to purchase sport fish licences. Furthermore, a considerable amount of resident fishing activity takes place in the more isolated areas of the Yukon. These are areas where licences cannot be easily purchased and where enforcement of fishing regulations is extremely difficult. A survey of Yukon residents during the summer of 1972 indicated that approximately 43 percent of the Yukon resident population sport fish at least once a year.³ On the basis of this information it was estimated that nearly 7,900 resident fishermen participated in the Yukon sport fishery during the 1971-72 fishing season. Only 5,585 resident licences were sold during this same period.

3. For a detailed outline of this survey see John Boland, The Yukon Fishery Resource: Its Existing Role and Its Future Potential, Economics Unit, Northern Operations Branch, Fisheries & Marine Service, Department of the Environment, March, 1973.

Another factor of interest when analyzing the pattern of participation in the Yukon sport fishery by non-resident fishermen is whether or not non-resident anglers tend to return to the Yukon and participate in the sport fishery. Table 1:5 provides a breakdown on the number of fishermen in each of the licenced categories who had previous Yukon sport fishing experience. Table 1:5 shows that of all non-resident sport fishermen, non-Canadian full-term licence holders had the most previous fishing experience. Twenty-nine percent of all non-Canadian full-term licence holders had previous fishing experience. This is more than double the percentage for non-Canadian short-term licence holders. Twenty-three percent of Canadian non-Yukoners had previous Yukon sport fishing experience.

TABLE 1:5

PREVIOUS YUKON SPORT FISHING EXPERIENCE OF
NON-RESIDENT ANGLERS ACCORDING TO
LICENCE CATEGORY 1970-71

	<u>Non-Canadian</u> <u>Short-Term</u> <u>%</u>	<u>Non-Canadian</u> <u>Full-Term</u> <u>%</u>	<u>Canadian</u> <u>Non-Yukoner</u> <u>%</u>
Those Who Had Fished in the Yukon Previously	12	29	23

The foregoing discussion has outlined the seasonal variation in non-resident participation in the Yukon sport fishery. The heavy concentration of non-resident effort in the summer months suggests that part of the fishing activity carried on by resident fishermen is not available to non-resident fishermen. For example, 530 resident fishermen fished through ice in the winter months. Their efforts during the winter

of 1970-71 are shown by river system in Table 1:6. Since the Yukon-White river system is located in the most populated area of the Yukon, it is understandably the most active ice fishing area. Moreover, a significant portion of resident fishing effort takes place on Yukon lakes. Table 1:7 indicates that 40 percent of resident anglers spent more than 75 percent of their total fishing time on lakes during the 1970-71 season. Since non-resident fishermen are less likely to have the use of a boat, and accordingly, have more restricted access to lake fishing, their participation in this activity is somewhat less.

TABLE 1:6

ICE FISHING EFFORT BY RESIDENT ANGLERS
IN THE YUKON 1970-71

<u>River System</u>	<u>Angler-Days</u>
Pelly-Macmillan	110
Teslin	160
Yukon-White	590
Tatshenshini-Alsek	-
Liard-Francis	110
Stewart-Lansing	400
Porcupine	-
Arctic Systems	-
Unclassified	30
	<hr/>
TOTAL	1,400
	<hr/> <hr/>

TABLE 1:7

THE INDICATED ALLOCATION OF FISHING EFFORT
FOR YUKON RESIDENTS BETWEEN LAKE AND OTHER FISHING
1970-71

<u>Portion</u>	<u>Percentage of Anglers</u>
Less than 1/4	17.1
1/4 to 1/2	17.7
1/2 to 3/4	14.5
More than 3/4 but Less than All	13.3
All	26.6
No Response	10.8
TOTAL	100.0

While winter and lake fishing is more restricted to resident sport fishermen the geographical distribution of sport fishing effort between resident and non-resident sport fishermen is comparable. The amount of effort expended by resident, Canadian non-Yukoner, and non-Canadian fishermen during the 1970-71 fishing season is shown in Table 1:8. According to this table both residents and non-residents alike expended most of their fishing effort on the Yukon-White river system. This amounted to nearly 35 percent of total Yukon fishing effort during the 1970-71 season. The proximity of this river system to the populated areas of the Yukon and the Alaska Higheay likely accounts for its popularity. The second most popular river system among resident fishermen was the Liard-Francis. This river system was also popular among non-Canadian short-term licence holders. However, among non-Canadian full-term

TABLE 1:8

TOTAL NUMBER AND PERCENTAGE OF ANGLER-DAYS EFFORT
IN EACH YUKON RIVER SYSTEM ACCORDING TO
FISHING LICENCE CATEGORY 1970-71

<u>River System</u>	<u>Resident</u>	<u>Non-Resident</u>			<u>Total</u>	<u>Per- Centage</u>
		<u>Non-Cdn. Short-Term</u>	<u>Non-Cdn Full-Term</u>	<u>Cdn. Non- Yukoner</u>		
Pelly-Macmillan	5,603	350	180	138	6,271	6.7
Teslin	10,143	1,700	1,040	575	13,458	14.5
Yukon-White	24,729	3,884	1,983	1,748	32,344	34.7
Tatshenshini- Alsek	3,988	1,006	534	161	5,689	6.1
Liard-Francis	14,838	1,950	520	253	17,561	18.9
Stewart-Lansing	9,576	335	303	23	10,237	11.0
Porcupine	2,692	-	140	460	3,272	3.5
Arctic Systems	78	-	-	-	78	0.1
Unclassified	<u>2,153</u>	<u>1,550</u>	<u>200</u>	<u>299</u>	<u>4,202</u>	<u>4.5</u>
TOTAL	<u>73,800</u>	<u>10,775</u>	<u>4,900</u>	<u>3,657</u>	<u>93,112</u>	<u>100.0</u>

licence holders the Liard-Francis river system came fourth in popularity behind the Teslin and Tatshenshini-Alsek systems.

A comparison of the results shown in Table 1:8 with Map 1 suggests that there is a significant correlation between the amount of fishing effort expended by non-Canadian licence holders and the accessibility of the river system to those travelling the Alaska Highway. This same, but somewhat weaker, relationship appears to be present among Canadian non-Yukoners. Thus, it would appear that those fishermen who know least about the Yukon sport fishery have their geographic pattern of participation influenced by their ability to gain access to suitable fishing locations.

Just as accessibility and familiarity with the fishery would influence how much fishing effort is carried out on any single waterway, it follows that the number and types of species caught would also be influenced by these factors. Table 1:9 shows the percentage of each

TABLE 1:9

PERCENTAGE OF EACH SPECIES CAUGHT TO
TOTAL YUKON SPORT CATCH 1970-71

<u>Species</u>	<u>Percentage</u>
Arctic Grayling	54
Trout	27
Northern Pike	14
Dolly Varden	3
Arctic Char	1
Salmon	1
	<hr/>
TOTAL	100
	<hr/> <hr/>

species of fish caught to the total sport fish catch in the Yukon during 1970-71. Arctic grayling accounted for 54 percent of the total sport fish catch with trout 27 percent and pike 14 percent. Dolly varden, Arctic char and salmon together accounted for only 5 percent of the total sport fish catch. When this information is broken down into licence category as shown in Table 1:10 and assessed with information on what species of fish are intentionally sought after by resident and non-resident fishermen, a number of interesting facts are suggested. Fishermen in each licence category catch Arctic grayling more frequently than any other fish species. The number of trout caught is second to Arctic grayling with northern pike third and dolly varden fourth. Yet despite indicated catch success according to the information presented in Table 1:11, all fishermen prefer to catch either trout or are indifferent to what type of fish they catch. It would also appear that non-resident fishermen are not as discriminating in their preferences as the resident fisherman. This is probably due to the non-resident fishermen's unfamiliarity with the species available to them while visiting the Yukon. This attitude is consistent with the belief that accessibility is the main influence in determining what rivers and streams support most non-resident fishing effort. Moreover, it would seem that experience and the fishing skills normally associated with local fishing experience does not play a significant role in determining the average number of each species caught.

Summary

The foregoing discussion has revealed a number of interesting facts about the Yukon sport fishery. Licence sales do not truly reflect the total amount of participation in the Yukon sport fishery. Difficulties associated with enforcing sport fish regulations and the number of individuals who are either unable or unwilling to purchase sport fish licences seem to be the main reason why licence sales are not truly indicative of total participation in this fishery. However, from the information gathered, it can be estimated that there were nearly 9,000 non-resident and 7,500 resident participants in the Yukon sport fishery during the 1970-71 season.

TABLE 1:10

TOTAL AND AVERAGE NUMBER OF FISH CAUGHT BY
SPORT FISHERMEN IN THE YUKON 1970-71

<u>Fish Species</u>	<u>Yukon Resident</u>		<u>Non-Resident</u>					
			<u>Non-Canadian Short-Term</u>		<u>Non-Canadian Full-Term</u>		<u>Canadian Non-Yukoner</u>	
	<u>Total</u>	<u>Av.</u>	<u>Total</u>	<u>Av.</u>	<u>Total</u>	<u>Av.</u>	<u>Total</u>	<u>Av.</u>
Trout	49,000	12.0	6,500	1.8	4,300	6.2	3,100	3.3
Northern	22,200	5.4	2,300	0.6	5,400	7.7	1,500	1.6
Dolly Varden	5,100	1.2	500	0.1	1,000	1.4	200	0.2
Arctic Grayling	89,900	21.9	24,900	6.7	7,600	10.9	4,100	4.3
Arctic Char	1,200	0.3	-	-	-	-	900	1.0
Chinook Salmon	700	0.2	100	0.1	400	0.6	-	-
Coho Salmon	200	0.1	100	0.1	-	-	-	-
Other Species	-	-	900	0.2	200	0.3	20	0.1
TOTAL	168,600	41.1	35,300	9.6	18,900	27.1	9,820	10.5

TABLE 1:11

SPECIES OF FISH INTENTIONALLY FISHED
FOR IN THE YUKON 1970-71

<u>Fish Species</u>	<u>Yukon Residents</u>	<u>Non-Resident</u>		
		<u>Non-Canadian Short-Term</u>	<u>Non-Canadian Full-Term</u>	<u>Canadian Non-Yukoner</u>
	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>
Trout	64.5	4.0	2.9	7.3
Northern Pike	0.6	-	-	-
Dolly Varden	1.9	0.7	2.9	-
Arctic Grayling	20.9	9.9	5.7	-
Arctic Char	1.3	-	-	-
Chinook Salmon	7.0	-	-	-
Coho Salmon	1.9	-	-	-
Any Species	-	78.8	82.8	70.7
No Response	1.9	6.6	5.7	22.0
TOTAL	100.0	100.0	100.0	100.0

Sport fishing, as a recreational pastime, is of great and growing importance to residents of the Yukon. It has been estimated that nearly 43 percent of the total resident population of the Yukon sport fish at least once a year. Non-Canadian fishermen utilized the Yukon sport fishery more and were more successful than Canadian non-Yukoner sport fishermen, and time appears to be the main factor limiting the amount of non-resident sport fishing effort.

The timing and pattern of non-resident visits to the Yukon suggests that winter ice fishing, and to some degree lake fishing, will remain solely a resident activity for many years to come. The geographic pattern of both non-resident and resident sport fishing activity is influenced to a considerable degree by convenience of access to suitable fishing locations. However, unlike resident fishermen, non-resident fishermen have the additional burden of not being familiar with the surrounding fishing areas. This probably affords considerable advantage to resident sport fishermen when competing for prime sport fishing locations.

Sport fishermen in every licence category caught Arctic grayling most frequently, with trout and northern pike coming second and third respectively. Resident fishermen caught more fish and were more discriminating in what fish species they preferred to catch than non-resident fishermen. For both resident and non-resident sport fishermen alike, it would appear that availability rather than fishing skill determine the species and number of fish caught. Also, it appears that the expanding highway network and the opening of Kluane National Park will stimulate further expansion of sport fishing effort in the Yukon.

CHAPTER TWO

SOCIO-ECONOMIC BACKGROUND OF YUKON SPORT FISHERMEN

In Chapter One it was suggested that sport fishing as a recreational pursuit was of great and growing importance to residents of the Yukon; that fishermen, as a group, usually fish in parties containing two or more individuals. Moreover, it was determined that non-resident sport fishermen travel in parties of two or more people and that non-resident fishermen appear to be more interested in the fishing opportunities available in the Yukon than Canadian non-Yukon fishermen. In this chapter specific details on the socio-economic background of sport fishermen will be presented and analyzed with a view to gaining a better understanding of the Yukon sport fishery and its importance.

Age, Occupation and Income of Yukon Sport Fishermen

Table 2:1 shows the age distribution and average age of resident and non-resident licence holders who participated in the Yukon sport fishery during the 1970-71 fishing season. Table 2:1 shows that the average age of licenced resident sport fishermen was 36 years of age; that non-Canadian short-term licence holders had an average age of 39; that Canadian non-Yukoner licence holders had an average age of 41 and non-Canadian full-term licence holders were by far the oldest group with an average age of 52.

A comparison between the information presented in Table 2:1 with census data presented in the 1970-71 Canada Year Book, suggests that more than 50 percent of Yukon males between 21 and 60 years of age purchased sport fish licences during the 1970-71 fishing season. This indicates that the Yukon sport fishery is very important to those living in the Yukon.

Table 2:2 provides the age distribution of resident and non-

TABLE 2:1

AGE DISTRIBUTION AND AVERAGE AGE OF RESIDENT
AND NON-RESIDENT YUKON SPORT FISHERMEN
ACCORDING TO LICENCE CATEGORY 1970-71

<u>Age</u>	<u>Resident</u>	<u>Non-Resident</u>		
		<u>Non-Canadian</u>	<u>Non-Canadian</u>	<u>Canadian</u>
	<u>%</u>	<u>Short-Term</u>	<u>Full-Term</u>	<u>Non-Yukoner</u>
		<u>%</u>	<u>%</u>	<u>%</u>
20 yrs and under	1.3	7.9	2.9	-
21 - 30 yrs	32.3	20.5	8.6	22.0
31 - 40 yrs	29.1	27.1	8.6	29.3
41 - 50 yrs	24.7	11.3	14.2	19.5
51 - 60 yrs	7.6	14.6	25.7	19.5
Over 60 yrs	2.5	11.3	37.1	7.3
No Response	2.5	7.3	2.9	2.4
TOTAL	100.0	100.0	100.0	100.0
AVERAGE AGE	36	39	52	41

resident Yukon sport fishermen and draws a comparison between the age distribution of all Yukon males and all Canadian males for these same years. Table 2:2 shows that in excess of 86 percent of all resident sport fishermen fall between the ages of 21 and 50. This compares to the total Yukon male population of which 66.7 percent fall into this same age category. The comparable figure for the Canadian male population is 56.6 percent.

TABLE 2:2

AGE DISTRIBUTION OF RESIDENT AND NON-RESIDENT

YUKON SPORT FISHERMEN, ALL YUKON MALES

AND ALL CANADIAN MALES 1970-71

Age	Resident %	Non-Resident			All* Yukon Males %	All** Canadian Males %
		Non-Cdn. Short-Term %	Non-Cdn. Full-Term %	Cdn. Non- Yukoner %		
16 - 20 yrs	1.3	7.9	2.9	-	11.1	14.2
21 - 50 yrs	86.1	58.9	31.4	70.8	66.7	56.6
51 and over	10.1	25.9	62.8	26.8	22.2	29.2
No Response	2.5	7.3	2.9	2.4	-	-
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

* Unpublished Canadian Census data for 1970 - males over 15 years of age.

** Canada Year Book - 1970-71, Table 25, p. 244.

In general terms, on the basis of the age data presented in Tables 2:1 and 2:2, it would seem that visitors to the Yukon who fish fall into virtually every age category and that most full-term licence holders are over 50. Fishing does not appear to be an important recreational pastime for residents over the age of 60. The importance of fishing to individuals under 20 years of age is probably misleading since persons under 16 years of age are not required to purchase a licence and therefore would not be included in the sample.

Table 2:3 shows the percentage of fishermen in each licence category according to occupation. As can be seen by the occupational breakdown, most fishermen are employed in the professional, managerial, or trade and technical job classifications. Most resident sport fishermen were employed in the trade and technical job category while most non-Canadian short-term sport fishermen were employed as professionals.¹ The largest single group from any category falling into a single occupational category was the 42.9 percent non-Canadian full-term licence holders who were retired. In fact, in excess of 57 percent of the total non-Canadian full-term licence holders were either self-employed or retired. This once again suggests that the main impediment to participation in the sport fishery by non-residents is the amount of time visitors are able to spend in the Yukon.

The income distribution of non-resident fishermen, Canadian non-Yukoners and Yukon residents is shown in Table 2:4. With the exception of non-Canadian full-term anglers, a relatively large number of whom are retirees, less than 10 percent of fishermen in each category earned less than \$5,000. Among Canadians as a whole, more than 40 percent earned less than \$5,000. Slightly less than 35 percent of all Yukon

1. The occupational distribution of non-resident Yukon fishermen coincides with that of non-resident British Columbia fishermen. However, the pattern of participation among age groups is significantly different. Fishing appears much more popular among fishermen 60 years of age and older in British Columbia. See: William F. Sinclair, The British Columbian Sport Fishermen, Department of the Environment, Fisheries Service, Pacific Region, 1972.

TABLE 2:3

OCCUPATIONS OF RESIDENT AND NON-RESIDENT
SPORT FISHERMEN IN THE YUKON
ACCORDING TO LICENCE CATEGORY 1970-71

<u>Occupation</u>	<u>Resident</u>	<u>Non-Resident</u>		
		<u>Non-Canadian</u> <u>Short-Term</u>	<u>Non-Canadian</u> <u>Full-Term</u>	<u>Canadian</u> <u>Non-Yukoner</u>
	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>
Executive	1.9	2.7	-	-
Professional	18.3	28.5	17.1	14.6
Managerial	19.0	4.6	-	19.5
Trade and Technical	32.3	15.9	11.4	19.5
Clerical or Sales	3.8	3.3	-	9.8
Self-Employed	8.2	11.3	14.3	19.5
Labourer	5.7	3.3	5.7	2.4
Retired	1.3	23.8	42.9	4.9
Other	7.0	6.6	8.6	9.8
No Response	2.5	-	-	-
TOTAL	100.0	100.0	100.0	100.0

TABLE 2:4

INCOME DISTRIBUTION OF ALL YUKON FISHERMEN
IN 1971 WITH ALL CANADIANS AND ALL YUKON RESIDENTS

Income Category	Resident	Non-Resident			All * Cdn.	All ** Yukon
		Non-Cdn. Short-Term	Non-Cdn. Full-Term	Cdn. Non- Yukoner		
\$	%	%	%	%	%	
0 - 4,999	5.7	8.0	22.9	7.3	48.2	34.5
5,000 - 9,999	29.1	20.5	22.9	39.0	40.5	38.5
10,000 - 14,999	46.9	27.2	22.9	24.4	7.8	22.0
15,000 - 19,999	6.3	11.2	8.5	9.8	1.8	4.0
20,000 - 24,999	3.8	14.6	14.2	12.2	0.7	0.5
25,000 and over	2.5	11.2	2.9	-	1.0	0.5
No Response	5.7	7.3	5.7	7.3	-	-
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

* Dept. of National Revenue, Taxation, 1971 Taxation Statistics, Informa-
tion Canada, Summary Table 2, p. 12. Results are based on taxable
income for 1969.

** Unpublished study by the Government of the Yukon Territory showing
taxable income for 1970.

residents earn less than \$5,000. It is clear from the data presented in Table 2:4 that the licenced Yukon sport fisherman is more affluent than the general population of either Canada or the Yukon. The generally higher income levels enjoyed by non-Canadian short-term licence holders probably is a reflection of the somewhat higher incomes enjoyed by residents of the United States. To some extent it may also be a reflection of the better financial situation of those individuals who are able to visit the Yukon on a vacation holiday.

The Origin of Non-Resident Fishermen

Just as the population of the Yukon is comprised of individuals from every corner of the world, it appears that non-resident fishermen visiting the Yukon are similarly diverse. Table 2:5 provides a breakdown of non-Canadian short-term and non-Canadian full-term 1970-71 licence holders according to country of permanent residence. As can be seen in Table 2:5 fishermen visiting the Yukon during the 1970-71 fishing season were from 9 different European countries, the United States, Mexico, New Zealand, and Japan. The vast majority of non-resident sport fishermen visiting the Yukon were from the United States. A further breakdown of the 3,706 United States fishermen visiting the Yukon during 1970-71 is provided in Table 2:6. Table 2:6 reveals that during the 1970-71 fishing season visitors from every state in the United States participated in the Yukon sport fishery. This suggests the existence of widespread appeal for the Yukon sport fishery among visitors from the United States.

Table 2:7 provides a percentage breakdown according to the state of permanent residence of United States sport fishermen visiting the Yukon during 1962 and fishermen visiting the Yukon from the United States during 1971. There appears to be no significant change in the state of origin of visiting United States fishermen over this nearly 10 year period.

The widespread popularity of sport fishing among non-Canadian

TABLE 2:5

HOME RESIDENCE OF ALL VISITING FISHERMEN
WHO PURCHASED A YUKON FISHING LICENCE 1970-71*

<u>Country of</u> <u>Permanent Residence</u>	<u>Non-Canadian</u> <u>Short-Term</u>	<u>Non-Canadian</u> <u>Full-Term</u>
United States	3,706	637
Mexico	1	1
New Zealand	1	0
Japan	1	0
<u>Europe</u>		
England	1	1
France	1	1
Germany	2	0
Ireland	0	2
Netherlands	0	1
Scotland	1	0
Sweden	2	0
Switzerland	0	2
West Germany	0	3
TOTAL	<u>3,716</u>	<u>648</u>

* The statistics in this table represent approximately 97 percent of all non-Canadian sport fishermen who purchased sport fish licences during the 1970-71 season.

TABLE 2:6

STATE OF PERMANENT RESIDENCE OF UNITED STATES
FISHERMEN WHO PURCHASED A YUKON FISHING
LICENCE DURING 1970-71

<u>Home State</u>	<u>Non-Cdn.</u> <u>Short-Term</u>	<u>Non-Cdn.</u> <u>Full-Term</u>	<u>Home State</u>	<u>Non-Cdn.</u> <u>Short-Term</u>	<u>Non-Cdn.</u> <u>Full-Term</u>
Alabama	10	2	Montana	113	13
Alaska	560	95	Nebraska	17	0
Arizona	55	14	Nevada	23	9
Arkansas	17	7	New Hampshire	13	3
California	627	116	New Jersey	21	7
Colorado	136	14	New Mexico	22	3
Connecticut	33	4	New York	110	17
Delaware	7	0	North Carolina	14	1
Florida	59	20	North Dakota	21	2
Georgia	8	0	Ohio	122	22
Hawaii	3	2	Oklahoma	49	2
Idaho	42	14	Oregon	127	24
Illinois	124	24	Pennsylvania	104	18
Indiana	64	5	Rhode Island	0	1
Iowa	62	5	South Carolina	6	0
Kansas	43	0	South Dakota	24	0
Kentucky	17	1	Tennessee	12	4
Louisiana	8	3	Texas	112	11
Maine	10	2	Utah	38	5
Maryland	17	0	Vermont	13	1
Massachusetts	27	6	Virginia	30	4
Michigan	231	67	Washington	248	43
Minnesota	142	10	West Virginia	1	0
Mississippi	8	2	Wisconsin	110	18
Missouri	22	1	Wyoming	9	1
			Unknown	50	14
			Total	<u>3,706</u>	<u>637</u>

TABLE 2:7

A COMPARISON OF AREA OF PERMANENT
RESIDENCE BETWEEN UNITED STATES FISHERMEN
VISITING THE YUKON IN 1962 AND 1971

<u>Area of Permanent Residence</u>	<u>1962</u> [*] <u>Percent of All U. S. Anglers</u> <u>%</u>	<u>1971</u> <u>All Non-Canadian Anglers</u> <u>%</u>
California	18.9	17.2
Alaska	17.7	15.2
Washington	6.8	6.8
Michigan	5.9	6.9
Other Mid-West	17.0	18.0
Other West	15.3	18.2
North-West	12.4	12.9
South	6.0	4.8
TOTAL	<u>100.0</u>	<u>100.0</u>

* From an unpublished study of the Yukon sport fishery by A. L. W. Tuomi.

visitors to the Yukon does not appear to be as pronounced among Canadian non-Yukon fishermen visitors. Table 2:8 presents the number and percentage breakdown of Canadian non-Yukoner fishermen according to home province for the year 1970-71. According to these data 66 percent of all Canadian non-Yukon sport fishermen visiting the Yukon during the 1970-71 fishing season were residents of either Alberta or British Columbia. The only other province where a significant number of visiting fishermen permanently reside is Ontario. Over 87 percent of all fishermen visitors to the Yukon during the 1970-71 fishing season were from one of these three provinces - Alberta, British Columbia, or Ontario.

The Importance of Sport Fishing to Non-Resident Fishermen Visitors

In an effort to assess what influence sport fishing opportunities have on the Yukon economy, it is necessary to determine what part sport fishing plays in attracting non-residents to the Yukon. By the very fact that an individual purchases a sport fish licence, it can be assumed that sport fishing is attractive to him. This does not, however, imply that sport fishing is a significant consideration when an individual is planning his summer vacation. Four different questions were directed to the fishermen in an attempt to ascertain what role fishing played in attracting fishermen to the Yukon.

Table 2:9 provides a breakdown of replies to the question: "Was the primary purpose of your trip to fish in the Yukon?". According to Table 2:9, 88 percent of non-Canadian short-term licence holders, 80 percent of non-Canadian full-term licence holders, and an overwhelming 92.7 percent of Canadian non-Yukoner licence holders indicated that the primary purpose of their trip was not to sport fish. About 17 percent of non-Canadian full-term licence holders indicated that their primary purpose was to sport fish. The small percentage of individuals in each of the two non-resident licence categories who did not respond to the question would tend to suggest that most non-residents were willing to categorically deny that their trip was primarily to sport fish.

TABLE 2:8

NUMBER AND PERCENTAGE BREAKDOWN
OF CANADIAN NON-YUKONER FISHERMEN
ACCORDING TO HOME PROVINCE 1970-71

<u>Province</u>	<u>Canadian Non-Yukoner</u>	
	<u>No.</u>	<u>Percentage</u>
Alberta	327	31.0
British Columbia	372	35.3
Manitoba	31	2.9
New Brunswick	1	0.1
Nova Scotia	10	0.9
Ontario	219	20.8
Quebec	27	2.6
Saskatchewan	57	5.4
Northwest Territories	11	1.0
TOTAL	<u>1,055</u>	<u>100.0</u>

TABLE 2:9

NON-RESIDENTS WHO CAME TO THE YUKON
PRIMARILY TO FISH 1970-71

	<u>Non-Canadian</u> <u>Short-Term</u> <u>%</u>	<u>Non-Canadian</u> <u>Full-Term</u> <u>%</u>	<u>Canadian</u> <u>Non-Yukoner</u> <u>%</u>
Primary Purpose of Trip Was Fishing	7.3	17.1	7.3
Primary Purpose of Trip Was Not Fishing	88.1	80.0	92.7
No Response	4.6	2.9	-
TOTAL	100.0	100.0	100.0

Table 2:10 provides a breakdown of answers to a question designed to determine whether or not fishermen would have made the trip had no fishing been available in the Yukon. According to Table 2:10, only 7.9 percent of the non-Canadian short-term licence holders, 5.7 percent of non-Canadian full-term licence holders, and 2.4 percent of the Canadian non-Yukoners indicated that they would not have made the trip to the Yukon if no fishing had been available.

Table 2:11 shows a breakdown of replies to the less extreme question of whether or not the individual fisherman would have made his trip shorter had there been no sport fishing opportunities available in the Yukon. As can be seen from the results in Table 2:11, 40 percent of the non-Canadian full-term licence holders and 29.1 percent of the non-

TABLE 2:10

SPORT FISHING'S IMPORTANCE IN DETERMINING
WHETHER OR NOT NON-RESIDENT FISHERMEN WOULD
HAVE VISITED THE YUKON 1970-71

	<u>Non-Canadian</u> <u>Short-Term</u> <u>%</u>	<u>Non-Canadian</u> <u>Full-Term</u> <u>%</u>	<u>Canadian</u> <u>Non-Yukoner</u> <u>%</u>
Would not have made trip if no fishing available	7.9	5.7	2.4
Would have made trip if no fishing available	92.1	94.3	97.6
No Response	-	-	-
TOTAL	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>

Canadian short-term licence holders indicated they would have stayed a shorter time in the Yukon had no sport fishing been available. This is in sharp contrast to the only 2.4 percent of the Canadian non-Yukoners who indicated they would have stayed a shorter period had no sport fishing been available. This once again points to the indifference of the Canadian non-Yukoner to the sport fishing opportunities available in the Yukon. Moreover, it would appear from the comparatively large number of individuals in each category who did not respond to the question that there were probably a significant number of fishermen who were unsure of whether or not they had extended their visit to the Yukon because of sport fishing.

TABLE 2:11

THE PERCEIVED INFLUENCE OF SPORT FISHING
IN EXTENDING NON-RESIDENT FISHERMEN'S
LENGTH OF STAY IN THE YUKON 1970-71

	<u>Non-Canadian</u> <u>Short-Term</u> <u>%</u>	<u>Non-Canadian</u> <u>Full-Term</u> <u>%</u>	<u>Canadian</u> <u>Non-Yukoner</u> <u>%</u>
If no fishing but trip would have been made anyway:			
1. Would have stayed shorter time in the Yukon	29.1	40.0	2.4
2. Would have substituted other activities for fishing	53.9	51.4	85.0
No Response	17.0	8.6	12.6
TOTAL	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>

Table 2:12 provides a breakdown of reasons given by sport fishermen for their trip to the Yukon during the 1970-71 fishing season. Most non-Canadians stated that they were visiting the Yukon while en route to Alaska. Canadian respondents were in the Yukon either to visit friends or relatives or as part of a vacation trip. Once again, however, it should be noticed that most non-residents who stated that their reason for the trip was to fish were also those fishermen who purchased non-Canadian full-term licences.

TABLE 2:12

REASONS STATED BY NON-RESIDENT FISHERMEN FOR
MAKING THE TRIP TO THE YUKON 1970-71

<u>Reason For Trip</u>	<u>Non-Canadian</u> <u>Short-Term</u> <u>%</u>	<u>Non-Canadian</u> <u>Full-Term</u> <u>%</u>	<u>Canadian</u> <u>Non-Yukoner</u> <u>%</u>
Fishing	1.9	8.5	2.4
Hunting	1.3	2.9	2.4
Mountain Climbing/Canoeing	1.0	2.9	-
En Route to Alaska	45.7	40.0	-
Vacation Trip	23.1	28.6	31.7
Visit Friends or Relatives	-	2.9	31.7
Return Trip	2.6	-	2.4
On Business	5.9	-	17.2
No Specific Reason	10.6	8.5	9.8
No Response	7.9	5.7	2.4
TOTAL	100.0	100.0	100.0

Tables 2:9, 2:10, 2:11 and 2:12 together suggest that there are many reasons why sport fishermen visit the Yukon. The fact that only a small percentage of the total number of fishermen indicated that sport fishing was important in attracting them to visit the Yukon should not be surprising. Fishing is only one of an infinite number of reasons why individuals would visit the Yukon. What would be important to one individual would not necessarily be important to another. Moreover, many non-residents would have good fishing opportunities closer to home. For instance, most Canadians live in locations where excellent fishing opportunities are available. Thus, it is not surprising that Canadian non-Yukoners as a group do not consider the availability of sport fishing opportunities an important reason for visiting the Yukon. What may be the most crucial consideration when attempting to determine the importance of fishing to the Yukon is whether or not a significant number of visitors actually extend their length of stay in the Yukon because there are fishing opportunities available. In this regard, it can be seen from the foregoing information that sport fishing did appear to be an important factor in extending the length of stay for many of the non-resident fishermen.²

Summary

While the Yukon sport fishery appeals to visitors from every age group, the majority of non-resident fishermen who fished in the Yukon for 5 days or more during 1970-71 were over 50 years of age. Most resi-

2. There are two important factors which bear on this discussion. One is that all of the information contained in this section is based on information gained from fishermen. Thus, their response to fishing as an activity would probably be more favourable than that received from the population as a whole. Second, from the other point of view, it could be argued that most individuals visiting the Yukon travel many thousands of miles through territory where good fishing opportunities are available. The section of the highway going through the Yukon is only a small portion of the total highway which must be travelled in order to visit Alaska or the Yukon itself. It is quite conceivable that an outdoorsman who is interested in fishing would visit the Yukon and not fish locally but in other locations along the main route. So despite the fact that sport fishing might be one of the main incentives for making the trip, their opinion would not be recorded in Tables 2:9, 2:10, 2:11 or 2:12.

dent participants are 40 years of age or younger and like their non-resident counterparts have a better than average income. Yukon sport fishermen generally are employed as professionals, managers, or as trade and technical workers. More than one-half of the male Yukon population between 21 and 60 years of age actively participated in the Yukon sport fishery.

During the 1970-71 sport fishing season, fishermen from 9 different European countries, the United States, Mexico, New Zealand, and Japan participated in the Yukon sport fishery. United States' fishermen came from every state in the United States, and Canadian non-Yukoner sport fishermen came from 8 provinces in Canada and the Northwest Territories. The geographical representation by United States fishermen has changed only slightly during the 10 year period for which data is available.

Despite the fact that most non-resident fishermen were unwilling to indicate that they visited the Yukon during the 1970-71 fishing season in order to participate in the Yukon sport fishery, there is ample reason to believe that a significant portion of these non-resident visitors extend the length of their stay in the Yukon in order to sport fish.

CHAPTER THREE

NET ECONOMIC BENEFITS, ECONOMIC IMPACT AND VALUE OF THE YUKON SPORT FISHERY

According to the Commissioner of the Yukon Territory's Annual Report for 1970-71, tourists visiting the Yukon during 1966 spent an average of \$28 per day. In contrast to this the present study reveals that non-resident visitors who fished in the Yukon during the summer of 1971 spent up to an average of \$53 per day while visiting in the Territory. In this chapter an economic assessment of fishing related expenditures will be presented. This will be accomplished in the following manner. The first section will be used to present a detailed outline of total fishing related expenditures and the net economic benefits accruing from these expenditures. The second section will present information on the capitalized value of the Yukon sport fishery to the Yukon Territory and to Canada. This will be followed by a discussion on the impact of fishing related expenditures on the Yukon economy.

Yukon Sport Fishermen Expenditures

A detailed breakdown of the total and average Yukon expenditures by fishermen according to type of expenditure is presented in Table 3:1. The largest item of expenditure for all visitors to the Yukon was travelling. The Yukon's distance from most of the more populated centres of North America serves to explain the large amount of travelling expenditures.

The largest item of expenditure for resident sport fishermen was for major capital purchases such as boats, motors, trailers, and tents. In total, resident sport fishermen spent in excess of \$1,870,000 on 74,000 angler-days fishing during 1970-71. Insofar as all resident expenditures were made during fishing trips, all resident expenditures are directly attributable to the Yukon sport fishery. Thus, from the information pre-

TABLE 3:1

<u>TOTAL AND (AVERAGE) EXPENDITURES MADE IN THE YUKON BY</u>				
<u>RESIDENT AND NON-RESIDENT SPORT FISHERMEN</u>				
<u>1970-71</u>				
<u>Expenditure Item</u>	<u>Resident</u>	<u>Non-Canadian</u>	<u>Non-Canadian</u>	<u>Canadian</u>
	<u>\$</u>	<u>Short-Term</u>	<u>Full-Term</u>	<u>Non-Yukoner</u>
	<u>\$</u>	<u>\$</u>	<u>\$</u>	<u>\$</u>
Travel Expenses	446,376 ¹ (108.90) ²	307,170 (83.20)	89,624 (129.51)	139,183 (147.44)
Food and Lodging	374,773 (91.43)	182,522 (49.44)	70,920 (102.49)	84,039 (89.02)
Tackle, Bait, Clothing, Camping Equipment	306,750 (74.84)	20,685 (5.60)	9,213 (13.31)	7,045 (7.46)
Boat Rental, and Other Services	13,360 (3.26)	27,556 (7.46)	11,547 (16.69)	11,996 (12.71)
Fuel, Repairs or Purchases: Boats, Motors, Trailers	716,989 (174.92)	12,372 (3.35)	2,867 (4.14)	2,256 (2.39)
Fishing Licences	12,297 (3.00)	12,922 (3.50)	6,920 (10.00)	2,832 (3.00)
TOTAL EXPENDITURES	1,870,545	563,227	191,091	247,351
AVERAGE ANNUAL	(456.35)	(152.55)	(276.14)	(262.02)
AVG. EXPENDITURES PER ANGLER-DAY	<u><u>((25.35))</u></u>	<u><u>((52.60))</u></u>	<u><u>((39.45))</u></u>	<u><u>((67.18))</u></u>

1. Total expenditure per item for each category.

2. Average annual expenditure in each category.

sented in Table 3:1, it can be seen that licenced resident sport fishermen, on the average, spent \$456.35 fishing in the Yukon during the 1970-71 fishing season. This works out to an average expenditure by resident fishermen of \$25.35 per angler-day during the 1970-71 season.

Although the expenditures shown for resident fishermen in Table 3:1 are indicative of the total amount of resident expenditures attributable to the Yukon sport fishery, non-resident fishermen expenditures are not indicative of the amount of non-resident spending which takes place because of the Yukon sport fishery. Only a small portion of non-resident expenditures in the Yukon can be attributed to the Yukon sport fishery. On the other hand, some small portion of their total expenditures in other parts of the world and Canada may occur because of the Yukon sport fishery's existence. Therefore, in Table 3:1, the visiting fishermen's expenditures are not comparable to expenditures made by resident sport fishermen nor are the total expenditures made by non-resident sport fishermen in the Yukon the only expenditures attributable to the Yukon sport fishery.

Table 3:2 provides a breakdown of non-resident fishermen's expenditures in the Yukon which are attributable to the Yukon sport fishery. In each of the three visiting fishermen categories, the total amount of expenditures attributable to the Yukon's fishery are less than the total Yukon expenditures made by visiting sport fishermen in Table 3:1.¹

Table 3:3 shows the total and average expenditures made in other parts of Canada by visiting sport fishermen who participated in the Yukon sport fishery during the 1970-71 fishing season.

Economic Benefits and Values

An economic assessment of the Yukon sport fishery involves the

1. For a detailed discussion on the meaning of the economic values provided in this chapter and an explanation of how these values were calculated see Appendix II.

TABLE 3:2

NON-RESIDENT FISHERMEN'S EXPENDITURES IN THE YUKON
ATTRIBUTABLE TO THE YUKON SPORT FISHERY
1970-71

	<u>Non-Canadian</u> <u>Short-Term</u> <u>\$</u>	<u>Non-Canadian</u> <u>Full-Term</u> <u>\$</u>	<u>Canadian</u> <u>Non-Yukoner</u> <u>\$</u>	<u>Total</u> <u>\$</u>
Travel	135,000	41,000	34,000	210,000
Food and Lodging	80,000	32,000	20,000	132,000
Other	27,000	11,000	5,000	43,000
TOTAL	<u>242,000</u>	<u>84,000</u>	<u>59,000</u>	<u>385,000</u>

measurement of two kinds of values or benefits. One is the primary or direct benefits which stem directly from participation in this recreational activity. These are non-price benefits which would be valued differently by every fisherman. Despite this, insofar as they benefit all individuals, they benefit society as a whole and therefore can be assumed to have some imputed price which would accurately reflect its value to society. From the Yukon's or Canada's viewpoint these benefits have a value only insofar as they contribute to the welfare of Yukon or Canadian people. The direct benefits non-resident fishermen receive from participation in the Yukon fishery cannot be considered a direct value to Yukoners or other Canadians.

The other type of value or benefits are secondary or indirect. These are the benefits which accrue to the Yukon and Canadian economies

TABLE 3:3

TOTAL AND (AVERAGE) EXPENDITURES MADE IN OTHER
PARTS OF CANADA BY SPORT FISHERMEN
VISITING THE YUKON DURING 1970-71

<u>Expenditure Item</u>	<u>Non-Canadian Short-Term</u>	<u>Non-Canadian Full-Term</u>	<u>Canadian Non-Yukoner</u>
	<u>\$</u>	<u>\$</u>	<u>\$</u>
Travel Expenses	435,632 ¹ (117.99) ²	92,253 (133.31)	121,794 (129.02)
Food and Lodging	274,137 (74.25)	76,100 (109.97)	50,098 (53.07)
Tackle, Clothing, Camping Equipment	10,171 (2.76)	5,971 (8.63)	77,248 (81.83)
Rental Other Equipment	33,595	12,258	5,522
All Other Expenses	(9.10)	(17.71)	(5.85)
TOTAL EXPENDITURES	753,535	186,582	254,662
AVERAGE ANNUAL	(204.10)	(269.53)	(269.77)

1. Total expenditure per item for each category.
2. Average annual expenditure in each category.

from expenditures on the Yukon sport fishery. In practice, these are usually the expenditures which non-resident fishermen make on goods and services because of sport fishing. They are in reality an inflow of money into the Yukon economy which otherwise would not be present if the Yukon sport fishery did not exist. Viewed from this standpoint, spending by either resident or non-resident fishermen can in reality make a net economic contribution to the local economy. The resident fishermen's contribution to net economic (indirect) benefits has been taken into consideration in this study.

One other factor which dictates the approach used in this study, and which is not always taken into account when analyzing the economic value of a sport fishery, is the question of who owns and benefits from the sport fishery. The Yukon sport fishery benefits people living in the Yukon but it also benefits all Canadians. Therefore, aside from the values that come from the knowledge that this diverse and unique aquatic resource belongs to them as Canadians (and as Canadians they have the option to view or otherwise participate in recreational activities based on this resource), all Canadians including Canadians living in the Yukon benefit economically from its existence. The economic benefits and value of the Yukon sport fishery to both Yukon and Canadian economies are calculated.

Net Economic Benefits to the Yukon and Canadian Economies

Just as all expenditures made by sport fishermen in the Yukon cannot be assumed a direct consequence of the Yukon sport fishery, not all related fishing expenditures can be assumed to generate economic benefits for the Yukon or for the people of Canada. Only that portion of total revenue which comes as a direct result of participation in the Yukon sport fishery, net of the costs of maintaining the Yukon sport fishery, can be considered net economic benefits. Wages or returns to capital investment cannot be considered net economic benefits. If no sport fishing had been available in the Yukon during the 1970-71 fishing

season, then all of the labour and capital employed to service sport fishermen during that fishing season would have been employed elsewhere and would have earned approximately the same returns. Competitive market structures would insure that wages and other payments to factors of production would remain about the same. Thus, the portion of an angler's spending which benefits Yukon residents and the Canadian people is only that portion left over after the payments to various factors of production (labour and capital) have been made. Net economic benefits include business profits (or private revenue), taxes, and licence revenue.

Table 3:4 shows the net economic benefits accruing to the Yukon Territory's economy from participation in the Yukon sport fishery during the 1970-71 fishing season. Table 3:4 shows that these benefits amounted to \$109,330. Table 3:5 shows the net economic benefits accruing to Canada's economy from participation in the Yukon sport fishery during the 1970-71 fishing season. This table shows that these benefits amounted to \$153,800.

The net economic benefits to the territorial government and to Canada include taxes on gasoline and alcohol sales. In addition to this, when considering total net economic benefits to Canada, licence revenue is included.² Business profits were calculated at 3 percent of total expenditures in the Yukon and at 2 percent of total expenditures elsewhere in Canada.

The Value of Free Sport Fishing Opportunities to Yukon Sport Fishermen

Before turning to the more difficult and more complicated concept of identifying the amount of direct (primary) benefits received by resident sport fishermen, it is necessary to clarify what factors are

2. Prior to 1972-73 all fishing licence revenue was collected and kept by the federal government. In 1972-73 the federal government turned over the responsibility of licencing sport fishermen to the Yukon territorial government. Henceforth, the Yukon territorial government will collect and keep revenue earned by sport fish licence sales.

TABLE 3:4

NET ECONOMIC BENEFITS TO THE YUKON ECONOMY
ATTRIBUTABLE TO THE YUKON SPORT FISHERY DURING 1970-71

<u>Business Profits on:</u>	<u>Related Anglers'</u> <u>Expenditures</u>	<u>Net</u> <u>Benefits</u>
	<u>\$</u>	<u>\$</u>
Travel	387,000	11,600
Food and Lodging (less alcohol)	225,700	6,800
Other Expenditures	457,700	<u>13,700</u>
Net Benefits to Private Sector		\$32,100
 <u>Public Revenue on:</u>		
Gasoline Expenditures (Territory Tax = 22%)	246,000	54,120
Alcoholic Beverages (Territory Net Revenue = 43.6%)	53,000	23,110
Net Benefits to Territorial Government		<u>\$77,230</u>
TOTAL NET BENEFITS TO THE YUKON ECONOMY		<u><u>\$109,330</u></u>

TABLE 3:5

NET ECONOMIC BENEFITS TO THE CANADIAN ECONOMY
ATTRIBUTABLE TO THE YUKON SPORT FISHERY DURING 1970-71

<u>Business Profits on:</u>	<u>Related Anglers'</u> <u>Expenditures</u>	<u>Net</u> <u>Benefits</u>
	<u>\$</u>	<u>\$</u>
Travel	312,800	8,900
Food and Lodging (less alcohol)	174,100	5,000
Other Expenditures	305,800	8,600
Net Benefits to Private Sector		\$22,500
 <u>Public Revenue on:</u>		
Gasoline Expenditures	209,800	
(Provincial Taxes = 26% approx.)		54,500
(Federal Tax = 12%)		25,200
Alcoholic Beverages	38,700	
(Provincial Net Revenues = 40% approx.)		15,400
(Federal Tax = 12%)		4,600
Licence Revenue		31,600
Net Benefits to Canadian Public Sector		\$131,300
TOTAL NET BENEFITS TO THE CANADIAN ECONOMY		\$153,800

taken into account when calculating this value. From our previous discussion on direct benefits it was established that the opportunity to sport fish in the Yukon provides direct benefits for Canadians who do not live in the Yukon as well as resident Yukon sport fishermen. Canadians who do not live in the Yukon have free access to what is essentially a Canadian resource. Therefore, a computation of direct benefits ideally should include within it some assessment of the direct benefits received by Canadian non-Yukon sport fishermen. This has not been possible in this presentation. Neither the information gathered in this study nor the method used to calculate direct benefits permit an assessment of the direct benefits accruing to Canadian non-Yukon sport fishermen.³

The method used to calculate the direct value received by Yukon residents from fishing in the Yukon relates the value and expenditures of a day's fishing in British Columbia to the value and expenditures per angler-day for fishermen in the Yukon.⁴ On this basis the value of a day's fishing to a Yukon resident is estimated to lie within a range of \$11 to \$17 per angler-day. When these estimates are applied to the total of 73,800 angler-days resident fishermen spent fishing in the Yukon during 1970-71, the total value of the Yukon sport fishery to residents of the Yukon for that period can be estimated to lie between \$812,000 and \$1,255,000.

Table 3:6 shows the total value to residents of sport fishing in the Yukon for the 1970-71 fishing season. It also shows the single best estimate of the value of one angler-day's fishing in the Yukon to

3. The information presented in Chapter Two indicated that Canadian non-Yukon sport fishermen were less enthusiastic about the sport fishing opportunities available in the Yukon than either resident or non-resident fishermen.

4. See P. H. Pearse and M. E. Laub, The Value of the Kootenay Lake Sport Fishery, B. C. Fish and Wildlife Branch of the Department of Recreation and Conservation, Victoria, B. C., 1969, and Pearse Bowden Economic Consultants Ltd., The Value of Fresh Water Sport Fishing in British Columbia, B. C. Fish and Wildlife Branch of the Department of Recreation and Conservation, Victoria, B. C., 1971.

be \$13.50. The corresponding total value of Yukon sport fishing to all resident fishermen is \$996,000.

TABLE 3:6

VALUE OF YUKON SPORT FISHERY TO YUKON
RESIDENT SPORT FISHERMEN 1970-71

Direct Benefits Per Angler-Day:	\$11.00	\$13.50	\$17.00
Total Direct Benefits	\$812,000	\$996,000	\$1,255,000

Present or Capitalized Value of the Yukon Sport Fishery

The calculation of net economic benefits to the Yukon and Canadian economies, as well as the direct benefits accruing to resident sport fishermen, permits estimation of the present discounted value of these benefits from the Yukon sport fishery. Table 3:7 shows the present discounted value of the Yukon sport fishery to the Yukon and Canadian economies from expenditures made on the Yukon sport fishery during the 1970-71 sport fishing season. The present values shown in Table 3:7 are based on a discount rate of 8 percent per annum to the year 2000 and participation growth rates in the Yukon sport fishery of 7 percent, 5 percent, and 3 percent per year respectively. For instance, at a participation growth rate of 7 percent per annum, the present discounted value to the Yukon of the net benefits of expenditures made on the Yukon sport fishery during the 1970-71 fishing season at an 8 percent per annum discount rate to the year 2000 is \$2,766,000. Since participation in the Yukon sport fishery can be expected to increase

TABLE 3:7

PRESENT DISCOUNTED VALUE TO THE YUKON AND CANADIAN
ECONOMIES FROM SPORT FISHING EXPENDITURES
DURING 1970-71

<u>Growth Rate</u> <u>Per Annum</u> <u>%</u>	<u>Net Benefits</u> <u>to Yukon</u> <u>\$</u>	<u>Present</u> <u>Discounted</u> <u>Value to Yukon</u> <u>\$</u>	<u>Net Benefits</u> <u>to Canada</u> <u>\$</u>	<u>Present</u> <u>Discounted</u> <u>Value to Canada</u> <u>\$</u>
7	109,330	2,766,000	153,800	3,891,070
5	109,330	2,136,080	153,800	3,004,930
3	109,330	1,682,560	153,800	2,366,940

at an annual average rate of between 7 and 3 percent,⁵ the best estimate of the growth rate in participation in the Yukon sport fishery is about 5 percent. Thus, it follows that the best estimate of the present discounted value of the Yukon sport fishery at a discount rate of 8 percent per annum is \$2,136,080. The best estimate of the present discounted value of the Yukon sport fishery to the Canadian economy at an annual discount rate of 8 percent is \$3,004,930.

5. As noted in William F. Sinclair's The British Columbian Sport Fishermen, Department of the Environment, Fisheries Service, Pacific Region, July, 1972, p. 8. The average growth rate in participation in the British Columbia sport fishery over the period 1967-1970 has increased at an average annual growth rate of 6.6 percent. Non-resident participation increased at a somewhat faster rate than resident participation in the British Columbia tidal sport fishery. According to Study Reports No. 4 and 5 prepared by Pearse Bowden Economic Consultants Ltd., The Value of Non-Resident Sport Fishing in British Columbia, and The Value of Fresh Water Sport Fishing in British Columbia, resident participation in the British Columbia fresh water sport fishery increased at about 4 percent per annum while non-resident participation in the same fishery increased at about 9 percent per annum.

Table 3:8 shows the present discounted value of the direct benefits to the Yukon residents from sport fishing in the Yukon during the 1970-71 sport fishing season. The present discounted values are based on an annual rate of discount of 8 percent and on a participation growth rate of 3 percent per year.⁶ As noted earlier the best single estimate of a value of one angler's day's fishing in the Yukon is \$13.50. On the basis of this best single estimate of the direct value, the present discounted value of the Yukon sport fishery is \$15,300,000.

TABLE 3:8

PRESENT DISCOUNTED VALUE OF FREE FISHING
TO YUKON RESIDENT SPORT FISHERMEN 1970-71
(based on 3% annual growth in participation)

At Value Per Angler-Day of:	\$11.00	\$13.50	\$17.00
Present discounted Value	\$12,500,000	\$15,300,000	\$19,300,000

Before proceeding with the discussion on the economic impact of sport fishing on the Yukon economy there are some necessary qualifications which should be noted by the reader. Both the annual discount rate of 8 percent and the period of time over which the stream of benefits are discounted (to the year 2000), are necessarily arbitrary. The discount rate of 8 percent is not, however, unrealistic nor is the cut-

6. Based on projections developed in, D. C. E. Mathurin and N. Lafreniere, Supply of and the Demand for Labour in the Yukon and Northwest Territories, Department of Indian Affairs and Northern Development, May, 1971, and extrapolating to expected population increases. Previous licence sales would have suggested an average rate of increase of 8 percent (which would appear unrealistic).

off date of the year 2000 inconsistent with what is normally considered reasonable. It is only necessary for the reader to be aware that the annual discount rate and the period of time over which the stream of benefits are discounted together determine the absolute size of the discounted values calculated above.

Other factors which should be noted are that the term "net benefits" implies that the benefits were calculated net of the cost of maintenance of the fishery. For instance, in the case of calculating the net benefits to Yukoners, the cost to Yukoners of maintaining the sport fishery in its present condition should be taken into account. This was not possible in this presentation because of the difficulties involved in calculating out those expenditures or costs which are directly attributed to the Yukon sport fishery. The total costs would be rather minimal and would only slightly overestimate the net benefits calculated above.

One further, and perhaps more critical, bias which would underestimate the value of both the resident and non-resident benefits generated by the Yukon sport fishery are that only expenditures and participation by licenced sport fishermen and fishermen 16 years of age and older are taken into account. Thus, to the degree that the total amount of participation in the Yukon sport fishery is carried out by persons under the age of 16 and by fishermen who did not purchase a fishing licence during the 1970-71 fishing season, the discounted present value of both the resident and non-resident fisheries are underestimated.

The Economic Impact of Fishing Expenditures on Income and Employment

One other measure of the sport fishery's importance to residents of the Yukon is the amount of business profit and the number of jobs generated by expenditures on the sport fishery. From a fishing advocate's point of view, a measurement of this benefit is particularly

important when the importance of sport fishing to the local economy is compared with that of other tourist activities. The reason for this is that visitors who fish usually commit a considerable portion of their total expenditures on goods and services which have a high local tax or profit component. For example, a considerable portion of a fisherman's total expenditure would be spent on gasoline for transportation to and from fishing locations. Fishermen would usually stay in small lodges located next to good fishing areas that would be owned locally and not by hotel chains or outside syndicates. In addition to this, the act of fishing requires certain expenditure commitments such as the purchase of a licence, of fishing equipment, or sometimes the hiring of guides. The overall effect is that fishermen as a group tend to generate greater income and employment benefits than does the general tourist.⁷

The amount of income and employment generated by the Yukon sport fishery is directly dependent upon the percentage of each expenditure which remains in the economy as part of the local income or profit component. Some portion of each dollar spent in the Yukon remains in the local economy and contributes to the profits of the local businessman, adds to the wages of local employees, becomes taxes for local government, or rent for local landowners. Thus, each expenditure will lead to successive rounds of spending on locally produced goods and services and will ultimately increase the profits, wages, taxes, and rents earned within the local economy.⁸

7. It is not intended here to suggest that fishermen as a group have greater impact on the economy than all other tourist groups who participate in other specialized types of activity while in the Yukon. For instance, it is probably true that hunters as a group have as great or greater impact on the local economy than sport fishermen. It is only necessary for the reader to be aware that those visitors who visit the Yukon especially to participate in certain specialized activities commit themselves to some minimal amount of local expenditures. Fishermen fall into this category. Moreover, this is supported by the data presented earlier in this chapter showing that the general tourist visiting the Yukon in 1966 spent an average of \$28 per day and the average expenditure of a sport fisherman visiting the Yukon during the summer of 1971 was up to \$53 per day.

8. This concept is normally referred to by economists as "the multiplier effect". For a detailed discussion of the multiplier effect and the size of the local income or profit component please see Appendix II.

It was established that for every \$100 spent in the Yukon by sport fishermen, local income increases by \$35 (see Appendix II). Thus, the \$385,000 spent by non-resident anglers in the Yukon during the 1970-71 sport fishing season generated \$697,000 worth of income for Yukon residents. From this it can be calculated that non-resident fishermen's expenditures during the 1970-71 fishing season created a total of 54 full-time jobs.

In addition to the income and employment generated by non-resident fishermen's expenditures, resident sport fishermen also spend a considerable amount of money on sport fishing in the Yukon which would not otherwise occur if the Yukon sport fishery did not exist. This expenditure also contributes to the income and employment generated by the Yukon sport fishery. Therefore, when the total amount of expenditures are taken into account (both non-resident and the appropriate resident fishermen's expenditures), it can be calculated that the total amount of income that was generated from fishermen's spending during the 1970-71 fishing season was \$2,042,000. This in turn created 212 full-time or 480 part-time jobs (480 jobs for a three month period) during 1971.

Summary

There are two types of benefits or values involved in an economic assessment of the Yukon sport fishery. One is the direct benefits (non-priced) which come directly from participation in the recreational sport fishery. The other is the indirect benefits which accrue to the Yukon and Canadian economies.

The net economic benefits generated by the Yukon sport fishery for the Yukon economy during 1970-71 amounted to \$109,330.

The net economic benefits generated by the Yukon sport fishery for the Canadian economy during the 1970-71 sport fishing season amounted to \$153,800.

On the basis of the information gathered for this study and previous work done in this study area, it is estimated that the value of a day's fishing to residents of the Yukon is \$13.50 per day.

The value of \$13.50 per day of a day's fishing to residents of the Yukon suggests that Yukon residents receive \$996,000 worth of free sport fishing in the Yukon Territory each year.

The present or capitalized value of the Yukon sport fishery to the Yukon economy calculated at an annual discount rate of 8 percent to the year 2000 is \$2,136,080.

The present or capitalized value of the Yukon sport fishery to the Canadian economy calculated at an annual discount rate of 8 percent to the year 2000 is \$3,004,930.

The present or capitalized value of the direct benefits received by Yukon sport fishermen is \$15,300,000 (8 percent to the year 2000).

Non-resident fishermen's expenditures in the Yukon during the 1970-71 sport fishing season generated profits or income of \$697,000 for Yukon residents. It was calculated that the \$697,000 created 54 full-time jobs.

The total fishing expenditures which would not have otherwise occurred in the absence of the Yukon sport fishery are calculated to have produced profits or income for Yukon residents of \$2,042,000 during 1970-71. This in turn created 212 full-time jobs.

CHAPTER FOUR

COMMENTS AND OPINIONS OF YUKON FISHERMEN ON THE QUALITY OF FISHING AND ITS MANAGEMENT

The responsible management of the Yukon's fishery resource requires that managers recognize and are responsive to the needs and wants of the Yukon and Canadian public. For this reason the questionnaire used to gather information for this study also contained a number of specific questions specifically designed to gather the sport fishermen's opinions on the management and quality of fishing in the Yukon. In this chapter the results of these questions and the comments made by fishermen in their returns are presented. The comments and opinions of both non-resident and resident sport fishermen are included in the information which follows.

In most areas of North America only a limited number of good quality sport fishing sites are available and accessible to the general population. The result is that there is a tremendous amount of competition between local and non-local fishermen for good quality fishing sites. Therefore, one of the questions directed at resident sport fishermen was designed to determine the attitude of resident sport fishermen to non-resident visitors. In this regard, resident sport fishermen were asked to select one of six possible policy alternatives towards fishing and tourism when taking into account the fact that tourism, especially foreign tourism, makes a significant contribution to the Yukon economy. The results are presented in Table 4:1. Table 4:1 shows that more than 60 percent of all fishermen indicated that they wished to encourage further foreign and Canadian tourism. More than 15 percent wished to encourage just Canadian tourism and allow foreign tourist participation in the Yukon fishery to remain as it is at present. Nearly 8 percent of resident fishermen indicated that they wished to discourage all non-resident participation in the Yukon sport fishery. The overall results would tend to indicate that most resident sport fishermen are in favour

TABLE 4:1
INDICATED ATTITUDES OF YUKON RESIDENT SPORT
FISHERMEN TO TOURISM AND TO NON-RESIDENT PARTICIPATION
IN THE YUKON SPORT FISHERY 1970-71

	<u>Percentage</u>
1. Encourage Further, Both More Foreign and Canadian Tourism	60.7
2. Encourage Just Foreign Tourism and Allow Fellow Canadians Participation in the Yukon Fishery to Remain As It Is at Present	5.1
3. Encourage Just Canadian Tourism and Allow Foreign Tourism Participation in the Yukon Fishery to Remain As It Is at Present	15.2
4. Actively Discourage Only Foreign Participation	3.8
5. Actively Discourage Only Canadian Participation	1.3
6. Actively Discourage All Non-Residents to Yukon Participation	7.6
No Response	6.3
TOTAL	<hr/> 100.0 <hr/> <hr/>

of encouraging non-resident participation in the Yukon sport fishery in order to increase the economic contribution to the Yukon economy.

The overriding opinion of resident sport fishermen that they wished to further encourage tourism to the Yukon and to encourage participation by non-residents in the Yukon sport fishery raises a number of questions about how fishery managers and tourist authorities could increase the number of non-resident visitors to the Yukon each year. A number of questions were directed at non-resident visitors to determine which factors had the most influence on their pattern of participation.

Table 4:2 presents a breakdown on how non-resident fishermen rate the quality of sport fishing available in the Yukon according to non-resident licence category. According to the information presented in Table 4:2 more than 60 percent of non-Canadian full-term licence holders felt that the sport fishing opportunities available in the Yukon were either good, very good, or the very best. Only slightly less of the non-Canadian short-term licence holders felt that the sport fishing opportunities were good or better. The vast majority of Canadian non-Yukoner licence holders felt that the fishing opportunities available in the Yukon were very good. Apparently none of the non-resident Canadian licence holders felt that fishing in the Yukon was poor.

When comparing the information presented in Table 4:2 with the information noted previously in Chapters One and Two, it is interesting to note that despite the fact that most Canadian non-Yukoner licence holders were indifferent to the sport fishing opportunities available in the Yukon, Canadian non-Yukoners as a group were aware that good quality sport fishing is available in the Yukon. It would seem reasonable to conclude from this information that the vast majority of Canadian non-Yukon licence holders had a specific non-recreational reason for visiting the Yukon during 1970-71. This is consistent with the information presented in Table 2:11 which indicated that the Canadian non-Yukoner sport fishermen's length of stay in the Yukon was not influenced by the Yukon sport fishery.

TABLE 4:2

OPINIONS OF NON-RESIDENT FISHERMEN ON THE QUALITY OF
SPORT FISHING AVAILABLE IN THE YUKON 1970-71

	<u>Non-Canadian</u> <u>Short-Term</u> <u>%</u>	<u>Non-Canadian</u> <u>Full-Term</u> <u>%</u>	<u>Canadian</u> <u>Non-Yukoner</u> <u>%</u>
The Very Best	11.3	28.6	14.6
Very Good	33.8	31.5	41.5
Good	19.2	11.4	24.4
Fair	13.9	11.4	7.3
Poor	9.9	11.4	-
No Response	11.9	5.7	12.2
TOTAL	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>

Table 4:3 shows the reasons given by non-resident sport fishermen for choosing either the lake or stream where they fished. It is apparent from the information presented in Table 4:3 that the recommendation of residents of the Yukon influenced most the location that non-residents choose to fish. It is not surprising that the second most critical factor influencing where the non-residents chose to fish was the ease with which they were able to gain access to the fishery.

It is also interesting to note that according to Table 4:3 it would appear that about one-third of the fishermen made an effort to learn of good fishing sites. Another one-third simply fished where they camped or where access was easily convenient. Relatively few chose their fishing locations on the basis of their beauty or solitude but then these are not uncommon qualities in the Yukon. In conjunction with the information on what species of fish was most frequently intentionally fished for given in Table 1:11, it does appear that although fishing is not usually a primary reason for a trip to the Yukon many fishermen are prepared to make an effort to improve the quality of the fishing opportunities available to them.

Table 4:4 provides a breakdown of the suggestions made by all Yukon fishermen on how the sport fishery might be improved. Consistent with the information noted earlier in Table 4:1, the vast majority of fishermen had no opinion on how improvement could be made to the Yukon sport fishery. Very few of the residents, and even fewer of the non-Canadian full-term licence holders, were concerned with road access. Some fishermen in every licence category felt that there should be changes in licence fee structure or limitations to the fishery. None of the non-Canadian fishermen felt that there was need for pollution control and only 2.4 percent of the Canadian non-Yukoners felt that pollution control was of concern. In contrast to this, slightly over 10 percent of the resident sport fishermen felt that there was some need for pollution control.

TABLE 4:3

WHAT PARTICULAR REASON INFLUENCED THE NON-RESIDENT
FISHERMEN MORE IN CHOOSING THE LAKE OR STREAM
WHERE THEY FISHED 1970-71

	<u>Non-Canadian</u> <u>Short-Term</u> <u>%</u>	<u>Non-Canadian</u> <u>Full-Term</u> <u>%</u>	<u>Canadian</u> <u>Non-Yukoner</u> <u>%</u>
Recommendation of Friends or Relatives, Guides or Local Residents	24.5	31.4	31.7
Recommendation of Travel Bureau or Automobile Association	4.0	5.7	-
Previous Experience	5.3	8.6	7.3
Convenient, Easy Access	18.5	11.4	17.1
Good, Convenient Camping Facilities	5.3	2.9	7.3
Close Proximity to Job	-	-	7.3
Fished Where Camped or Stopped on Road	12.6	14.3	7.3
Sought New Area	-	-	2.5
Spot Offered Beauty and Solitude	5.3	2.9	-
No Reason	14.6	11.4	4.9
No Response	9.9	11.4	14.6
TOTAL	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>

TABLE 4:4

SUGGESTIONS MADE BY YUKON FISHERMEN ON HOW
THE SPORT FISHERY MIGHT BE IMPROVED

<u>Means of Improvement</u>	<u>Residents</u> <u>$\frac{c}{c}$</u>	<u>Non-Canadian</u> <u>Short-Term</u> <u>$\frac{c}{c}$</u>	<u>Non-Canadian</u> <u>Full-Term</u> <u>$\frac{c}{c}$</u>	<u>Canadian</u> <u>Non-Yukoner</u> <u>$\frac{c}{c}$</u>
1. More law enforcement, protection of existing fish stocks and spawning areas	10.1	1.3	-	2.4
2. More re-stocking facilities	5.1	1.3	-	-
3. More species introduced	2.5	-	-	-
4. Regular fish census conducted	1.9	-	-	-
5. Pollution control	10.1	-	-	2.4
6. Institution of special licences and/or changes in licence fees and limitations	13.9	8.0	14.3	2.4
7. More boat rentals, launching, camping, and other public facilities	2.5	6.0	2.9	7.4
8. Better road access to fishing areas	3.8	8.6	2.9	17.1
9. Less access to fishing areas	1.9	-	-	-
10. Keep Yukon unchanged	2.5	9.9	17.1	9.8
11. Changes in commercial fishery	3.2	-	-	-
12. Other	4.5	6.0	5.7	2.4
No response	38.0	58.9	57.1	56.1
TOTAL	<u><u>100.0</u></u>	<u><u>100.0</u></u>	<u><u>100.0</u></u>	<u><u>100.0</u></u>

Table 4:5 outlines the various ways non-resident fishermen indicated that they learned of the fishing opportunities available in the Yukon. Over one-half of non-resident anglers were aware of the fishing opportunities prior to beginning their trip. Magazines and other media provided the information to about 24 percent of the non-residents, while another 20 percent learned about fishing opportunities from friends and relatives. About 8 percent gained the information from travel bureaus and automobile associations and about the same number knew of the fishing from previous experience. Of the roughly 30 percent who had no knowledge of fishing opportunities when they began their trip, 8 percent learned of the opportunities in the "Milepost" while a further 5 percent were informed while in the Yukon by either local residents or guides.¹

Summary

The information presented in this chapter along with information presented in Chapters One and Two on fishermen's preferences tend to indicate that a policy designed to encourage non-resident participation in the Yukon sport fishery would probably increase the number of tourists visiting the Yukon annually. Moreover, it does appear that most of these visitors could be encouraged to stay longer because of the existence of good sport fishing opportunities. The most effective way of advertising the opportunities available in the Yukon appears to be through the magazines or other media.

Despite the excellent opportunity available to use the Yukon sport fishery to increase the number of visitors to the Yukon each year, it does not appear as if fishing could be used to attract Canadian non-Yukoner visitors. Most Canadian non-Yukon fishermen are aware of the good fishing opportunities available to them while visiting in the Yukon, and most of these visitors are indifferent and use the sport fishery only on a casual basis.

1. The "Milepost" is a guide book of the Alaska Highway and can be purchased in northern British Columbia, the Yukon, or in Alaska.

TABLE 4:5

METHODS BY WHICH NON-RESIDENT FISHERMEN
LEARNED OF FISHING OPPORTUNITIES IN THE YUKON

<u>Method</u>	<u>Non-Canadian</u>	<u>Non-Canadian</u>	<u>Canadian</u>
	<u>Short-Term</u>	<u>Full-Term</u>	<u>Non-Yukoner</u>
	<u>%</u>	<u>%</u>	<u>%</u>
"Milepost"	9.9	5.7	2.4
Travel Bureaus, Automobile Associations	8.0	5.7	2.4
Magazines and Other Media	25.8	20.0	19.5
Friends or Relatives	16.6	22.9	24.4
Local Residents, Guides in Yukon	4.6	-	12.2
Previous Experience	6.6	8.5	9.8
From School or Business	-	-	4.9
No Prior Information	15.2	22.9	7.3
No Response	13.3	14.3	17.1
TOTAL	100.0	100.0	100.0

It would appear from the information presented above that most Yukon residents prefer to encourage tourism in the Yukon, since, Yukon fishermen as a group, do not appear to be concerned that encouraging tourism would force them to compete with non-resident fishermen for use of their fishery resource.

CONCLUSION

In this study we have shown that the main influx of fishermen to the Yukon takes place during June, July, and August each year; that this influx provides considerable net economic benefits for residents of the Yukon creating a large number of employment opportunities and a substantial amount of income for its residents. The net economic benefits generated by the Yukon sport fishery for the Yukon economy during 1970-71 amounted to \$109,330. The present or capitalized value of the Yukon sport fishery to the Yukon, discounted at 8 percent per annum to the year 2000, is \$2,136,080. Non-resident fishermen spent about \$697,000 in the Yukon during 1970-71 and it is estimated that this created 54 full-time jobs.

Some of the expenditures made by resident sport fishermen would not have taken place if the Yukon sport fishery did not exist. When these expenditures are added to total non-resident expenditures the amount of income and profit generated by the Yukon sport fishery was \$2,042,000. This expenditure created 212 full-time or 480 part-time jobs.

In addition to the indirect benefits generated by the Yukon sport fishery, there were also a considerable amount of direct or primary benefits received by residents who participated in the fishery. It is estimated in this study that the value of a day's sport fishing to a resident of the Yukon is \$13.50. On this basis it can be estimated that Yukon residents received \$996,000 worth of free sport fishing in the Territory during 1970-71. The present or capitalized value of these free fishing benefits is \$15,300,000. This value is underestimated by the amount of direct benefits received by Canadian non-Yukoners who also fish in the Yukon. The value of the Yukon sport fishery to residents of the Yukon is enhanced considerably because of the lack of alternative recreational pursuits. Thus, it would appear that the Yukon sport fishery is an important social pastime for residents of the Yukon. This is confirmed to some degree by the fact that nearly 43 percent of the total resident

population of the Yukon sport fish at least once a year and over 50 percent of males between 20 and 60 years of age purchased fishing licences during 1970-71.

The Yukon sport fishery is also of value to the Canadian economy. During the 1970-71 sport fishing season the Yukon sport fishery generated net economic benefits of \$153,800. The present capitalized value of the Yukon sport fishery to Canada is \$3,004,930.

Throughout this presentation it has been emphasized that the impact of sport fishing on the Yukon economy is considerable. A number of commercial enterprises such as lodges, fishing camps, or resorts depend directly on the patronage of fishermen. When or if any part of the Yukon's fishery resource, is destroyed or impaired, some economic loss will occur. These are factors of which the public should be aware and also factors which must be taken into account when industrial development of any type impinges upon fish habitat or related waterways.

It should be noted that the values calculated in this presentation are based on the best possible information and the most realistic assumptions possible. There are, however, a number of theoretical and methodological limitations which do detract from the accuracy of the information. The values calculated above do not provide the reader with any indication of the economic value of a particular lake's or waterway's sport fishery. Moreover, it is not always clear just which factors are taken into account by the economic values used here. Overcrowding in specific locations may detract from the experience of one sport fisherman and add to the experience of another. One sport fisherman might enjoy the seclusion and solitude of an isolated location while the other sport fisherman prefers to share his experience with others having similar interests.

Resident sport fishermen indicated that they do not object to sharing Yukon sport fishing with people from outside of the Yukon and

other parts of the world. Furthermore, most fishermen were satisfied with the quality of fishing available to them while in the Yukon. There was no general consensus among fishermen on how administrators could improve the Yukon sport fishery. In fact, a great many non-Canadian full-term licence holders indicated that they preferred the quality of fishing in the Yukon to remain unchanged. However, since resident sport fishermen overwhelmingly preferred to catch trout and non-resident fishermen were indifferent to the species which they caught, it follows that a restocking program which concentrates on trout would enhance the enjoyment of resident fishermen without detracting from the enjoyment of non-resident fishermen.

The Yukon sport fishery is a valuable natural resource to Canada. It provides recreational opportunities for many Canadians, for people from all over the world, and particularly for residents of the Yukon. No doubt there are more valuable sport fisheries in North America and in Canada. However, none of these sport fisheries has so great a future potential. The information contained in this study has indicated that there is ample opportunity to increase the economic returns generated from the Yukon sport fishery. This requires that administrators of the Yukon sport fishery recognize the sport fishery's value and its future potential. As incomes rise and the North American people have more and more leisure time, the unique quality of sport fishing opportunities available in the Yukon will continue to increase in value. At the same time new highways and parks will increase the accessibility of the fishery resource. If a great deal of care is taken to insure that growth and development do not take place at the expense of this fishery, then Canada's future generations will receive considerable benefits from the Yukon fishery resource.

APPENDIX I

Most of the data used in this report was gathered in a mail survey carried out during the fall of 1971 and the spring of 1972. The survey consisted of a 5 percent random sample of fishermen who purchased Yukon sport fishing licences during the period April 1, 1970 to March 31, 1971. Care was taken to ensure that 5 percent of residents, Canadian non-Yukoners, and non-Canadian fishermen were included in the sample.

Two separate questionnaires were used in this survey; one of the questionnaires was directed and sent solely to non-resident fishermen. The other questionnaire was sent solely to resident sport fishermen. Canadian non-Yukoners were sent the non-resident questionnaire.

Table I:1 indicates the number of questionnaires sent to fishermen in each licence category and the number of successful returns. Nearly 90 percent of the questionnaires sent to non-Canadian full-term licence holders were successfully returned. The lowest response was from resident fishermen where the total number of useable returns was a little over 70 percent. The comparatively low rate of returns from resident sport fishermen is likely due to the transient nature of the Yukon resident population.

Chi-square tests were performed on the relationship between the response rate of the individual fisherman and the number of times the respondent fished during 1970-71. The purpose of this test is to determine whether or not there is a survey response bias. That is, to determine whether or not information gathered in this survey reflects the opinions of all sport fishermen or just the more ardent angler. Separate tests were carried out on fishermen in all four licence categories, i.e. the full-term non-Canadian licence holder, the short-term non-Canadian licence holder, the Canadian non-Yukoner, and Yukon residents. The data used in these tests are presented in Tables I:2, I:3, I:4, and I:5. The chi-square tests show that at the 95 percent confidence level there is

TABLE 1:1

SAMPLE SIZE AND QUESTIONNAIRE RETURNS

BY LICENCE CLASSIFICATION

	<u>Resident</u>	<u>Canadian Non-Yukoner</u>	<u>Non-Canadian Short-Term</u>	<u>Non-Canadian Full-Term</u>
Number of Licences	3,411	1,055	2,652	1,386
Questionnaires Sent	225	52	189	39
Questionnaire Returns	181	45	157	37
Respondents Who Did Not Fish	18	4	5	1
Incomplete Questionnaires	5	0	1	1
Total Useable Questionnaires	158	41	151	35
Response Rate: Percent of Number Sent	70.2	78.8	79.9	89.7

TABLE I:2

YUKON RESIDENT SPORT FISHERMEN ACCORDING TO
WHEN THEY RETURNED THE COMPLETED QUESTIONNAIRE AND
THE NUMBER OF TIMES THEY FISHED IN THE YUKON - 1971

<u>Reminder</u>	<u>Number of Times Respondents Fished in the Yukon - 1971</u>					<u>Total</u>
	<u>Zero</u>	<u>1 - 3</u>	<u>4 - 7</u>	<u>8 - 12</u>	<u>12 or More</u>	
No Reminder Needed	-	17	18	20	52	107
First	-	0	0	2	1	3
Second	-	5	6	6	13	30
Third	-	3	1	3	4	11
Fourth	-	0	1	0	3	4
TOTAL	0	25	26	31	73	155

TABLE I:3

CANADIAN NON-YUKONER SPORT FISHERMEN ACCORDING TO
WHEN THEY RETURNED THE COMPLETED QUESTIONNAIRE AND THE
NUMBER OF TIMES THEY FISHED IN THE YUKON - 1971

<u>Reminder</u>	<u>Number of Times Respondents Fished in the Yukon - 1971</u>					<u>Total</u>
	<u>Zero</u>	<u>1 - 2</u>	<u>3 - 4</u>	<u>5 - 10</u>	<u>11 or More</u>	
No Reminder Needed	-	20	9	2	3	34
First	-	0	0	0	0	0
Second	-	1	0	2	0	3
Third	-	1	0	0	0	1
Fourth	-	2	0	1	0	3
TOTAL	<u>0</u>	<u>24</u>	<u>9</u>	<u>5</u>	<u>3</u>	<u>41</u>

TABLE I:4

NON-CANADIAN SHORT-TERM SPORT FISHERMEN ACCORDING TO
WHEN THEY RETURNED THE COMPLETED QUESTIONNAIRE AND
THE NUMBER OF TIMES THEY FISHED IN THE YUKON - 1971

<u>Reminder</u>	<u>Number of Times Respondents Fished in the Yukon - 1971</u>					<u>Total</u>
	<u>Zero</u>	<u>1</u>	<u>2 - 3</u>	<u>4 - 5</u>	<u>More Than 5</u>	
No Reminder Needed	-	41	30	11	13	95
First	-	3	1	0	1	5
Second	-	23	10	2	5	40
Third	-	2	3	1	0	6
Fourth	-	2	0	1	2	5
TOTAL	0	71	44	15	21	151

TABLE I:5

NON-CANADIAN FULL-TERM SPORT FISHERMEN ACCORDING TO WHEN
THEY RETURNED THE COMPLETED QUESTIONNAIRE AND
THE NUMBER OF TIMES THEY FISHED IN THE YUKON - 1971

<u>Reminder</u>	<u>Number of Times Respondents Fished in the Yukon - 1971</u>					<u>Total</u>
	<u>Zero</u>	<u>7 or Less</u>	<u>7 - 9</u>	<u>10 - 12</u>	<u>13 or More</u>	
No Reminder Needed	-	16	1	6	2	25
First	-	0	0	0	0	0
Second	-	5	0	0	2	7
Third	-	0	0	0	0	0
Fourth	-	0	0	2	0	2
TOTAL	0	21	1	8	4	34

no significant relationship between the number of times fishermen fished during the 1970-71 sport fishing season and the speed with which questionnaires were returned. There does not, according to these tests, appear to be any survey bias. Despite the high percentage of useable returns and the certainty that there is no response bias the data are still subject to a certain amount of survey and sampling error. For instance, in a mail survey there are practically always some problems which result from the interpretations respondents apply to certain questions. Moreover, there is the problem of properly interpreting the results and the possibility that some of the estimates may be intentionally exaggerated. These problems do exist and obviously may detract from the accuracy of the information presented in this report. However, the reader should be aware that all the data presented in this report were subjected to careful scrutiny and the information presented is consistent with data gathered in other surveys of fishermen carried out in the past.

In addition to the information gathered in the mail survey, data gathered in a telephone survey carried out during the summer of 1972 was also utilized. For information on this survey please see Appendix I of John Boland's The Yukon Fishery Resource: Its existing Role and Its Future Potential, Economics Unit, Northern Operations Branch, Fisheries and Marine Service, Pacific Region, Department of the Environment, March, 1973, NOB/ECON 1-73.

APPENDIX II

There are three main benefits used in this study to indicate the importance of the Yukon sport fishery to the people of Canada and the Yukon. First, an estimate of the net economic benefits accruing to the Yukon and Canadian economies because of the sport fishery is presented. Second, a calculation of the discounted capitalized value of the direct (primary) benefits to the people of the Yukon. Third, calculations of the impact of sport fishing related expenditures on the income and employment of the Yukon. In this appendix the method of calculation and the assumptions necessary to make these calculations are presented for each of the three value estimates presented in the paper.

Net Economic Benefits to the Yukon and Canadian Economies

There are a number of problems associated with providing adequate estimates of the net economic benefits accruing from the Yukon sport fishery. Perhaps the most difficult problem is determining what portion of total expenditures by fishermen can be attributed to the sport fishery. Not all of the expenditures made by sport fishermen in the Yukon or Canada are made because of the Yukon sport fishery. Further, only a portion of the total expenditures that are attributable to the sport fishery actually benefit the Yukon and Canadian economies. In order to avoid some of these difficulties, in studies such as this, which attempt to ascertain the economic importance of sport fishing, sport fishermen are normally asked what is the main reason for visiting a particular area. If the fisherman states that he came to an area or region particularly to sport fish then all of the sport fisherman's expenditures are attributed to the sport fishery. If, on the other hand, the fisherman indicates that he visited the area for any reason other than to sport fish then none of his expenditures are attributed to the sport fishery. Despite the fact that in most instances lack of information makes it desirable to follow this approach it can be readily seen that there is considerable room for error. As pointed out earlier in Chapter Two, people travel for

a variety of reasons and the indicated reason for a trip does not necessarily identify the most important reason for an individual to be in a particular locality. Given this, it would seem highly unrealistic to attribute all of an individual's expenditure to a sport fishery simply because the individual happened to sport fish in a particular location while on a general vacation. Moreover, it would seem equally unrealistic not to attribute some expenditure to a sport fishery when it is recognized that an individual must make some commitment of both time and money to participate in a sport fishery. In this study, the seasonal nature of the Yukon sport fishery, the difficulties associated with gaining access to the sport fishery, and the Yukon Territory's distance from other more populated areas of North America are taken into consideration when calculating net economic benefits. For instance, it is assumed that it takes at least one additional day in the Yukon to participate in the sport fishery. This assumption, together with the knowledge gained in this study on the average expenditure per fisherman per day makes it possible to estimate the total amount of spending attributable to the Yukon sport fishery during the 1970-71 season.

In addition to this, there are difficulties involved in ascertaining precisely which expenditures would have occurred in the absence of a sport fishery. Normally this problem is avoided by using only non-resident spending to calculate net economic benefits. It is assumed that resident fishermen would spend the same amount of money on other recreational alternatives within the economy in the absence of a sport fishery. Once again, it can be readily recognized that this assumption is not necessarily valid particularly in the Yukon where only a limited number of recreational alternatives are available to residents. Therefore, it is assumed when calculating the net economic benefits to the Yukon economy that 40 percent of total resident fishing expenditures would not have been made in the Yukon had there been no sport fishery. Further, when calculating the net economic benefits for the Canadian economy it is assumed that 50 percent of total Yukon resident spending outside of the Yukon would in fact occur outside of Canada. These

assumptions are based on three factors: (1) that there are only a limited number of alternative recreational opportunities available to residents of the Yukon; (2) that many residents leave the Yukon and even Canada during the winter months for a recreational vacation in warm climates, and (3) many Yukon residents visit Alaska and British Columbia as an alternative to fishing in other locations within the Yukon Territory.

The final difficulty associated with calculating net economic benefits is determining what portion of total spending on the Yukon sport fishery provides economic benefits for the local economy. Total expenditures do not indicate the extent to which the local population and economy benefit from the sport fishery. Net economic benefits accrue only after the cost of providing goods and services consumed by fishermen is subtracted from the total amount of money spent on sport fishing. As noted in the text of this presentation, business profits were calculated at 3 percent of total expenditures in the Yukon and at 2 percent of total expenditures elsewhere in Canada. Profit on gasoline expenditures is calculated at 22 percent of expenditures in the Yukon, 26 percent of expenditures in other provinces, and at 12 percent for the federal government. The profit on alcoholic beverages is calculated at 43.6 percent for the Territory and at 12 percent for the federal government.

The Value of Free Fishing (Direct and Primary) Benefits
to Residents of the Yukon

The method used in this study to calculate the free fishing benefits received by Yukon resident fishermen starts with the estimated value of a day's fishing to resident fishermen in the Kootenay Lake area of British Columbia as estimated by Pearse and Laub.¹ This estimated benchmark value of \$6.50 per angler-day was then compared with the average expenditure per angler-day of \$12 for resident fishermen in northern

1. P. Pearse and M. Laub, op. cit. This benchmark value was developed by directly asking a sample of resident fishermen how much compensation they would require if they were to be excluded from the Kootenay Lake sport fishery. A median annual value was developed and was reduced to a value of about \$6.50 per angler-day.

British Columbia.² In the absence of direct information from Yukon residents, the assumption is made that the proportion of value to expenditures on an angler-day basis would be roughly the same for both areas. By knowing Yukon resident expenditures per day to be \$25.35, the resulting value of the activity is estimated to be about \$13.50 per angler-day in the Yukon.³

Impact of Anglers' Spending on Income and Employment in the Yukon

The absolute impact of fishing related expenditures on the amount of employment and income available in the Yukon is determined by the amount of fishing related expenditures, the size of the local income component, and the income multiplier.

The size of a multiplier for any particular region varies according to the "leakages" in the system. These leakages result from money in the system which is saved rather than spent and money which is spent on factors of production outside the local economy. In Table II:1 the portion of fishermen's spending which remains within the local economy is calculated. This is known as the local income component of total fishermen's expenditures and includes wages, salaries, profits, and rents remaining in the local economy.

The local income component in column b of Table II:1 estimates the proportion of expenditure in each category which remains in the Yukon in the form of income.⁴ The total of column c indicates that each \$100 of non-resident anglers' spending increases local incomes by \$35. The local income component then represents 35 percent of local expenditures.⁵

2. Pearse Bowden Economic Consultants Ltd., op. cit. This region is contiguous to the Yukon and probably comes closest to approximating living conditions there.

3. i.e. Where the benchmark value per angler-day is \$6.50, average expenditures per angler-day are \$12 in northern British Columbia; average expenditure per angler-day in the Yukon is \$25.35; and where n represents a comparable value per angler-day in the Yukon, then $n/\$25.35 = \$6.50/\$12.00$ or $n = \$13.50$ (approximately).

4. Estimates derived from the Yukon Territory Statistical Appendix to the Annual Report of the Commissioner, 1970-71, various tables.

5. Where local resident spending patterns differ, this figure would change but available data suggests that this figure is approximately correct.

TABLE II:1

THE LOCAL INCOME COMPONENT OF FISHERMEN'S
EXPENDITURES IN THE YUKON, 1971

	a	b	c (a x b)
	Percentage of Total Anglers' <u>Expenditures</u>	Percentage of Local Income <u>Component</u>	Local Income Component of <u>Total Expenditures</u>
1. Travel	55	20	11
2. Food and Lodging	34	50	17
3. Assoc. Expenses (goods)	4	20	1
4. Fishing Services	7	30	6
	—		—
	100		35
	==		==

It is also necessary to know the proportion of residents' total income which is spent within the Territory on the goods and services which they consume. This is estimated as being 75 percent of their income.⁶

The income multiplier is then derived from the formula $\frac{1}{1-L \cdot C}$ where L represents that proportion of local expenditure which remains in the local economy as income to residents, and C represents that proportion

6. W. J. Gillen and A. Guiccione, "The Estimation of Post-War Regional Consumption Functions in Canada", Canadian Journal of Economics, May, 1970; A. Asimakopulos, "Analysis of Canadian Consumer Expenditure Surveys", Canadian Journal of Economics and Political Science, May, 1965.

of any increase in local incomes which is spent locally.⁷ With estimated values for L of 0.35, and C of 0.75, the multiplier has an estimated value of 1.35.

Through the multiplier process, the \$35 increase in local incomes for each \$100 of non-resident anglers' spending is multiplied by 1.35 leading to a total increase in incomes of \$47.

The total business spending generated by non-resident fishermen's expenditures can be calculated in the following manner: each \$100 spent by anglers channels \$35 into local incomes and leaves \$65 to be spent by local businesses. Assuming that 80 percent of spending by retail businesses (categories 1 and 3, Table II:1) is on imports and that no spending by service outlets (categories 2 and 4, Table II:1) is on imports, then 53 percent⁸ of business spending, or \$34⁹ remains in the local economy. Then a \$100 increase in non-resident anglers' spending results in an increase in business revenues on the second round to \$60 (75 percent of \$35 plus \$34) which is increased to \$81 by the multiplier.

Non-resident anglers' expenditures of \$385,000 attributable (see page 48) to the sport fishery, thus account for \$231,000 in second round business revenues. These revenues are then multiplied on successive rounds to a total of \$312,000. Thus, total business revenues generated by non-resident spending attributable to the sport fishery during 1970-71 are \$385,000 plus \$312,000 or \$697,000. When Yukon resident expenditures which create net benefits to the Yukon (40 percent of resident spending due to the fishery) are included with non-resident expenditures then a total of \$1,128,000 of expenditures can be attributed to the sport fishery. These expenditures account for \$677,000 in business revenues in the second round. These revenues are then multiplied on

7. C. M. Tiebout, The Community Economic Base Study, Committee for Economic Development, New York, 1962, p. 59.

8. $1 - [(0.8 \times 0.59) + (0 \times 0.41)] = 0.53$.

9. $0.53 \times \$65 = \34 .

successive rounds to a total of \$914,000. Thus total business revenues generated by resident and non-resident spending which would not have occurred in the absence of the Yukon sport fishery in 1971 are \$1,128,000 plus \$914,000 or \$2,042,000.

The business revenues as calculated above create employment opportunities in the Yukon which can be measured. It is only necessary to estimate what proportion of spending occurs specifically in retail and service outlets and then apply the average amount of annual sales per employee to the appropriate portion of total expenditure.

In 1971, in the Yukon, it is estimated that one employee was required per \$31,000 of annual retail sales and \$7,000 of annual sales by service outlets. From Table II:1 it can be seen that 59 percent of total expenditures are accounted for by retail outlets (travel, and associated expenditures on goods), and 41 percent by service outlets (food, lodging, and fishing services).

Thus, as Table II:2 indicates, on the basis of sales generated, 13 jobs are created in retail outlets, and 41 jobs are created in service outlets. These represent full-time jobs but in actuality, due to the seasonal nature of sport fishing, they represent a larger number of part-time positions. The number of seasonal jobs represented can be estimated at about 40 in retail and 120 in service outlets.

When resident spending which would not be expected to occur in the Yukon in the absence of the sport fishery is included the employment opportunities due to the fishery rise dramatically. This can be seen in Table II:3.

As Table II:3 shows, expenditures generated by the sport fishery create 52 full-time jobs in retail outlets and 160 full-time jobs in services. Due to the seasonal nature of the fishery, these jobs actually represent about 156 seasonal jobs in retail outlets and about 480 seasonal jobs in service outlets.

TABLE II:2

EMPLOYMENT OPPORTUNITIES CREATED AS A RESULT
OF NON-RESIDENT PARTICIPATION IN
THE YUKON SPORT FISHERY

	<u>Sales</u>	<u>Average Sales</u>	<u>Total No.</u>
	<u>\$</u>	<u>Per Employee</u>	<u>of Jobs Created</u>
		<u>\$</u>	<u>in Yukon</u>
Retail	411,000	31,000	13
Services	286,000	7,000	41

All calculations are discounted at the rate of 8 percent per annum and calculated to the year 2000. In each case the present discounted values presented in this study allows for an annual growth in the participation rate of Yukon sport fishermen. An annual growth rate of 3 percent for resident participation in the Yukon sport fishery is used. It is assumed that non-resident participation in the Yukon sport fishery will grow at an annual rate of 5 percent.

TABLE II:3

EMPLOYMENT OPPORTUNITIES CREATED AS A
RESULT OF THE YUKON SPORT FISHERY

	<u>Sales</u>	<u>Average Sales</u>	<u>No. of</u>
	<u>\$</u>	<u>Per Employee</u>	<u>Jobs Created</u>
		<u>\$</u>	
Retail	1,616,000	31,000	52
Services	1,123,000	7,000	160

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