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The Socio-Economic Importance of Fishery Resources to the Bella Coola Valley

by
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FOREWORD

The fishery resource has always been of considerable importance to people living in the central coast area of British Columbia. Bella Coola and a number of other small central coastal communities have traditionally survived because of fish related activities. Times are changing, however, and a considerable amount of industrial development is taking place in the Bella Coola Valley. In this study, John Boland estimates the social and economic value of the fishery resource to the people of the Bella Coola Valley while taking into account changes in the valley's industrial base.

Resource managers have to be aware of a broad range of economic and social considerations which are affected by their decisions. It is intended that this study will provide decision-makers of the Fisheries and Marine Service with information which will enable them to assess the consequences of their decisions.

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Considerable help was received from Fishery Officers Gus Gjaltema and Norm Lemmen, and Fishery Guardians Harvey Mack and Bob Ratcliff.

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Valuable advice and criticism was received from David Reid, and I received assistance from David Hoare who compiled some of the data presented in this study. Sharon Walker typed and helped edit the many drafts of this report. Jerry Fung prepared the maps contained herein.

I am especially indebted to the people of the Bella Coola Valley. Their willing cooperation was essential to the preparation of this report.

John Boland
June, 1974.

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I. INTRODUCTION

The fishery resource has been a main source of food and of employment for the people of the Bella Coola Valley for generations. However, the growth of the logging industry and an increase in the number of proposed industrial developments clearly show that the structure of this valley's economy is changing. The purpose of this study is to assess the present and future importance of the fishery resource to the people of the Bella Coola Valley.[1]

The Bella Coola Valley is situated in the central coast area of British Columbia at the head of North Bentinck Arm. The central coast area (see Map 1) is one of the most isolated sections of the British Columbian coast. Bella Coola is approximately 250 miles northwest of Vancouver and roughly 150 miles southeast of Prince Rupert.

Bella Coola is a long narrow valley which extends approximately 40 miles inland from the sea (see Map 2). The mountains that surround the valley on three sides form an almost vertical wall, with elevations that exceed 5,700 feet. Much of the valley bottom consists of low lying flood plain.

The climate of the valley, like most of British Columbia's coastline, is wet and mild. Bella Coola is provided limited protection from coastal weather conditions by the Coast District Mountain Range. This tends to reduce precipitation and increase snowfall. "Average annual precipitation in Bella Coola is 61 inches, while snowfall averages 64 inches per year."[2]

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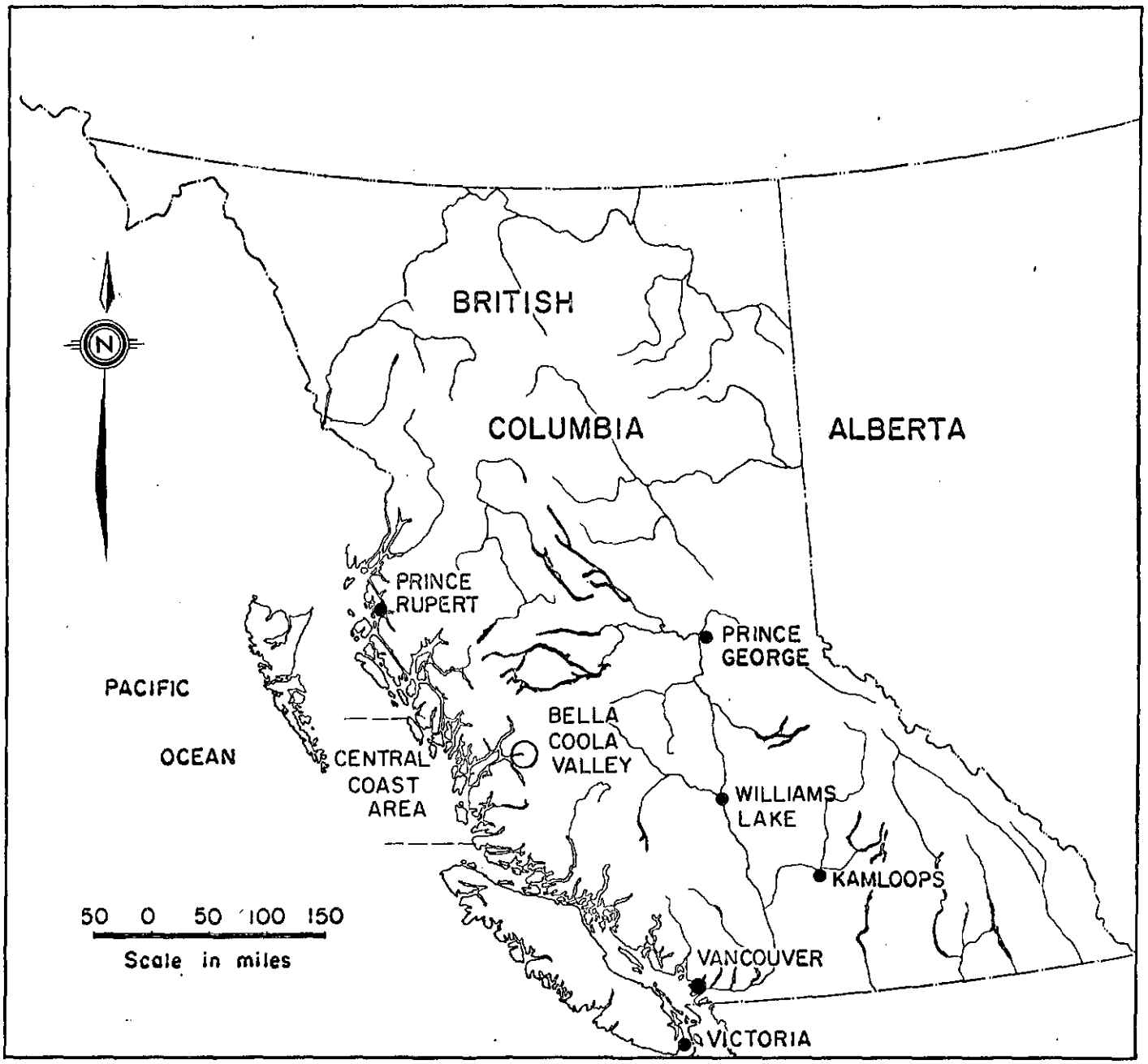
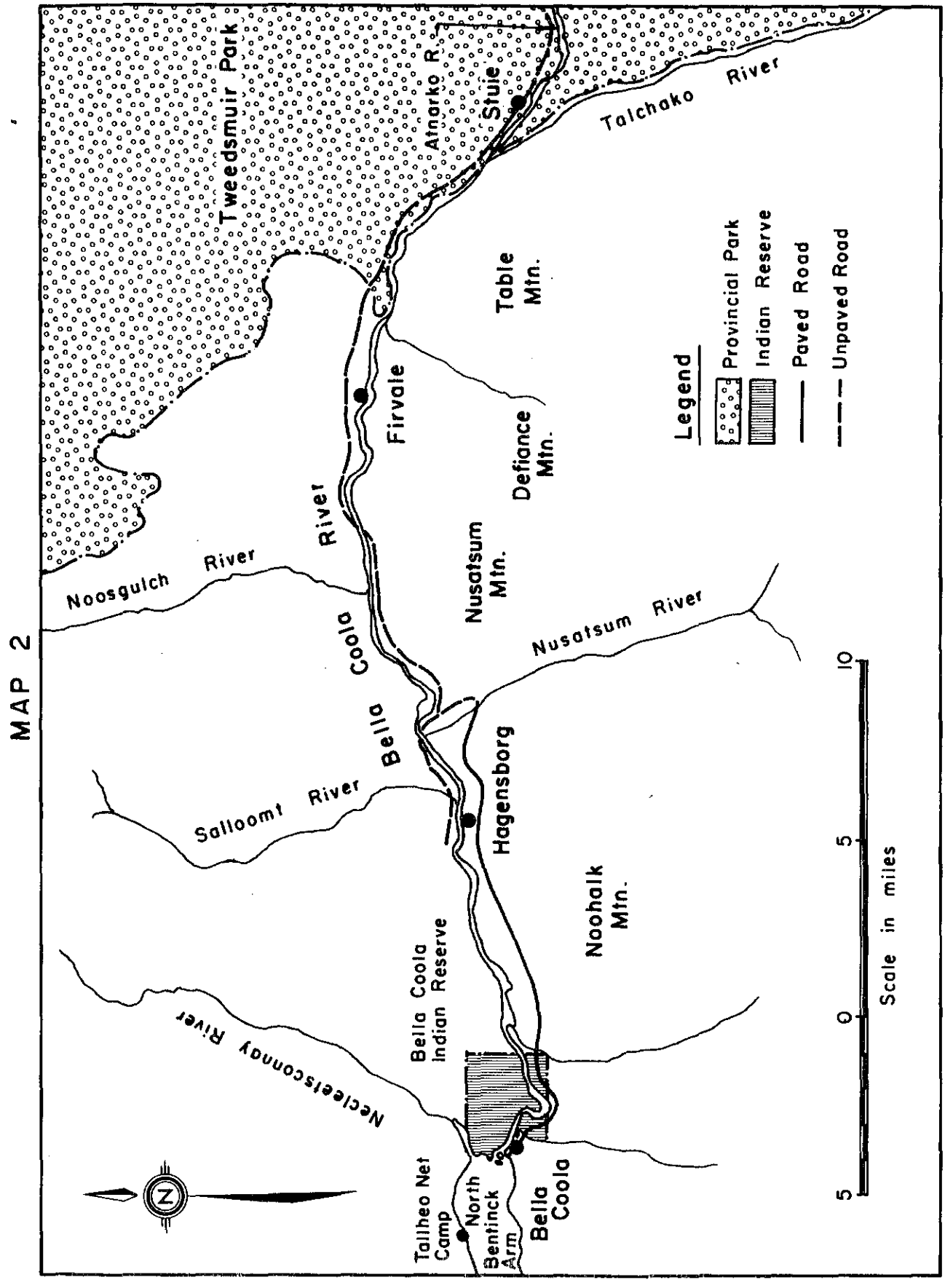
1 This report deals with the entire Bella Coola Valley from the village of Bella Coola to Stuie in Tweedsmuir Provincial Park (see Map 2). For the purpose of this report "Bella Coola" should be interpreted as meaning the entire valley. "The village of Bella Coola" refers to the single community of Bella Coola.

2 Bruce Chambers, Bella Coola-Hagensborg Sub-Regional Plan, Environmental Management, Department of Municipal Affairs, Victoria, B. C., 1972, p. 3.

MAP I



LOCATION OF THE BELLA COOLA VALLEY WITHIN B.C.



THE BELLA COOLA VALLEY

According to the 1971 National Census Survey, the Bella Coola Valley has a population of 1,533.[3] The people of the valley can be divided into three main population groups. Members of the Bella Coola Indian Band are one population group. Another group consists of the descendants of the original Norwegian settlers. More generally this group would include all those non-Indian people born in Bella Coola. The remaining Bella Coola residents are referred to locally as "outsiders" and include those people who do not have any ancestral ties with the valley. Although Bella Coola does have different identifiable groups of people, generally, there is an atmosphere of cooperation and good community spirit within the valley. This is perhaps related to Bella Coola's isolation from other areas of British Columbia.

The village of Bella Coola, located at the mouth of the Bella Coola River, is a small compact community with an established retail sector (see cover picture). Most retail establishments are located in this section of the valley. Approximately 273 people live in the Bella Coola Village. Immediately adjacent to the village of Bella Coola is the Bella Coola Indian Reserve. Although the Indian reserve stretches up the valley for approximately two miles, the majority of Indians live in a compact area immediately adjacent to the Bella Coola Village. A total of 482 Indians live on the Bella Coola Reserve.

The area between the eastern border of the Indian reserve and Hagensborg is referred to locally as "Lobelco". This section of the valley contains a residential area as well as a number of small farms and has a population of 317. The village of Hagensborg is located approximately 10 miles east of the Bella Coola Village. A few retail outlets, a small sawmill, and the valley's only high school are found at Hagensborg. The valley east of Hagensborg is more sparsely populated. The small settlement of Firvale is located approximately 15 miles east of Hagensborg. Firvale has a general store which services a few local

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3 All population data presented in this paper are taken from data reported by Statistics Canada, Census Survey, 1971.

farms. Stuie, which is located just inside the border of Tweedsmuir Provincial Park, consists of two recreational lodges. The eastern Bella Coola Valley, including Hagensborg, has a population of 461.

Two airlines provide mail and passenger service to Bella Coola. Pacific Western Airlines has a daily flight to Vancouver. Wilderness Airlines flies in from Williams Lake and also provides an air charter service throughout the central coast area. During the winter months, periods of extensive cloud cover cause air service to be irregular.

Northland Navigation Shipping Company services Bella Coola twice a week on its regular run between Vancouver and Stewart. Northland Navigation carries a considerable amount of freight to Bella Coola. A few passengers also make use of this service.

The economy of Bella Coola has always been dependent on the natural resources of the area.[4] Traditionally, fishing and agriculture, and more recently logging, have provided the primary employment in the valley. The fishing industry continues to be an important source of employment. Commercial fishing is particularly important to Bella Coola Indians who operated 50 of the 70 fishing vessels located in the valley during 1972. Furthermore, approximately 30 percent of the total male Bella Coola Indian population between 16 and 60 years of age is employed in the fishing industry.[5] A number of residents still supplement their incomes by working as part-time farmers. The logging industry also provides a considerable amount of employment for Bella Coola residents. Most employment is of a primary or extractive nature and there is only very limited secondary or processing employment in the valley.

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4 A more detailed presentation on the industries in Bella Coola appears in Section Two of the report.

5 Canada, Department of the Environment, Fisheries and Marine Service, Pacific Region, Possibilities for Native Indian Employment in the Fishing Industry in Northern British Columbia, (compiled by D. B. McEachern), 1973, PAC/T-73-14.

The remainder of this report is divided into four main sections and two appendices. Section Two uses economic base analysis to show commercial fishing's economic importance to the Bella Coola Valley. Section Three is devoted to an examination of the Bella Coola River System's subsistence fishery. Subsistence fishing's sociological and economic importance to Bella Coola and Anahim Lake Indians is outlined in this section. Section Four describes the sport fishery in the Bella Coola Valley and comments on the present status and potential of this fishery. The next section of this study summarises the report and outlines some of the developments which may occur in the valley. Appendix I describes economic base analysis and its application in this study. Finally, Appendix II outlines how the information used in this study was gathered and the procedure used to estimate Bella Coola's base income multiplier.

II. AN ECONOMIC ANALYSIS OF COMMERCIAL FISHING'S IMPORTANCE TO THE BELLA COOLA VALLEY[6]

The first group of permanent non-Indian settlers to come to Bella Coola was a group of Norwegians led by the Reverend Christian Saugstad. Their arrival in 1894 marked the beginning of the Norwegian presence in Bella Coola. Although some of these original settlers became discouraged and left the valley, the majority stayed. Many people in Bella Coola today are descendants of this first group of European settlers.

Only six years after the first settlers arrived in the valley, the first cannery was established (built in 1900). This marked the beginning of the commercial fishery centered in the Bella Coola area. Prior to this, Bella Coola Indian fishermen had been forced to fish at Rivers Inlet. In 1902, Clayton Cannery was purchased by the British Columbia Packers' Association and renamed the Bella Coola Cannery. The original cannery operated until 1930 when it was destroyed by fire. British Columbia Packers "then replaced it with a new cannery which operated until 1935 after which it operated as a net-camp".[7]

A second fish cannery was built in the Bella Coola area in 1917 by B. F. Jacobsen. It was originally called Nieumiamus Cannery, taken from the name of the adjacent creek which flows into North Bentinck Arm.[8] This establishment changed hands several times and eventually became known as Tallheo Cannery. In 1926 the Canadian Fishing Company Limited purchased Tallheo which continued to operate as a can-

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6 Economic base studies have been carried out on a number of British Columbia's coastal communities, including Bella Coola, in the past. See William F. Sinclair, The Importance of the Commercial Fishing Industry to Selected Remote Coastal Communities of British Columbia, Department of the Environment, Fisheries Service, Pacific Region, August 1971.

7 Cliff Kopas, Bella Coola, Mitchell Press Ltd., Vancouver, 1970, p. 261.

8 Cicely Lyons, Salmon: Our Heritage, Mitchell Press Ltd., Vancouver, 1969, p. 315.

nery until the mid 1930s.[9] The closure of both Bella Coola canneries was related to a coast wide process of centralisation of the canning industry.[10] Although fishing remained of prime importance to the residents of the valley, after the late 1930s there was no longer a fish processing industry in Bella Coola.[11]

The 1930s marked the beginning of logging in Bella Coola. It was during this period that a group of settlers formed the Northern Co-Operative Timber and Mills Association. The company later changed its name to the Northcop Logging Company Limited which still operates a sawmill today. The logging industry in Bella Coola expanded over the years. By 1940 Bella Coola had two important primary industries: commercial fishing and logging.

Fishing has always been an important source of employment and income. A local Bella Coola historian summarised fishing's past importance to the valley:

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9 Tallheo still operates as a net-camp today.

10 For a more detailed discussion of the centralisation of the fish canning industry in British Columbia, see William F. Sinclair, op. cit. Also see David J. Reid, The Development of the Fraser River Salmon Canning Industry, 1885 to 1913, Department of the Environment, Fisheries and Marine Service, Northern Operations Branch, Economics Unit, Pacific Region, 1973, NOB/ECON 4-73.

11 The Bella Coola people originally believed that the pulp mill located at Ocean Falls was to be built at Bella Coola. Jacobsen, the founder of Tallheo Cannery, had introduced the central coast area to a group of American investors interested in building a pulp mill. After a tour of the area it was decided that Ocean Falls was the most suitable site. "Jacobsen and the Norwegians appear to have misunderstood the plans of the company, for they (the investors) did not as the colonists believed, promise to put their plant at Bella Coola." See Bruce Ramsey, Rain People: The Story of Ocean Falls, British Columbia, Ocean Falls Centennial '71 Committee, Agency Press Ltd., Vancouver, 1971, p. 43. A pulp mill would have altered the structure of the Bella Coola economy and would probably have reduced the relative importance of commercial fishing. However, in 1912 the pulp mill went into production at Ocean Falls. It was five years later that Jacobsen built Tallheo Cannery.

> Bella Coola suffered depression or enjoyed prosperity according to the salmon run and almost disregarded what was happening in the outside world.[12]

Like central coast fishermen in general, Bella Coola fishermen have been more dependent on fishing than most other groups in British Columbia. Wages, relative to other parts of British Columbia, have been low. The predominance of seasonal industries has resulted in a high rate of unemployment during certain periods of the year. A 1970 survey of northern British Columbia fishermen summarised the recent predicament of central coast fishermen as follows:

> Central Coast district fishermen are more dependent on commercial fishing to earn a living than other Northern Operations region fishermen. However, paradoxically, they earn less fishing income. Their situation is made worse by their lack of alternative employment opportunities. Fishermen who live in the Central Coast district have limited alternative employment opportunities within the district because of a lack of industrial development and have limited opportunities elsewhere because of their lack of formal education.[13]

This study uses economic base analysis to assess commercial fishing's importance to Bella Coola. An economic base analysis divides the economic activities of a community into two groups: the basic or exporting activities and the nonbasic or service activities. The basic or exporting activities are the "area building" activities. Essentially, economic base theory holds that exports are basic to the growth of an area and that increases or decreases in population or economic activity will result from similar behaviour in the base sector. Base analysis is particularly suited to studying small isolated or semi-isolated areas with simple economic structures.[14] Nonetheless, it was necessary for

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12 Cliff Kopas, op. cit., p. 269.

13 William F. Sinclair and John P. Boland, A Socio-Economic Survey of Commercial Fishermen Living in the Northern Regions of British Columbia, 1970, Department of the Environment, Fisheries and Marine Service, Northern Operations Branch, Economics Unit, Pacific Region, June 1973, NOB/ECON 3-73, p. 48-49.

14 A detailed explanation of economic base analysis, its application in this study and why it is suitable for analysing small isolated areas is presented in Appendix I.

the purposes of this study to make one further refinement to the procedure normally adopted in economic base analysis. It was necessary to separate private income and employment from government income and employment.[15] This was necessary because large amounts of government expenditures in the valley tend to hide the true importance of locally operated private industry. Comparisons within the private sector provide a better understanding of how important an industry is to the valley.[16]

Table 1 shows total public and private basic and nonbasic employment for 1972 and 1973. It also shows total basic and nonbasic income for 1972. The proportion of basic to total employment was approximately 82 percent for both 1972 and 1973. Total gross income in Bella Coola was $4,445,000 during 1972. Nearly 85 percent of the total gross income generated in Bella Coola during 1972 was classified as basic income.

Table 2 shows all private basic employment and income for the Bella Coola Valley by industry for 1972. It also shows all private basic employment for 1973. The commercial fishing industry provided over 25 percent (or $510,000) of all private gross income during 1972. In contrast, the logging and lumber industry generated 63 percent of gross basic income. During 1972 all private basic activities together generated a total gross income of $2,022,000. The commercial fishing industry accounted for nearly 31 percent of all private basic employment

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15 For the purpose of this study, nongovernment income is defined as private income. Government income (the wages and salaries of government employees and government transfer payments) is defined as public income. The procedure used to distinguish between private income and public income is outlined in Appendix II.

16 Detailed breakdowns on private basic and nonbasic income and employment, public basic and nonbasic income and employment are shown in Appendix II (Tables II:1 and II:2). It is shown that nonbasic income and employment account for a much higher percentage of total income and employment in the private sector than in the public sector.

TABLE 1

TOTAL BASIC AND NONBASIC EMPLOYMENT 1972-1973, AND TOTAL BASIC AND NONBASIC GROSS INCOME 1972, IN THE BELLA COOLA VALLEY

	1972				1973	
	Employment		Gross Income		Employment	
	No.*	%	$	%	No.*	%
All Basic	394	82.1	3,766,000	84.7	416	81.9
All Nonbasic	86	17.9	679,000	15.3	92	18.1
TOTAL	480	100.0	4,445,000	100.0	508	100.0

* In full-time man years.

TABLE 2

PRIVATE BASIC EMPLOYMENT 1972-1973, AND PRIVATE BASIC GROSS INCOME 1972, BY INDUSTRY IN THE BELLA COOLA VALLEY

Private Basic Industries	1972 Private Basic Employment No.*	%	1972 Private Basic Gross Income $	%	1973 Private Basic Employment No.*	%
Commercial Fishing	78	30.9	510,000	25.2	76	27.8
Logging-Lumber	139	55.2	1,273,000	63.0	161	59.0
Tourism	12	4.8	59,000	2.9	13	4.8
Transportation	14	5.5	109,000	5.4	14	5.1
Other	9	3.6	71,000	3.5	9	3.3
All Private Basic Industries	252	100.0	2,022,000	100.0	273	100.0

* In full-time man years, assuming that both fishing and logging are full-time occupations.

during 1972 and more than 27 percent of all private basic employment during 1973.[17]

A more detailed indication of commercial fishing's relative importance is presented in Table 3. Table 3 shows the private basic and nonbasic direct gross incomes generated by each industry in Bella Coola during 1972.[18] Commercial fishing and logging-lumber generated over 88 percent of all private basic incomes during 1972. Nearly 80 percent of all private nonbasic gross income was earned in retail or service activities. More than 49 percent of all private gross income was generated by the logging-lumber industries while commercial fishing provided nearly 20 percent of total gross income. Service and retail activities contributed another 22 percent of the total private gross income. The total private gross income generated in Bella Coola during 1972 was $2,592,000.

When an income multiplier of 1.18 is applied to basic industry income, the total direct and indirect income provided by each individual industry can be estimated.[19] This information is shown in Table 4. According to Table 4, the commercial fishing industry was

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17 Private basic employment for both 1972 and 1973 is presented in Table 2. This data was presented because it was available. However, the reader should note that no comparison is being made between 1972 employment (or income) and 1973 employment (or income). It is impossible to make valid comparisons over a two year period because of the cyclical nature of the fishing industry. Nonetheless, as shown in Table 5 and discussed later in this section, commercial fishing incomes are rising over time. It is the opinion of the author that 1972 commercial fishing income provides a reasonable standard of comparison between commercial fishing income and other basic incomes generated within the valley. In other words, it is felt that when 1972 commercial fishing income is compared with other basic income, it does not provide a distorted picture of commercial fishing's relative importance to the people in the valley.

18 Direct income and employment is the amount of income and employment created by an injection of jobs or income into the local economy. Indirect employment or income is the amount of income or employment generated through subsequent rounds of local spending (the multiplier process) as a result of this initial injection (see Appendix II).

19 The method used to calculate this income multiplier is described in Appendix II.

TABLE 3

PRIVATE BASIC AND NONBASIC GROSS INCOME BY INDUSTRY

IN THE BELLA COOLA VALLEY, 1972

Industry	Private Basic Gross Income		Private Nonbasic Gross Income		All Private Gross Income	
	$	%	$	%	$	%
Commercial Fishing	510,000	25.2	-	-	510,000	19.7
Logging-Lumber	1,273,000	63.0	-	-	1,273,000	49.1
Transportation	109,000	5.4	25,000	4.4	134,000	5.2
Retail	23,000	1.1	252,000	44.2	275,000	10.6
Service	101,000	5.0	202,000	35.4	303,000	11.7
Finance and Insurance	-	-	61,000	10.7	61,000	2.3
Agriculture	6,000	0.3	30,000	5.3	36,000	1.4
Total Private Sector	2,022,000	100.0	570,000	100.0	2,592,000	100.0

TABLE 4

TOTAL GROSS INCOME DIRECTLY AND INDIRECTLY GENERATED BY BASIC INDUSTRIES IN THE BELLA COOLA VALLEY, 1972*

Basic Industries	Gross Income	
	$	%
Commercial Fishing	602,000	13.5
Logging-Lumber	1,503,000	33.8
Other Private Basic	282,000	6.4
All Public Basic	2,058,000	46.3
TOTAL	4,445,000	100.0

* Assuming a local income multiplier of 1.18.

responsible for generating $602,000 representing nearly 14 percent of all gross income generated in Bella Coola during 1972. The logging industry created directly and indirectly nearly 34 percent of local gross income. Public basic income accounted for 46 percent of all total gross income earned in the valley. Commercial fishing and logging-lumber together directly and indirectly generated 48 percent of all local income.

Table 5 shows both the number of commercial fishermen in Bella Coola and their average incomes for the years 1970 to 1973. It shows that the number of fishermen has remained relatively constant over that period. However, the average income per fisherman has increased significantly. The average income per fisherman in 1970 was $4,800 while the average income per fisherman in 1973 was $14,200.

Table 5 also shows that fishing income rose significantly between 1972 and 1973. There are two main reasons for this increase. The first reason for this increase was that the herring fishery was reopened in 1972 after being closed for many years. The Japanese demand for herring roe increased and this resulted in higher herring prices.[20] Second, both salmon catch[21] and the landed price of salmon[22] increased during 1973.

Although other basic industry incomes increased during 1973, the 127 percent increase in commercial fishing income is likely to be greater than the increases experienced in other basic industries. It

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20 Twelve commercial fishing vessels from Bella Coola earned a total landed value of $70,200 in the herring fishery of 1973.

21 The central coast area (Fisheries Service Statistical Areas 6, 7 and 8) has experienced much larger catches in even years than in odd years. However, the 1973 salmon catch was 8 percent higher than the 1972 catch. The 1973 salmon catch in the central coast area showed an increase of 160 percent over the 1971 salmon catch.

22 Average price per pound paid to net fishermen for salmon increased by as much as 120 percent for some species (chum salmon) and by not less than 30 percent for other species (sockeye salmon) from 1972 to 1973 on the total British Columbia coast.

TABLE 5

GROSS FISHING INCOME AND AVERAGE FISHING INCOME FOR RESIDENT BELLA COOLA VALLEY COMMERCIAL FISHERMEN 1970 - 1973[1]

	1970	1971	1972	1973	Four Year Average
Total Gross Commercial Fishing Income	$348,000	$332,500	$431,700	$981,700	$523,500
No. of Fishermen[2]	72	71	70	69	70.5
Average Income Per Fisherman	$4,800	$4,700	$6,200	$14,200	$7,400

1 The income figures presented here are simply the total gross incomes received by fishermen for their catch. Trip expenses, boat repairs, taxes, etc. have not been subtracted.

2 The number of fishermen is based on the assumption that there is only one man working each boat.

is expected, therefore, that commercial fishing probably provided considerably more than 14 percent of Bella Coola's basic income during 1973. Moreover, it would seem reasonable to expect that even though the number of Bella Coola people employed in the commercial fishing industry will experience only a modest increase in future, fishing incomes could account for a much higher proportion of total gross basic income.[23] Commercial fishing will continue to play an important role in Bella Coola's economy and the potential for increase is good.

It also appears as if logging operations will continue to expand in the Bella Coola area. Crown Zellerbach, the largest logging company in the area, plans to increase its operations by 40 percent in 1974. Both the basic employment and income attributable to logging can be expected to be considerably higher as a result. The relative importance of the logging industry in the Bella Coola Valley appears to be increasing.

This section may now be summarised. Before the first white settlers came to Bella Coola, commercial fishing was important to the people in the valley. Today, fishing and logging are Bella Coola's two most important basic industries. It is expected that employment in commercial fishing will experience only modest increases within the foreseeable future. However, commercial fishing incomes can be expected to increase in relative importance. Logging will account for a larger portion of Bella Coola's total basic employment and income in future.

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23 There are many other fishery resources in the area that could be commercially harvested in future.

III. THE IMPORTANCE OF THE SUBSISTENCE FISHERY TO BELLA COOLA AND ANAHIM LAKE INDIANS[24]

The Indian people of Bella Coola belong to the Salish nation. They are isolated from all other groups of Salish Indians by many hundreds of miles.[25] Their neighbours to the north, west and south are the Kwakiutl Indian people. The Carriers and the Chilcotin Indian peoples are their neighbours to the east. Anthropologists are unable to estimate accurately how long the Bella Coola Indian people have inhabited the valley. Long before the arrival of European explorers the Bella Coola Indian Band had developed a complex society. Their economic development was based largely on the abundance of fish resources, including salmon, steelhead trout and eulachon. Fish provided both a source of food and a valuable trading commodity:

> The eulachon run on the April full moon was the first return of summer abundance after the rigors of winter and attracted the Carrier neighbours from the eastern plateau country. These people brought with them for trade, furs and buckskin and returned with supplies of fish products. The paths they used were well-marked and called "grease trails".[26]

Thus, subsistence fishing on the Bella Coola River System has been of primary importance to the Bella Coola Indians, and to a lesser extent their eastern neighbours, the Anahim Indians, for centuries.[27]

At one time, the Bella Coola people fished for food on the Bella Coola, Atnarko, Taleomeny, Noeick, Kimsquit and Dean Rivers. How-

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24 Most of the information used in this section was obtained directly from senior members of the Bella Coola and Anahim Lake Indian people. Cooperation and assistance was received from Clayton Mack, Harvey Mack, Edward Moody, Andy Schooner Sr., Mack Squinas and Ivan Tallio.

25 For a more detailed presentation on the history of the Bella Coola Indians see: James W. E. Baker, "A Linguistic and Ethnohistoric Approach to Bella Coola Prehistory", Unpublished paper in partial fulfillment of M.A., Simon Fraser University, December 1973.

26 Cliff Kopas, op. cit., p. 5.

27 British Columbia, Department of Education, Bella Coola, British Columbia Heritage Series, Our Native Peoples, Victoria, B. C., 1971, Series 1, vol. 10.

ever, a series of smallpox epidemics drastically decreased their population and the Bella Coola people moved from a number of small settlements to one central village. This central village is the present site of the Bella Coola Indian community.

Today, the Bella Coola Indians are restricted to fishing on the lower four miles of the Bella Coola River while the Carrier Indians from Anahim Lake are restricted to the upper reaches of the Bella Coola and the Atnarko Rivers. Carrier Indians come to the valley after the annual Anahim Lake Stampede in July. Their food fishing sites are located at Stuie on the Atnarko River and at Canoe Crossing on the Bella Coola River. Unlike their Bella Coola counterparts, who use primarily drift gill nets, Anahim Lake people use set gill nets.

Table 6 lists the Indian food fish catch on the Bella Coola River System for the years 1965 to 1973. All five species of Pacific salmon are caught as well as steelhead trout and eulachons. The average annual catch of salmon and steelhead is 7,100 pieces. The relatively small number of pink salmon that return to the Bella Coola System in odd-numbered years results in smaller catches in odd-numbered years than in even-numbered years. An unusually large number of steelhead trout were caught in 1973. This was the result of mild weather, suitable water conditions and a better than average steelhead escapement. There does not appear to be any long-run change in the catch of the Bella Coola River System Indian food fishery.

All Indians living on the Bella Coola Reserve benefit from the food fishery. Of the approximately 480 on-reserve Indians, roughly 145 individuals or 30 percent actively participate in the food fishery while the remaining 70 percent receive a share of the fish caught. The Bella Coola Indians ensure that all their people have fish to eat. Some large families fish four days a week during the salmon runs and consume most of the fish themselves. Others fish very irregularly and give much of

TABLE 6

INDIAN FOOD FISH CATCH ON THE BELLA COOLA RIVER SYSTEM

BY SPECIES, 1965 - 1973*

Year	Sockeye	Coho	Chinook	Chum	Pink	Steelhead	Total Salmon and Steelhead	Eulachon
1965	2,300	1,300	800	100	800	300	5,600	200
1966	2,100	1,700	700	600	1,100	400	6,600	200
1967	2,700	400	900	100	800	300	5,200	200
1968	1,200	2,100	1,000	1,200	2,800	300	8,600	200
1969	3,200	300	800	200	200	300	5,000	100
1970	1,500	2,400	600	1,400	3,200	200	9,300	200
1971	4,000	1,600	700	600	100	200	7,200	300
1972	1,600	3,000	400	2,300	1,700	200	9,200	-
1973	3,900	1,500	200	300	100	800	6,800	200
AVERAGE	2,500	1,600	700	800	1,200	300	7,100	200

* All species shown in pieces excluding eulachon which is shown in hundredweight (CWT).

their catch away. Despite the varying degrees of participation, all Bella Coola Indian people benefit from the fishery and many depend heavily on this high protein food supply.

Approximately 50 percent (or 120 people) of all Indians living at Anahim Lake make an annual fishing trip into the Bella Coola Valley. It was estimated that the average participating Anahim family caught 150 fish per year.

The Indian people have always practised maximum utilisation of the fish caught. Almost all of the fish is used, including the head, tail and eggs. Preserving allows much of the fish caught to be consumed during the winter months. The traditional method, smoking the fish, is still used extensively. The Bella Coola people smoke their fish over alder because it produces much smoke with little heat. Canning and freezing are also popular. Most of the fish caught by Anahim people are smoked over fir.

Conservation of the resource has been of concern to the Bella Coola Indians for centuries. When the explorer Alexander Mackenzie first came down into the Bella Coola Valley he counted 19 fish traps in the river. These fish traps were an extremely effective method of catching fish. Thousands of Indians took fish from all parts of the river and conservation was a necessity. Many of the older band members have an excellent understanding of the fish resource and it is claimed that historically, fishing would be delayed until an adequate escapement to the spawning grounds was assured. It is also claimed that conservation practices, such as clearing log jams out of the river, were long ago adopted by the Indian people.

The fish caught in the Indian food fishery provide economic benefits for both Bella Coola and Anahim Lake Indians. Since the catch goes directly from the fisherman to the consumer, wholesale rather than

landed values provide a truer reflection of the economic value of this catch to the Indians involved. Table 7 lists the 1973 average annual wholesale value of the Indian food fish catch by species. The Indian food fish catch on the Bella Coola River System has an average annual wholesale value of $63,200. It is possible to calculate the stream of net economic benefits accruing to Indians benefitting from the Bella Coola food fishery. The present discounted value (to the year 2000 discounting at 8 percent) of this food fishery is $746,400.

Approximately 600 Indians benefit directly as a result of the Indian food fishery on the Bella Coola River System. Since the total catch has an average annual wholesale value of $63,200, the average Indian receives about $105 worth of fish yearly. Thus, the food fishery provides a significant income supplement for Indians from both Bella Coola and Anahim Lake.

The cultural or sociological aspects of the food fishery to the Bella Coola Indians are extremely important and many Indians consider the food fishery to be almost a sacred ancestral right.[28] Most fishing takes place during the early evening. Often a group of people will gather to watch the small skiffs drift down the river and unload their fish. Great interest is always shown in the catch. Afterwards the sharing of fish among the Indians helps heighten the sense of unity within the band.

The yearly migration into the Bella Coola Valley is an important social event for many families from the Anahim Lake Indian Reserve. The primary reason for the trip is to fish but the social activities involved make it much more enjoyable. Mack Squinas, Chief of the Anahim Lake Indians, has talked about why the young come to the valley: "The

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28 The Indians of Bella Coola claim that they were guaranteed the right to fish for food year-round on the Bella Coola River and some believe the fishing regulations (lower four miles of the Bella Coola River, four days a week, etc.) are an infringement upon these rights.

TABLE 7

WHOLESALE VALUE OF THE INDIAN FOOD FISH CATCH ON THE BELLA COOLA RIVER SYSTEM AVERAGE 1965 - 1973

Species	Average Indian Food Catch lb.	Wholesale Value* $
Sockeye	11,800	14,000
Coho	12,300	14,300
Chinook	10,900	9,700
Chum	9,900	11,200
Pink	4,700	3,500
Steelhead	3,200	2,500
Eulachon	20,000	8,000
TOTAL CATCH	72,800	63,200

* Preliminary estimates based on 1973 prices.

girls (his daughters) are just picking berries. They are on holiday and the children also".[29] For older people the trip to the valley provides a chance to socialise with Bella Coola people and renew old friendships. Life at the fish camp, although primitive, is pleasant and the trip to the valley is much like a holiday for all those involved.

The subsistence fishery on the Bella Coola River System continues to provide important sociological and economic benefits to the Indians of Bella Coola and Anahim Lake. A high rate of participation will likely also continue for many years. There is no indication that Bella Coola or Anahim Lake Indians are losing interest in subsistence fishing.

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29 Ann Piper, "Annual Migration for Gill Netting: Anahim Indians to Bella Coola", The Williams Lake Tribune, 7 August 1973, p. 2.

IV. THE IMPORTANCE OF THE SPORT FISHERY IN THE BELLA COOLA VALLEY

The Bella Coola River System provides excellent sport fishing opportunities for both local and non-resident anglers. The majority of sport fishing activity takes place on the Bella Coola River and its main tributary, the Atnarko River. Steelhead trout, chinook and coho salmon, and various species of freshwater trout are abundant in the system.

Most sport fishing takes place during June and the first two weeks of July. The Atnarko is closed to all salmon fishing between July 15 and August 31 and continues to be closed to chinook salmon fishing until October 15.[30] On September 1 the coho salmon fishery opens on the Atnarko. Large numbers of anglers participate in this coho fishery as well as in the famous Bella Coola steelhead trout fishery.

The local tourist industry relies heavily on non-resident sport fishermen. Because of poor road access only the more adventurous travellers visit the valley and the majority of them require more incentive than simply sightseeing. Tweedsmuir Lodge at Stuie is the only sport fish lodge in the valley and the owner estimates that nearly 100 percent of his business is due to sport fishermen. Visitors to Tweedsmuir Lodge fished approximately 1,400 angler-days during the 1973 season.[31] The number of visitors to Tweedsmuir Lodge has increased in each of the last three years.

Although salmon and steelhead are the major attractions for

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30 Canada, Department of the Environment, Fisheries and Marine Service, British Columbia Fish Regulations, Manual of Fisheries Acts and Regulations, Ottawa. Regulation #93 (1)(a): "No person shall fish for, take, kill, or have in his possession any salmon from the Atnarko River from July 15th to October 15th, except that a person may fish for, take, kill, or have in his possession coho salmon after August 31st from that portion of the Atnarko River downstream from fishing boundary signs situated approximately fifty yards downstream from Corboulds Bridge."

31 Any part of a single day devoted to fishing by an individual is termed an angler-day.

sport fishermen, a number of resident and non-resident anglers fish for freshwater species. During late July and early August of 1973, Fisheries and Marine Service personnel interviewed visitors to the Bella Coola Valley. At the time of these interviews salmon fishing was closed and very few steelhead were being caught. Nevertheless over 65 percent of the visitors interviewed participated in the sport fishery.

The Bella Coola and Atnarko Rivers are two of British Columbia's more important steelhead rivers. Table 8 shows the estimated number of steelhead anglers and steelhead angler-days spent on the Bella Coola and Atnarko Rivers between 1969-70 and 1972-73. Over this four year period the Bella Coola System supported an average of 3,070 steelhead angler-days. An average of 405 steelhead anglers fished the Bella Coola River each year and an average of 158 steelhead anglers fished the Atnarko River. Although steelhead angling pressure is expected to increase in the future, there has not been a significant increase in either the total number of steelhead anglers or steelhead angler-days in recent years.

Table 9 shows steelhead fishing effort on the Bella Coola System by residence classification. Between 1969-70 and 1972-73, Cariboo Coast area residents recorded over 56 percent of all steelhead angler-days on the Bella Coola System. Non-Canadians accounted for a further 23 percent. Canadian anglers from provinces other than British Columbia accounted for less than 1 percent of all steelhead angler-days.

Table 10 provides information on how the Bella Coola River ranks among all steelhead rivers in British Columbia. This rating is based on total steelhead angler participation during the period 1969 to 1973. According to Table 10, the Bella Coola River ranked thirty-first among all steelhead rivers. During the same period, among non-Canadians it rated ninth. The Bella Coola River appears to be relatively more attractive to non-Canadian steelhead anglers than it is to Canadian steelhead anglers.

TABLE 8

TOTAL STEELHEAD ANGLER-DAYS AND STEELHEAD ANGLERS
ON THE BELLA COOLA RIVER SYSTEM
1969-70 TO 1972-73[1]

	Steelhead Angler-Days					Steelhead Anglers				
	1969-70	1970-71	1971-72	1972-73	Average	1969-70	1970-71	1971-72	1972-73	Average
Bella Coola River	2,711	3,205	1,389	2,465	2,442	435	407	278	500	405
Atnarko River	802	625	409	639	618	188	141	122	179	158
Total Bella Coola System[2]	3,516	3,837	1,798	3,128	3,070					

1 The yearly fishing season (licence year) lasts from April 1 to March 31 of the next year.

2 These angler-days include small numbers reported for the Salloomt River, Snootli Creek and Talchako River in certain years. No total number of anglers for the Bella Coola System is available. Many anglers will fish both the Bella Coola and Atnarko Rivers. Therefore, the above steelhead angler figures are not additive.

Source: Steelhead Harvest Analysis, Province of British Columbia, Fish and Wildlife Branch, Victoria, B. C., 1969-70, 1970-71, 1971-72, 1972-73.

TABLE 9

NUMBER AND PERCENTAGE OF STEELHEAD ANGLER-DAYS
ON THE BELLA COOLA RIVER SYSTEM BY RESIDENCE CATEGORY
1969-70 TO 1972-73

	1969-70		1970-71		1971-72		1972-73		Average	
	No.	%	No.	%	No.	%	No.	%	No.	%
Cariboo Coast*	1,954	55.6	2,854	74.4	570	31.7	1,514	48.4	1,723	56.1
Other British Columbians	729	20.7	285	7.4	672	37.4	831	26.6	629	20.5
Non-B. C. Canadians	-	-	8	0.2	43	2.4	23	0.7	19	0.6
Non-Canadians	833	23.7	690	18.0	513	28.5	760	24.3	699	22.8
TOTAL	3,516	100.0	3,837	100.0	1,798	100.0	3,128	100.0	3,070	100.0

* The Cariboo Coast area includes the Bella Coola and Dean Rivers, Rivers Inlet, Knight and Bute Inlets, Williams Lake, Quesnel and Quesnel Lake.

Source: Steelhead Harvest Analysis, Province of British Columbia, Fish and Wildlife Branch, Victoria, B. C., 1969-70, 1970-71, 1971-72, 1972-73.

TABLE 10

THE BELLA COOLA RIVER[1] RANKED AMONG ALL BRITISH COLUMBIA STEELHEAD RIVERS BY TOTAL STEELHEAD ANGLERS AND TOTAL NON-CANADIAN STEELHEAD ANGLERS 1969-70 TO 1972-73[2]

	Bella Coola River Ranked By:	
	All Anglers	Non-Canadian Anglers
1969-70	33	9
1970-71	31	9
1971-72	37	9
1972-73	21	9
AVERAGE RANK	31	9

1 Excluding tributaries.

2 Ranked among all 384 British Columbia steelhead rivers recorded in questionnaire returns for 1967 to 1973.

Source: Steelhead Harvest Analysis, Province of British Columbia, Fish and Wildlife Branch, Victoria, B. C., 1969-70, 1970-71, 1971-72, 1972-73.

The catch per angler-day for the seasons 1969-70 to 1972-73 is given in Table 11. In the past four years no significant trend seems to have developed. Approximately three angler-days were fished on the Bella Coola River for every steelhead caught.

Precise information on the number of Bella Coola resident and non-resident anglers and their angling effort is unavailable. However, sport fishing is undoubtedly an important recreational activity for many residents. Information gathered from various local individuals suggests that the number of Bella Coola resident sport fishermen ranges between 200 and 250 anglers.[32] Calculations based on these figures imply that resident effort ranges between 2,900 and 3,600 angler-days per year.[33] Total non-resident effort is estimated to range between 8,700 and 9,400 angler-days per annum.[34] Therefore, in recent years total sport fishing effort in Bella Coola has been approximately 12,300 angler-days. Steelhead angler-days contributed an estimated 25 percent of this total, while salmon and trout fishing made up the remaining 75 percent.

The Bella Coola Valley is the service centre for the Dean River sport fishery. The Dean River, located roughly 30 miles north of Bella Coola, is renowned among sport fishermen for its summer runs of steelhead. Of the three major sport fish camps on the Dean, two are owned and operated by Bella Coola people. Wilderness Airlines in Bella Coola reports that approximately 20 percent of its business is due to

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32 These estimates are consistent with information presented in David J. Reid, The Importance of Sport Fishing to the North Mainland Coast and North Central Areas of British Columbia: An Economic Survey, Department of the Environment, Fisheries and Marine Service, Northern Operations Branch, Economics Unit, Pacific Region, 1974, PAC/T-74-11, NOB/ECON 6-74.

33 The average resident sport fisherman from the Cariboo Coast area fishes for 14.5 days per year. See Pearse Bowden Economic Consultants, The Value of Fresh Water Sport Fishing in British Columbia, Department of Recreation and Conservation, Fish and Wildlife Branch, Victoria, 1971, Study Report No. 5, p. 21.

34 Local people familiar with the sport fishery believe that steelhead angler-days account for roughly one-quarter of total angling effort. Applying this proportion to total steelhead angler-days and subtracting the estimated number of resident angler-days gives an approximation of non-resident angler-days.

TABLE 11

CATCH PER STEELHEAD ANGLER-DAY RECORDED
ON THE BELLA COOLA RIVER SYSTEM
1969-70 TO 1972-73[1]

	Catch Per Angler-Day[2]
1969-70	.35
1970-71	.26
1971-72	.41
1972-73	.37
AVERAGE	.35

1 Includes only the fish actually landed and not those fish released.

2 The total catch recorded on the Bella Coola River System was divided by the total number of steelhead angler-days for each year.

Source: Steelhead Harvest Analysis, Province of British Columbia, Fish and Wildlife Branch, Victoria, B. C., 1969-70, 1970-71, 1971-72, 1972-73.

tourists flying in to the Dean River. Considerable revenue is generated in Bella Coola because of the neighbouring Dean River sport fishery.

A portion of the Bella Coola Valley is situated in Tweedsmuir Provincial Park. Tweedsmuir Park is British Columbia's largest provincial park. It is a large wilderness park with very few facilities. Recently, however, the Parks Branch has started a program designed to improve facilities within the park. For example, a new campsite at the bottom of the "switchbacks" is under construction. Two more campsites are tentatively planned for the future. A series of hiking and riding trails are also being considered. A trail to the famous Hunlen Falls and Lonesome Lake should be completed in a few years. This park development will undoubtedly bring more visitors and more sport fishermen to the Bella Coola Valley. The potential for an increase is revealed by information provided by the Parks Branch. The Parks Branch estimates that the number of campers visiting Tweedsmuir Park increased by more than 100 percent between 1972 and 1973.

Future growth of the sport fishery and the whole tourist industry in Bella Coola depends on road development. If Bella Coola had good paved highway access the number of visitors to the valley would increase tremendously.[35] The cost of such road construction has been estimated by Highways Department personnel to be approximately $50 million. High costs will likely prevent any major road development in the immediate future. All that is planned is a gradual improvement of the existing road westwards from Williams Lake. In short, Bella Coola probably will continue to be without paved highway access for another ten years. This will serve to restrict the growth of non-resident participation in local sport fishing.

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35 It should be noted that a number of local residents are not in favour of improving the present road.

V. SUMMARY AND CONCLUSIONS

The findings of this study are summarised in this section. Section One provides a general introduction to the Bella Coola Valley. The valley is a small geographical area which is relatively isolated from other areas of British Columbia. Bella Coola's population of approximately 1,500 is concentrated in the village of Bella Coola, Hagensborg and the Bella Coola Indian Reserve.

In Section Two economic base analysis was used to study the industrial structure of Bella Coola and to assess the relative importance of commercial fishing. Although base analysis has conceptual and practical limitations many of its more serious shortcomings are avoided in this study. The valley's small simple economy and its relative isolation from other communities made it possible to use base analysis to examine Bella Coola's economy. A firm-by-firm interview procedure was adopted and the area multiplier was estimated using income data.

When base analysis was applied to information collected during the Bella Coola economic survey the importance of the commercial fishing and logging-lumber industries and government financed activities were clearly demonstrated. The commercial fishing industry provided over 25 percent of all basic private gross income during 1972, while 63 percent of basic private gross income was supplied by the logging-lumber industry. Over 46 percent of all basic gross income in the valley was provided by the public sector. Government activities, the commercial fishing industry and the logging-lumber industry supported directly and indirectly nearly 96 percent of the valley's total gross income during 1972.

The logging-lumber industry and the commercial fishing industry are expected to remain Bella Coola's two most important private sector sources of employment and income for many years. However, employment in the commercial fishing industry can be expected to grow slowly or remain

relatively constant while employment in the logging industry can be expected to increase. Nonetheless, it is expected that commercial fishing will remain very important to the Bella Coola economy. There is an excellent possibility that commercial fishing may even increase in relative importance.

Section Three described the importance of the subsistence fishery on the Bella Coola River System to the Bella Coola and Anahim Lake Indians. The total Indian food fish catch has not changed significantly in recent years. All Bella Coola Indians and approximately one half of the Indians from Anahim Lake benefit from this food fishery. Bella Coola Indians have traditionally depended extensively on fishing and have been concerned with conservation of the resource for centuries. Although both Indian groups derive important economic benefits from the food fishery, the sociological or cultural aspects of this fishery are likely far more important. Both Bella Coola and Anahim Lake Indians are keenly interested in preserving their fishing rights and a high rate of participation in this fishery is expected to continue for many years.

The sport fishery on the Bella Coola River System was described in Section Four. Excellent sport fishing opportunities for both fresh water and anadromous species are available and the majority of visitors to the valley participate in these fisheries. The Bella Coola and Atnarko Rivers are both good quality steelhead angling rivers. The Bella Coola River appears to be particularly popular among non-Canadian steelheaders. It is generally believed that chinook and coho salmon fishing accounts for more sport fishing activity than all other types of angling.

The provincial Parks Branch is currently building new recreational facilities in the Bella Coola Valley portion of Tweedsmuir Park. This park development will likely attract more visitors to Bella Coola. The valley has the potential to become one of the most popular sport

fishing areas in the province and lacks only good paved highway access. However, it seems unlikely that any major highway development will take place for at least the next few years.

The Bella Coola Valley may be on the verge of several major industrial developments. A pulp mill, saw mills, together with expanded logging operations and a major sea port are all future possibilities. A salmon enhancement program has also been proposed for the Atnarko River to increase the stocks of both commercial and sport fish salmon species. An expanded tourist industry is another future development possibility available to the people of the valley.

The limited geographical area of the Bella Coola Valley and the large amount of flood plain land constrains future development in the valley. A recent planning report on the Bella Coola-Hagensborg area concluded that future residential development should be restricted in the flood plain areas between Hagensborg and Bella Coola because of the high water table, drainage problems and the threat of flooding.[36] Future development will probably take place in the higher lands east of Hagensborg.

Clearly, all of the proposed developments could not live in harmony with each other in the limited land and water available in this valley. Some of these future industrial developments may have to be modified or restricted so as to protect the resource that traditionally has been so important to the people of Bella Coola. Although future industrial developments may reduce the relative importance of fish oriented activities, it is likely that the people of this valley will continue to depend extensively on the fishery resource for many years.

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36 Bruce Chambers, op. cit., p. 16.

APPENDIX I

ECONOMIC BASE ANALYSIS AND ITS APPLICATION IN THIS STUDY[1]

Economic base analysis is used in this study to analyse the relative importance of commercial fishing to the economy of the Bella Coola Valley. Economic base analysis separates the economic activities in a community or region into basic or export activities and into non-basic or service activities. The theoretical implication is that any growth or decline in population, employment or income is directly related to the growth or decline in the basic sector. Changes in the nonbasic sector are dependent on changes in the basic sector. The interrelationship between basic activity and nonbasic activity is normally referred to as the regional multiplier. Using income as a unit of measurement, the regional or community multiplier is expressed as:[2]

$$\frac{1}{\frac{\text{Basic Income}}{\text{Total Income}}}$$

The theory of base analysis has been widely criticised in economic literature. There are numerous difficulties associated with this theory. However, many of these serious pitfalls are overcome when base analysis is used to study the economy of a small, isolated area such as the Bella Coola Valley.[3] The following section outlines some of the major difficulties associated with base theory and discusses how this study deals with some of these problems.

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1 For an excellent introduction to the concepts and uses of economic base analysis refer to Charles M. Tiebout, The Community Economic Base Study, published by the Committee for Economic Development, Supplementary Paper No. 16, New York, December 1962.

2 For a precise explanation of how the multiplier was calculated for this study see Appendix II.

3 William F. Sinclair, "Economic Base Analysis: A Survey", unpublished paper in partial fulfillment of M.A., Simon Fraser University, February 1974, p. 20.

The usefulness of base analysis depends to a large degree on how well the assumptions, inherent in the theory, apply to the study area. The assumptions of base analysis when applied at the community level are as follows:

1. The residents of the community will spend the same portion of their income at each different income level.
2. The residents of the community will spend the same portion of their income on nonlocally produced goods and services at each different income level.
3. Local investment depends on forces outside the community such as interest rates, general economic conditions and other nonlocal factors.
4. The community's exports are a small part of the total world market and therefore local production does not affect the market.
5. The community's exports are directly dependent upon external market demands.[4]

When assumptions 1, 2 and 3 are considered, it becomes clear that base analysis is only a short-run tool. Clearly, spending levels do change over time, import substitution would likely accompany increased income, and local investment does change with internal changes in the local economy. Assumptions 4 and 5 appear to hold in the Bella Coola Valley. It can be concluded that when base analysis is used to predict long-run changes within a region the results may be misleading. However, if base analysis is used to study the impact of a particular industry on a small region's economy (a short-run analysis) the assumptions listed above need not necessarily impair the reliability of the results.[5]

Perhaps the first major procedural problem that must be overcome when base analysis is used to study an area is separating activi-

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4 William F. Sinclair, The Importance of the Commercial Fishing Industry to Selected Remote Coastal Communities of British Columbia, Department of the Environment, Fisheries Service, Pacific Region, August 1971, pp. 75-76.

5 William F. Sinclair, "Economic Base Analysis", p. 5.

ties into basic and nonbasic categories. Methods such as the minimum requirement technique[6] and location quotient technique[7] have been used in various studies with only limited success. The direct survey method appears to be the most popular and the most acceptable method of delineating basic and nonbasic activities.[8] In this study the direct survey method was used. Information was gathered in a firm-by-firm survey of businessmen located in the Bella Coola Valley.[9] This information was used to distinguish between basic and nonbasic activities.

Selection of the proper unit of measurement is another mechanical or technical difficulty encountered when applying economic base analysis.[10] Traditionally, employment and income have been the most common units of measurement. Employment statistics, however, do not take account of nonwage or salary incomes and fail to account for differences in the wage levels of various industries. Although income information does not enable calculation of the actual number of job holders it does permit all data (wages, salaries, unearned income) to be expressed in one common denominator - dollars. Income or payroll information is considered to be the most direct and, at the same time, the most accurate unit of measurement.[11] Both employment and income

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6 Edward L. Ullman and Michael F. Dacey, "The Minimum Requirement Approach to the Urban Economic Base", Papers and Proceedings of the Regional Science Association, 1960, vol. 6, pp. 175-194.

7 George H. Hildebrand and Arthur Mace, Jr., "The Employment Multiplier in an Expanding Industrial Market: Los Angeles, 1940-47", Review of Economics and Statistics, 1950, vol. 32, pp. 241-249. Also, Roger Leigh, "The Use of Location Quotients in Urban Economic Base Studies", Land Economics, 1970, vol. 46, pp. 202-205.

8 William F. Sinclair discusses various methods used to identify basic activities and concludes that although direct surveys are costly and in many cases impractical they are also the most acceptable method for identifying the basic activities. William F. Sinclair, "Economic Base Analysis", p. 13.

9 For a detailed description of this survey refer to Appendix II.

10 Richard B. Andrews, "Mechanics of the Urban Economic Base: The Problem of Base Measurement", Land Economics, 1954, vol. 30, pp. 52-60, and C. L. Leven, "An Appropriate Unit for Measuring the Economic Base", Land Economics, 1956, vol. 32, pp. 369-371.

11 William F. Sinclair, "Economic Base Analysis", p. 15.

data were obtained in the Bella Coola survey. However, for the reasons noted above, this study uses income data to develop the base multiplier.

Geographical delineation of the study area appears to be another serious difficulty associated with base analysis.[12] Defining the study area would be difficult in most regions. However, the Bella Coola Valley is physically isolated from all other areas of British Columbia. Therefore, geographical delineation does not present a problem in this study.

Another difficulty often encountered when using economic base analysis is the problem of identifying interindustry relationships. An accurate assessment of local regional economic activity implies that all direct inputs, or linkages, to export production are identified and understood. This is indeed a difficult task and is not normally accomplished. In this study identification of linkages did not present a problem. The firm-by-firm interview procedure and the comparatively simple economic structure of the local economy made it easy to identify most interindustry effects.[13]

Economic base analysis is useful for carrying out short-run studies in small geographical regions with simple economies. If base analysis is used to study large complex economies, interindustry effects, or is used for predicting population changes, then the results are often unreliable.[14] Sinclair noted that:

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12 Richard B. Andrews, "Mechanics of the Urban Economic Base: The Problem of Base Area Delimitation", Land Economics, 1954, vol. 30, pp. 309-319.

13 For example, Walter Isard said: "It is possible for the analyst using the firm-by-firm method to eliminate the first of its two multiplier components by considering local intermediate-linked components as basic (export) activity." See Walter Isard, Methods of Regional Analysis: An Introduction to Regional Science, M.I.T. Press, Cambridge, Massachusetts, 1966, p. 203.

14 Ralph W. Pfouts, "An Empirical Testing of the Economic Base Theory", Journal of the American Institute of Planners, 1957, vol. 23, pp. 64-69. Also, George Hildebrand and Arthur Mace, op. cit., and Roger Leigh, op. cit.

> Those studies which have obtained favourable results using economic base techniques have been carried out in small regions, using income or payroll data and they have been concerned with the impact of changes in economic base activity.[15]

As suggested above, this study of the Bella Coola Valley has been able to avoid most of the major shortcomings normally encountered in economic base studies. The valley's small, simple economic structure, its relative isolation from other parts of British Columbia, together with the firm-by-firm interview procedure and the development of the community multiplier using income data, help to ensure that the results are reasonably accurate.

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15 William F. Sinclair, "Economic Base Analysis", p. 19-20. Two studies which have achieved favourable results using base analysis are: Charles B. Garrison, "The Impact of New Industry: An Application of the Economic Base Multiplier to Small Rural Areas", Land Economics, 1972, vol. 48, pp. 329-337, and Steven J. Weiss and Edwin C. Gooding, "Estimation of Differential Employment Multipliers in a Small Regional Economy", Regional Economics, ed. H. W. Richardson, Macmillan St. Martin's Press, 1969, pp. 55-68.

APPENDIX II

THE BELLA COOLA ECONOMIC SURVEY: THE SEPARATION OF THE PUBLIC AND PRIVATE SECTORS INTO BASIC AND NONBASIC CATEGORIES AND THE DEVELOPMENT OF THE LOCAL INCOME MULTIPLIER

During the summer of 1973 the Economics Unit, Northern Operations Branch, of the Fisheries and Marine Service conducted a survey in the Bella Coola Valley. The purpose of the survey was to obtain information on all economic activities carried out in the valley including employment and income data.

During this survey all businesses and places of employment were personally contacted by Fisheries and Marine Service staff. The procedure was to interview the owner, manager or person in charge of an establishment. The information requested was: (1) total full-time (in man years) employment for 1972 and 1973; (2) obtain total payroll information for 1972. Excellent cooperation was received.

For the purposes of this study it is assumed that the entire commercial fishing and logging industries are basic or export activities. Similarly, the total nonlocal transportation services are classified as basic. Exports and interindustry effects are estimated for all other private sector establishments in the valley. Thus, an estimate of private sector basic employment and income is obtained and the remainder of private activities are classified as nonbasic. Although British Columbia Hydro and Power Authority is a government owned company, it was included in the private sector because it operates as an independent crown corporation.

The division of government financed activities into basic and nonbasic sectors is treated differently in various economic base studies. In most larger and more accessible communities government incomes are

relatively less important than they are in Bella Coola. Government gross incomes and transfer payments in Bella Coola provided 44 percent of total gross income in 1972. Since there are no precise rules for separating public income into basic and nonbasic categories, this appendix outlines three different methods of treating public income and, therefore, calculates three different multipliers.

Method 1 - Classifying Federal Government Income as Basic Income and Provincial and Local Government Income as Nonbasic Income

Tiebout discussed a method where only federal government activities are classified as basic.[1] He includes all state (provincial) and local government activities in the nonbasic sector. However, Bella Coola is an unincorporated area and local government activities are nonexistent. By classifying all provincial government incomes as nonbasic, a local income multiplier of 1.57 is calculated for the Bella Coola Valley. Intuitively this income multiplier is too large when compared with multipliers developed elsewhere.[2] This somewhat arbitrary method of separating public sector activities into basic and nonbasic sectors does not appear to be appropriate in Bella Coola because of the community's small population and remoteness as well as the large proportion of government income to total income.

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1 Charles M. Tiebout, The Community Economic Base Study, published by the Committee for Economic Development, Supplementary Paper No. 16, New York, December 1962, pp. 40-42.

2 The results of other studies in which income multipliers have been calculated for small areas imply that this is an unrealistically large multiplier for the Bella Coola Valley. See: Charles B. Garrison, "The Impact of New Industry: An Application of the Economic Base Multiplier to Small Rural Areas", Land Economics, 1972, vol. 48, pp. 329-337; Steven J. Weiss and Edwin C. Gooding, "Estimation of Differential Employment Multipliers in a Small Regional Economy", Regional Economics, ed. H. W. Richardson, Macmillan St. Martin's Press, 1969, pp. 55-68; and Price Waterhouse and Company, The Growth and Impact of the Mining Industry in British Columbia, Mining Association of British Columbia, Vancouver, 1968.

Method 2 - Classifying All Government Income as Basic Income

If we assumed that all government activities were financed from nonlocal sources then all public income could be considered basic income. Under this assumption local support of government activities would be considered insignificant. Using this method, the Bella Coola income multiplier would be 1.15. This multiplier appears to be more realistic than 1.57 calculated using Method 1. The large amount of government expenditures in Bella Coola and the small population imply that a relatively large portion of public sector activities were not financed locally, and therefore, the above simplifying assumption may not seriously affect the accuracy of the local income multiplier.

Method 3 - Classifying Government Income Into Basic and Nonbasic Categories According to the Source of Support

Although Method 1 clearly underestimates government basic income, Method 2 probably overestimates basic income because it does not account for any nonbasic public income. Isard outlines another method of categorising government activities into basic and nonbasic sectors:

> The "products" of...government activities are not sold on the market; hence there can be no ratio of export to local sales. However, it is possible to identify the source of support for such non-marketed activities, for example, taxes in the case of government work and state-supported schools, and to determine how much of that support comes from inside and how much from outside the community.[3]

In order to estimate the portion of government activities that are locally supported it was necessary, when using Method 3, to estimate taxes, both direct and indirect, and other revenues to governments from Bella Coola residents. Direct taxes, sales taxes, gasoline taxes, property taxes, liquor store profits, and other sources of government revenue from Bella Coola residents combined to supply $955,000 of government revenue in 1972. The provincial and federal government spent an

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3 Walter Isard, Methods of Regional Analysis: An Introduction to Regional Science, The M.I.T. Press, Cambridge, Massachusetts, 1966, p. 198.

estimated $2,549,000 in the valley during 1972 of which $1,853,000 directly became gross income for local residents. That portion of local government income that is not supported by residents of the valley is considered basic income. Because of the difficulties associated with determining whether local demand would directly support a particular job in the public sector, all government employment is assumed autonomously determined or basic (as shown in Table II:1, below).

Method 3 is chosen as the appropriate alternative for the Bella Coola Valley. Table II:1 details basic and nonbasic income and employment within the public sector. Table II:2 gives the same information for the private sector. This information was used to calculate a local income multiplier of 1.18. This multiplier (calculated using Method 3) lies within the extremes of Methods 1 and 2. It also is an intuitively acceptable estimate which - as indicated above - compares favourably with multipliers developed elsewhere.

TABLE II:1

PUBLIC BASIC AND NONBASIC EMPLOYMENT 1972-1973, AND PUBLIC BASIC AND NONBASIC GROSS INCOME 1972, IN THE BELLA COOLA VALLEY

	1972				1973	
	Employment		Gross Income[1]		Employment	
	No.*	%	$	%	No.*	%
Public Basic	142	100.0	1,744,000	94.1	143	100.0
Public Nonbasic	-	-	109,000	5.9	-	-
Total Public Sector	142	100.0	1,853,000	100.0	143	100.0

1 Includes all government transfer payments and wages and salaries to government employees.

* In full-time man years.

TABLE II:2

PRIVATE BASIC AND NONBASIC EMPLOYMENT 1972-1973, AND PRIVATE BASIC AND NONBASIC GROSS INCOME 1972, IN THE BELLA COOLA VALLEY

	1972				1973	
	Employment		Gross Income		Employment	
	No.*	%	$	%	No.*	%
Private Basic	252	74.6	2,022,000	78.0	273	74.8
Private Nonbasic	86	25.4	570,000	22.0	92	25.2
Total Private Sector	338	100.0	2,592,000	100.0	365	100.0

* In full-time man years.

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