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The October 23, 1995 deadline indicated on pages 1 & 16 of this report and on the Response Form is incorrect. Public comments will be accepted until November 15, 1995.

Kingcome Timber Supply Area Socio-Economic Analysis

July 1995

**Economics And Trade Branch
British Columbia Ministry of Forests**

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Executive Summary

Introduction

The British Columbia Forest Service is presently conducting a provincial Timber Supply Review to assist the Chief Forester in setting Allowable Annual Cut (AAC) levels in the province's Timber Supply Area (TSAs). Four reports are released for each TSA. The Timber Supply Analysis Reports (TSARs) examine the short-term and long-term effects of current forest management practices on the availability of timber for harvesting in the TSAs. The Socio-Economic Analysis (SEA) reports discuss the social, economic, and environmental implications of changing TSA timber harvest levels. The Discussion Papers summarize the first two reports and encourage public comment on the findings. Finally, the AAC Rationale Statements outline the reasoning behind the Chief Forester's AAC determinations.

This SEA report profiles the Kingcome TSA area and discusses the socio-economic and environmental implications associated with three of the timber harvest forecast scenarios presented in the Kingcome TSA Timber Supply Analysis Report. These harvest scenarios were chosen to illustrate a range of impacts; they are not meant to suggest preferred AAC levels, nor will they be the only options considered in the AAC determination.

Kingcome TSA Profile

The Kingcome TSA covers approximately 1.13 million hectares, and extends over much of northern Vancouver Island, as well as the adjacent Queen Charlotte Straits and coastal mainland area. The TSA is administered by the Port McNeill Forest District, which also has responsibility for administering extensive Tree Farm Licence holdings in the same general area. The Forest District's boundaries generally coincide with those of the Mount Waddington Regional District.

Communities - The main communities are Port Hardy (pop. 5385), Port McNeill (pop. 2816), and Port Alice (pop. 1518). The TSA's estimated 1994 population was 14 809.

Economy - Resource-based industries (fishing, mining, and particularly forestry) dominate the region's economy and employment base. Forestry plays the major role in Port McNeill and Port Alice. Port Hardy is diversified around forestry, mining, fishing, tourism, and the public sector.

First Nations - There are 11 First Nations, organized into two Councils, in the area. The locally-resident First Nations population is about 2000, comprising a relatively high 14% of the District population.

Environmental Setting - The Kingcome TSA covers a wet, mountainous area of north-central Vancouver Island and adjacent inlets on the mainland. The variation in topography, landform and climate has created a complex mosaic of ecological conditions. Forests of the TSA are primarily hemlock/balsam (56%) and red cedar (41%), with a small

amount of Douglas fir and spruce (3%). The TSA contains a rich and diverse array of wildlife, comprising various species of migratory and resident birds, mammals, amphibians, and reptiles. Rivers and tributaries provide important habitat for salmon, steelhead, rainbow trout, cutthroat trout, and Dolly Varden char, and support a growing recreational fishery. There are many attractive visual landscapes of interest to the tourism/outdoor recreation sector.

Forestry Sector

Timber from the TSA accounted for 26% of the total District harvest over the period 1992 to 1994. TFLs accounted for 46%, and Timber Licences for 25%. There are portions of seven TFLs in the District, with a combined local AAC of about 3.4 million m³. The Kingcome TSA supports an AAC of 1 658 770 m³, which is apportioned among Interfor (44%), MacMillan Bloedel (5%), Mill & Timber Products (4%), Richmond Plywood (4%), Weldwood (13%), and Western Forest Products (7%). These licensees together hold an allotment of 1 290 363 m³. The Small Business program has 21% of the AAC (339 572 m³). For the three years 1992-94, the AAC has been undercut by about 20%, mostly due to underselling in the Small Business program.

Harvest of the entire AAC would support direct employment of an estimated 2354 PY.

The 1992-94 average harvest level of 1 340 000 m³ is estimated to support a direct employment base of 1902 PY. The North Island share is 250 PY (13%); the great majority being related to timber harvesting. Another 356 direct PY (19%) are supported in the Campbell River area (mostly harvesting and pulp mill related), and 1296 PY (68%) are supported in the Lower Mainland and southern Vancouver Island (mostly in sawmills and pulp and paper mills). This underlines the fact that about 90% of the fibre leaves the North Island for processing elsewhere. Aside from Western's Port Alice pulp mill, Shushartie Log Sales near Port Hardy is the only large licence holder to carry out further processing in the North Island area.

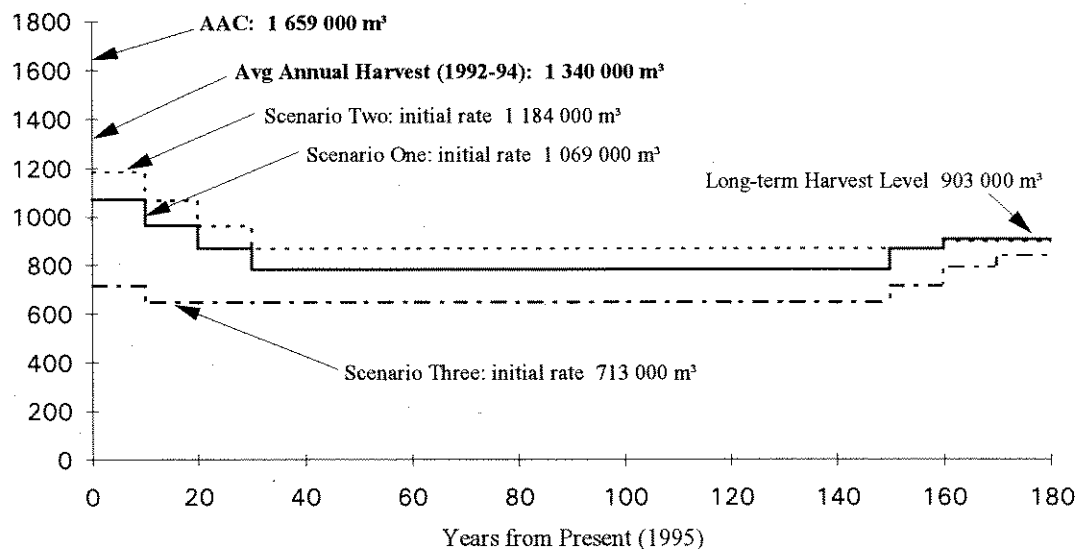
Kingcome TSA Timber Supply

The timber supply analysis shows that a large immediate decline in the allowable annual cut is required in order to avoid future disruptions in Kingcome TSA timber supply. The reduction of the timber harvesting land base by about 50%, and a long history of harvesting in the TSA, have meant that the original abundance of mature forest which historically supported harvest rates well above the long-term level no longer exists. In addition, practices implemented to accommodate non-timber forest and landscape values reduce the availability of mature timber.

Harvest Forecast Scenarios

To illustrate a range of possible impacts, this report examines three timber harvest forecasts from the Timber Supply Analysis Report (TSAR), as shown in Figure ES.1. **Examination of these particular scenarios is not intended to indicate an AAC recommendation--they are presented for illustrative and discussion purposes only.**

Figure ES.1 Kingcome TSA Timber Harvest Scenarios



Scenario One (TSAR Base Case) - Immediate harvest decline to 1 069 000 m³, a decline of 20% (271 000 m³) from the current harvest level of 1 340 000 m³, and a 36% decline (590 000 m³) from the AAC. The annual harvest falls by another 10% for each of the following three decades.

Scenarios Two and Three were generated by respectively relaxing and restricting the forest cover constraints modelled in the base case.

Scenario Two - Immediate harvest decline to 1 184 000 m³, a decline of 12% (475 000 m³) from the current harvest level (29% below the AAC), followed by three decades of 10% reductions.

Scenario Three - Immediate harvest decline to 713 000 m³, 47% (627 000 m³) under the current harvest and 57% (946 000 m³) below the AAC. After a further drop of 10% the following decade, there would be no change for 140 years.

Impacts of Harvest Scenarios

Table ES.1 summarizes the impacts of Scenario One and Scenario Two. These are grouped into sections dealing with the economy and government revenues, communities, First Nations, and the environment.

Table ES.1: Summary of Socio-Economic Impacts

	Year	Current	Scenario One		Scenario Two		Scenario Three	
			0	30	0	30	0	10
	Harvest (1000m ³)	1340	1069	779	1184	867	713	644
ECONOMIC IMPACTS								
TSA Employment (Person Years)								
Direct	250		200	146	221	162	133	120
Indirect/Induced	<u>111</u>		<u>90</u>	<u>65</u>	<u>99</u>	<u>73</u>	<u>60</u>	<u>54</u>
Total	361		290	211	320	235	193	174
TSA Employment Income (After-tax \$1994 mil.)								
Direct	\$ 9.2		\$7.3	\$5.3	\$ 8.1	\$5.9	\$4.9	\$4.4
Indirect/Induced	<u>2.3</u>		<u>1.8</u>	<u>1.3</u>	<u>2.0</u>	<u>1.5</u>	<u>1.2</u>	<u>1.1</u>
Total	\$11.5		\$9.1	\$6.6	\$10.1	\$7.4	\$6.1	\$5.5
Provincial Employment (Person Years)								
Direct	1902		1517	1105	1680	1230	1012	914
Indirect/Induced	<u>2853</u>		<u>2277</u>	<u>1659</u>	<u>2522</u>	<u>1847</u>	<u>1519</u>	<u>1372</u>
Total	4755		3794	2764	4202	3077	2531	2286
Provincial Employment Income (After-tax \$1994 mil.)								
Direct	\$ 70.5		\$ 56.3	\$41.0	\$ 62.3	\$45.6	\$37.5	\$33.9
Indirect/Induced	<u>70.7</u>		<u>56.4</u>	<u>41.1</u>	<u>62.5</u>	<u>45.8</u>	<u>37.6</u>	<u>34.0</u>
Total	\$141.2		\$112.7	\$82.1	\$124.8	\$91.4	\$75.1	\$67.9
Government Revenues (\$1994 mil.)								
Provincial Government	\$55.5		\$44.4	\$32.3	\$49.1	\$36.0	\$29.6	\$26.7
Federal Government	\$36.0		\$28.8	\$21.0	\$31.8	\$23.3	\$19.2	\$17.3

	Scenario One	Scenario Two	Scenario Three
COMMUNITY IMPLICATIONS	<ul style="list-style-type: none"> • Immediate -to-significant implications. • Direct job loss distributed 13% North Island, 19% Campbell River Area, 68% in South Island/Lower Mainland. North Island mostly harvest-related; South Island/Lower Mainland mostly processing. • In TSA, most impacts in Port Hardy and Port McNeill. • Low threat to community viability, but may compound with other destabilizing factors. 	<ul style="list-style-type: none"> • Similar to Scenario One, but smaller immediate impact. • Lowest threat to community viability. 	<ul style="list-style-type: none"> • Immediate and most significant impact. • Greatest risk to community stability, especially for Port Hardy.
FIRST NATIONS IMPLICATIONS	<ul style="list-style-type: none"> • Mixed - Preferred on the grounds of possible economic opportunity, but not on grounds related to environmental concerns, traditional forest uses, and resource conservation pending land claims negotiations outcome. 	<ul style="list-style-type: none"> • Greatest potential economic opportunity, but least preferred regarding environmental values and traditional uses. 	<ul style="list-style-type: none"> • Lowest immediate economic benefit. • Greatest protection of environmental values and traditional uses. • Preferred by groups favouring conservation pending land claims negotiations outcome.
ENVIRONMENTAL IMPLICATIONS	<ul style="list-style-type: none"> • Possible long-term loss of biodiversity and declines in old-growth dependent wildlife populations. • Possible impacts on fish habitat and community watersheds. • Possible detractions from visual landscape. • Enhanced recreational access. 	<ul style="list-style-type: none"> • Greatest environmental risk. 	<ul style="list-style-type: none"> • Least environmental risk. • Greatest flexibility for future resource management and land use initiatives.

Kingcome TSA Impacts

The analysis estimates economic impacts assuming that employment changes occur in direct proportion to harvest changes. While a number of limitations to this approach are noted in the report, this is on balance a practical and reasonably accurate method of producing benchmark estimates for discussion purposes, as is done here.

If the full AAC were being harvested, there would be an estimated 310 PY of direct employment and 139 PY of indirect/induced employment in the TSA. The current harvest level is estimated to support 250 PY of direct forest sector employment in the TSA, as well as 111 PY in indirect/induced employment. Impacts relative to current harvest levels would be as follows:

Scenario One - An immediate 20% employment drop, corresponding to 50 PY of direct employment and 21 PY of indirect/induced employment. Employment levels would follow the drop in harvest levels over subsequent decades. By Year 30 there would be a cumulative drop of about 40 %, representing about 100 direct PY and 46 indirect/induced PY. Employment income levels would follow a similar pattern.

Scenario Two - An initial drop of about 12% in employment, with the loss of about 20 direct PY and 12 indirect/induced PY. By Year 30, there would be a cumulative reduction of 35%, with the loss of about 70 direct PY and 30 indirect/induced PY.

Scenario Three - Immediate employment decline of 47%. Direct employment would fall by about 120 PY, and indirect/induced employment by about 50 PY. A further reduction of 10% would occur in Year 10, followed by employment level stability.

In comparison, if the AAC were used as a benchmark, rather than the current harvest level, employment levels would initially fall by larger amounts: about 35% in Scenario One, 30% in Scenario Two, and 55% in Scenario Three.

Provincial Impacts

Including jobs in the TSA, the current harvest level is estimated to support 1902 PY of direct forest sector employment and 2853 PY of indirect/induced employment. If the full AAC were being harvested, there would be an estimated 2354 PY of direct employment and 3531 PY of indirect/induced employment. Relative to current levels, there would be the following total (indirect and induced) impacts:

Scenario One - Total employment would fall immediately by 20%, or about 960 PY, with an associated drop in after-tax income of \$29 million. By Year 30, there would be a cumulative drop of 40%, representing a total of almost 2000 PY and \$60 million in after-tax income.

Scenario Two - The initial 12% harvest drop would produce a drop of 554 PY of total employment and about \$16 million in after-tax income. By Year 30, the cumulative reduction would be 35%, with the loss of about 1680 PY and \$50 million of after-tax income.

Scenario Three - The 47% harvest decline would result in the loss in total of about 2200 PY and \$66 million in after-tax income. There would be a further reduction of 10% in Year 10.

Government Revenue Impacts

Under Scenario One, provincial government revenues relative to current harvest levels would fall immediately by \$11.1 million, to \$44.4 million, and would continue to drop until Year 30, when they would stabilize at \$32.3 million. Under Scenario Two the initial reduction would be \$6.4 million, with further 10% drops in each of the next three decades. Provincial government revenues in Scenario Three would fall in Year 0 by \$25.9 million (47%), with an additional drop of \$2.9 million in Year 10.

Federal government revenues would follow the same harvest-related trends, falling initially by \$7.2 million under Scenario One, \$4.2 million under Scenario Two, and \$16.8 million under Scenario Three.

Community and Regional Implications

North Island - The harvest declines would result in North Island direct job losses (estimated proportionally) of about 50 PY in Scenario One, 30 PY in Scenario Two, and 115 PY in Scenario Three, with additional indirect/induced job losses of about 20 PY, 10 PY, and 50 PY, respectively. On the basis of the distribution of the current TSA-related employment base, 65%-70% of these losses would arise in Port Hardy, 20%-25% in Port McNeill, and the balance in Port Alice, Holberg, and other smaller communities.

For Port Hardy the direct job losses under Scenario One would correspond to about 7% of the locally resident forestry workers. The proportion would be 4% under Scenario Two and 15% under Scenario Three. For Port McNeill, where much of the forestry employment is TFL-related, the figure would be lower: about 2% under Scenario One, 1% under Scenario Two, and 4% under Scenario Three.

There are several forestry-based initiatives being pursued by North Island communities and organizations, focused on increasing the share of fibre for local processing beyond the present low level.

Mid Island - Direct forestry employment in the Campbell River area could fall initially by 75 PY under Scenario One, by 40 PY under Scenario Two, and by 165 PY under Scenario Three. About 65% of these would be logging jobs and about 25% would relate to pulp mill employment at Fletcher Challenge's Elk Falls mill.

South Island and Lower Mainland - Almost 70% of the direct employment base related to the Kingcome TSA is generated in the South Island or Lower Mainland (about 1300 PY). Of this, 83% (about 1100 PY) arises in sawmilling or pulp and paper operations, so the greatest impact would be on the processing sector. The current estimated fibre outflow from the TSA corresponds to the needs of 3 - 4 average-sized sawmills. Impacts could include increased mill downtime, elimination of shifts, or potential mill closures, particularly under Scenario Three, with

resulting effects on the communities and individuals involved. The South Island/Lower Mainland also accounts for most of the spin-off employment generated by the TSA harvest.

First Nations Implications

Increased involvement in a broad range of forestry-related activities is seen by many as an important means of improving the low employment and low income levels that currently exist. A number of forestry-related initiatives have been proposed or are underway that emphasize increased First Nations participation and responsibility. Varying opinion exists regarding how and when economic development goals should be achieved. To some, these goals are best pursued within the broader context of land claims negotiations. This position is combined with a general emphasis on long-run resource sustainability, on the protection of traditional fishing and hunting rights, and on reducing the ecological damage of timber harvesting (particularly in mainland areas). It is assumed that AAC determinations with large initial reductions toward the sustainable harvest level would be preferred (in particular, Scenario Three).

Others in the First Nations community would prefer more tangible and immediate economic benefits. Maintenance of the AAC at the highest possible level in the short-term would provide the most potential for economic development in the short-term, at least for ventures linked to timber harvesting or processing. Smaller initial reductions to the AAC would may also represent the lower risk to the First Nations peoples who are currently employed in the forestry sector. Scenarios One and Two appear to offer a greater opportunity to realize these aims. This position is conditional on First Nations achieving greater levels of fibre access.

Environmental Implications

The analysis of environmental implications deals mainly with the differences between harvests related to the rate harvest decline to the long-term level, and to the different underlying assumptions regarding forest cover constraints. It is limited by the frame of reference, which precludes a range of land designation (such as possible new protected areas) and management changes (for example, the Forest Practices Code) that are likely to have a major impact in the near future, and by the general lack of information on habitat and animal and plant species.

All three scenarios would ultimately involve the harvesting of much of the old-growth in the TSA. This would probably lead to a loss of biodiversity and declines in the populations and distributions of wildlife species dependent on old-growth, but may be beneficial for relatively adaptable species and species that thrive in early successional forests. Logging roads may lead to greater recreational access, placing pressure on wildlife populations and habitat. Disturbance of the forest floor and lower levels of forest cover could lead to terrain instability and water-related impacts, such as the release of sediment, possibly impairing fish habitats and affecting community water users. Harvesting may also detract from the visual landscape.

Many of these impacts would be mitigated by resource management practices in place in the TSA and by the Forest Practices Code (which was not incorporated into the timber supply analysis).

Scenario Three, with the largest immediate harvest, would probably involve lower environmental risk to wildlife and fish habitat and populations, watersheds, terrain, and visual landscapes of interest to the outdoor recreation sector (although there may be fewer access roads), and would preserve more flexibility for future resource management and land use initiatives. This conclusion is qualified by the fact that actual environmental impacts would depend mainly on where and how harvesting would occur.

Concluding Remarks

This study assesses the economic, social, and environmental impacts of changing timber harvest levels in the Kingcome TSA. The three timber supply scenarios examined could lead to significant losses in jobs, incomes, and provincial government revenues, although the timing of the losses would differ in each case. Forest Renewal BC, announced in April, 1994, was considered only in a very general way in this report, but may assist in offsetting these impacts. While reductions in harvest levels would have economic and social impacts, they would also have environmental benefits.

It should be noted that the analysis in this report considers only impacts attributable to changes in the harvest level, and assumes no change in factors such as the land base, management, harvesting and processing technology, and timber prices. A change in any of these variables, would require a re-examination of impacts.

1.0 Introduction

1.1 Background

The British Columbia Forest Service (the Ministry of Forests) is presently conducting a provincial Timber Supply Review to assist the Chief Forester in setting Allowable Annual Cut (AAC) levels in the province's Timber Supply Area (TSAs). Four reports are released for each TSA. The Timber Supply Analysis Reports (TSARs) examine the short-term and long-term effects of current forest management practices on the availability of timber for harvesting in the TSAs. The Socio-Economic Analysis (SEA) reports discuss the social, economic, and environmental implications of changing TSA timber harvest levels. The Discussion Papers summarize the first two reports and encourage public comment on the findings. Finally, the AAC Rationale Statements outline the reasoning behind the Chief Forester's AAC determinations.

1.2 Approach

This report profiles the Kingcome TSA area and discusses the socio-economic and environmental implications associated with three of the timber harvest forecast scenarios presented in the *Kingcome TSA Timber Supply Analysis Report*. These harvest scenarios were chosen to illustrate a range of impacts; they are not meant to suggest preferred AAC levels, nor will they be the only options considered in the AAC determination.

The report follows a multiple accounts approach, which focuses on a range of values derived from the forest ecosystem, and recognizes the need to consider a variety of factors when examining options for forest land management. After a presentation of profile information, separate sections (or accounts) of the report discuss the potential economic, provincial government revenue, community, First Nations, and environmental implications associated with the three harvest scenarios. The report is the result of research and interviews with key local stakeholders, including the forestry sector, the tourism/outdoor recreation sector, environmental interests, provincial government agencies, First Nations, and community representatives.

The analysis in this report considers only impacts attributable to changes in the harvest level, and assumes no change in factors such as the land base, management, harvesting and processing technology, and timber prices.

2.0 TSA Socio-Economic Profile

2.1 Regional Background

The Kingcome TSA covers approximately 1.13 million hectares, and extends over much of northern Vancouver Island, as well as the adjacent Queen Charlotte Straits and coastal mainland area (see Figure 2.1). The TSA is administered by the Port McNeill Forest District, which also has responsibility for administering extensive Tree Farm License holdings in the same general area. The Port McNeill Forest District's boundaries extend from the Brooks Peninsula on the west coast of Vancouver Island to Telegraph Cove on the east coast; and from Knight Inlet in the south to Cape Caution, on the mainland, in the north. The Forest District's boundaries generally coincide with those of the Mount Waddington Regional District (there are small boundary differences in the Naka Creek and Brooks Peninsula areas), which is the reference area for the socio-economic information presented in this section.

The Mount Waddington Regional District as shown in Table 2.1 is sparsely populated. The 1994 population has been estimated by BC Stats at 14 809 individuals. The region's population expanded steadily in the 1960s and 1970s, boosted by high levels of activity in the region's resource sectors, as well as greatly improved road access. Economic and population growth slowed in the 1980s, and a small net outflow of people was registered in the 1986-1991 census period. Population levels have stabilized and increased somewhat since the 1991 census.

Table 2.1: Mount Waddington Regional District Population Trends^a

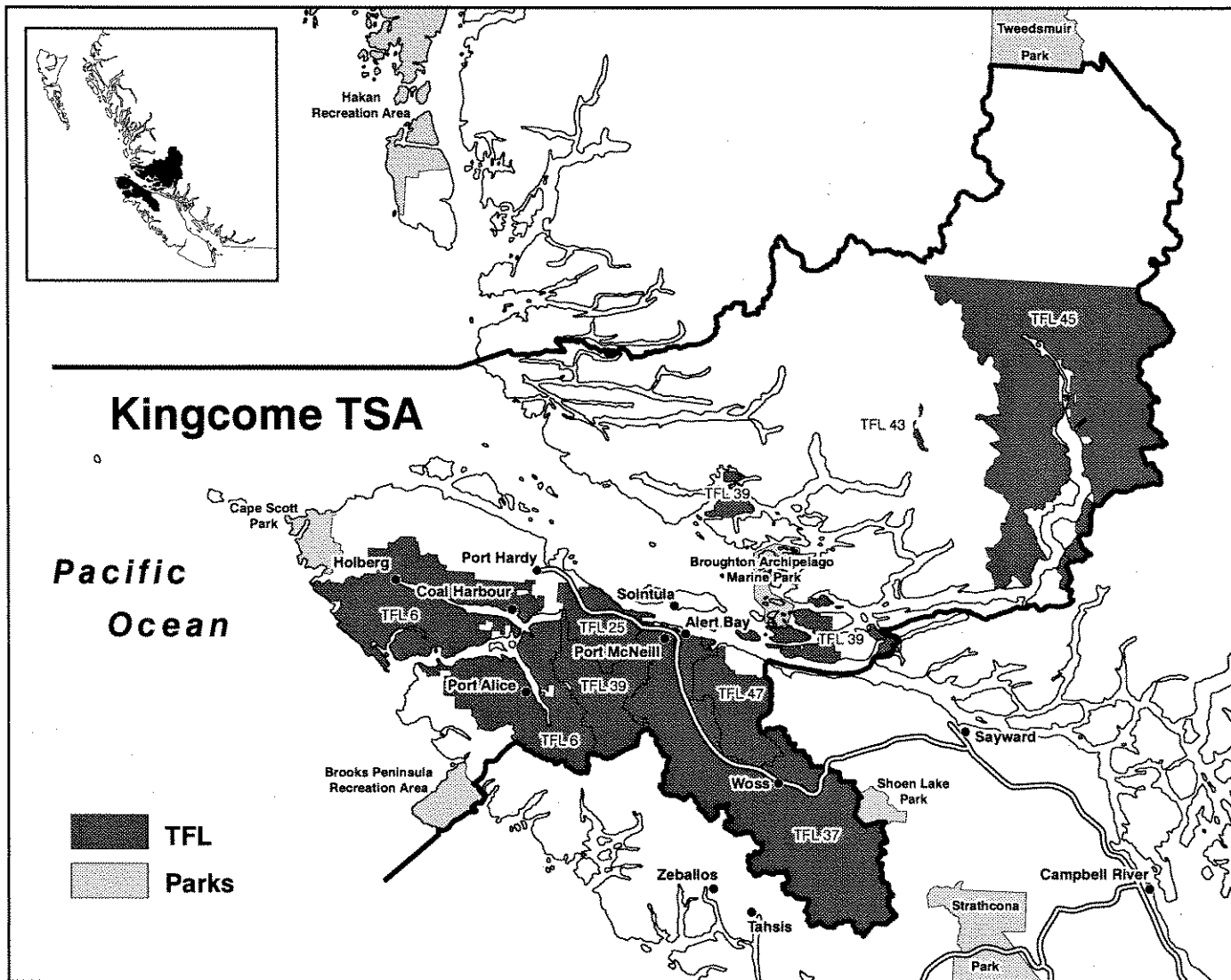
<i>Community</i>	<i>1986 Population</i>	<i>1991 Population</i>	<i>1994 Estimate</i>	<i>1986-94 Change (%)</i>
Port Hardy	5 389	5 230	5 385	-
Port McNeill	2 559	2 717	2 816	10.0 %
Port Alice	1 387	1 411	1 518	9.4 %
Alert Bay	679	647	691	1.8 %
Sub-Div. A ¹	1 098	1 039	n/a	(5.5 %)
Sub-Div. B ¹	2 430	1 506	n/a	(38.0 %)
First Nations Reserves	1 392	1 750	2 000	17.0 %
Region Total	14 934	14 300	14 809	(1.0 %)

Source: Population Section, Central Statistics Branch, Ministry of Finance and Corporate Relations (BC Stats).

Notes:

1. Sub-Division A covers the Vancouver Island portion of the TSA, and includes the small communities of Woss Lake, Holberg, Hyde Creek, and Coal Harbour. Sub-Division B covers the Mainland areas, and a group of islands in Queen Charlotte Strait (the largest of which is Malcolm Island, where the village of Sointula is located). The combined population of both of these Sub-Divisions is considered by Regional District officials to have increased somewhat since the 1991 Census.

Figure 2.1 Map of the Kingcome TSA and Adjacent TFLs and Parks



The major communities in the District are Port Hardy, Port McNeill, Port Alice, and Alert Bay. The populations of some of the smaller settlements have declined as resource activities have contracted or been consolidated in the larger centres, and as other activities (such as the Canadian Forces base near Holberg) have ceased. In some instances, the population outflow from these smaller settlements has been offset by an influx of “lifestyle” oriented individuals.

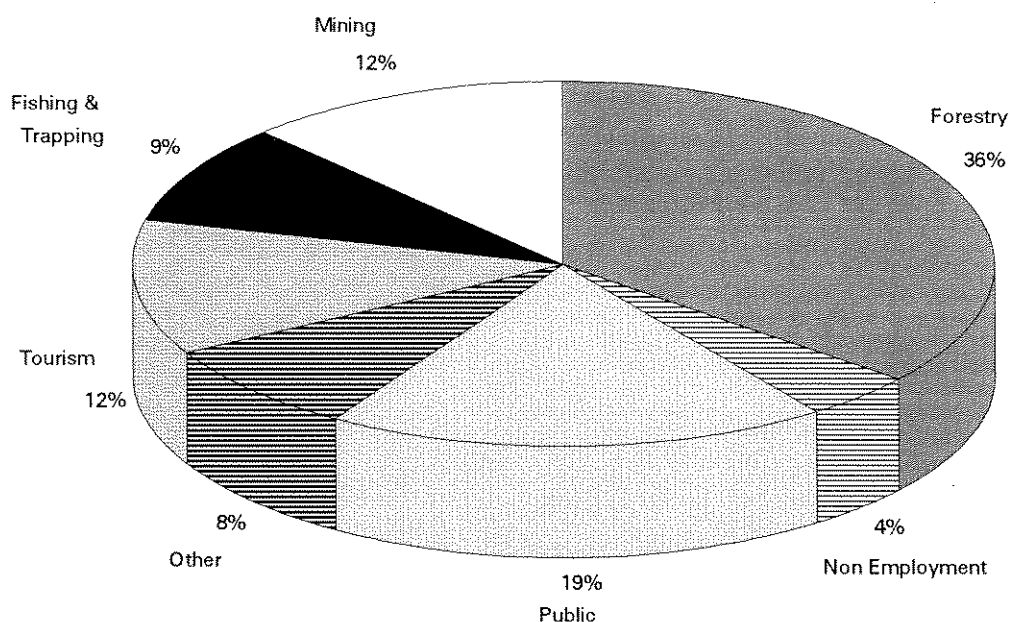
First Nations peoples comprise an important and increasing proportion of the District’s overall population. The estimated 1993 locally resident population of about 2 000 comprised almost 14% of the District’s total 1993 population, compared to about 10% in 1986. The District’s First Nation’s population is profiled in Section 3.0.

Resource-based industries (fishing, mining, and particularly forestry) dominate the region’s economy and employment base. This is shown in Figure 2.2, which indicates that in 1990 forestry-related employment accounted for 36% of total employment; mining for 12%; and fishing and trapping for 9%. Other major employment sectors were tourism (12%), and the public sector (19%).¹ The 1990 employed labour force was estimated at 6355 individuals.

Table 2.2 breaks down these figures down by community. For the three largest communities, the forestry-related employment shares were: 55% for Port McNeill; 17% for Port Hardy; and 76% for Port Alice. These shares may be different today, reflecting the employment shifts that have occurred since 1990, the most significant of which have been in forestry and in mining. These figures include all forestry-related employment, including direct forest sector jobs and jobs indirectly related to forestry. (The shares of direct forest sector jobs would be lower than those shown.)

Regional District unemployment rates were as follows: 9.5% in 1993, 10.7% in 1992, 9.5% in 1991, and 8.4% in 1990. Unemployment rates differ among communities in the region. In 1993, unemployment rates in the three larger communities were as follows: 13.5% in Port Alice; 8.6% in Port Hardy; and 10.2% in Port McNeill. With the exception of Port Alice, the 1993 Regional District and community unemployment rates were all below those of 1992 (the 1993 increase in the Port Alice rate was related to downtime at the community’s major employer, the Western Forest Products pulp mill).

¹ For the purposes of this analysis, the Kingcome TSA economy is separated into two parts - the basic, and non-basic sectors. The basic sector is defined as the component of the economy that results in the in-flow of dollars from outside the local area. Examples of income sources considered to be part of the basic portion of the economy include sawmills and pensions. Although only one is classified as industrial, both the mill worker and the pensioner receive income from sources outside of the TSA. Conversely, the non-basic sector workers earn income by selling goods and services to individuals living in the local community. A pharmacist or grocery store clerk are two examples. The basic sector is assumed to be the driver of the local economy, in that employment and income generated in the non-basic sector depends on the spending of those employed in the basic sector.

Figure 2.2 Kingcome TSA - Employment Dependencies (1990)

Source: Information from Ministry of Finance and Corporate Relations (based on 1991 Census data).

Table 2.2 Kingcome TSA - Employment Dependencies, 1990

	Forestry	Mining	Public	Tourism	Fishing & Trapping	Other	Non-Employment ¹
Alert Bay	0 %	0 %	44 %	13 %	12 %	28 %	3%
Port McNeill	55 %	0 %	20 %	13 %	4 %	4 %	4 %
Port Alice	76 %	0 %	12 %	5 %	3 %	1 %	3 %
Port Hardy	17 %	28 %	21 %	13 %	9 %	6 %	6 %
Mount Waddington Sub-Divisions A & B	44 %	0 %	14 %	9 %	19 %	11 %	3 %
Kingcome TSA	36 %	12 %	19 %	12 %	9 %	8 %	4 %

Source: Information from Ministry of Finance and Corporate Relations (based on 1991 Census data).

Notes:

1. Includes employment related to the spending of income from non-employment sources such as pensions and investments.

The Mount Waddington Regional District has a much lower proportion of its population over the age of 65 than the BC average — 2.9% compared to a provincial 1991 average of 13.1%. The proportion of youth (up to age 17) is higher than the provincial average (29.9% versus 23.1%).

The Regional District also has a higher labour force participation rate, 74.3% as compared to 65.7% for BC as a whole. This is consistent with a generally younger population.

The following section profiles the larger communities located within the Mount Waddington Regional District².

2.2 Community Profiles

Port Hardy

The District Municipality of Port Hardy (1994 population 5 385) is the largest business and service centre on the North Island. The town has regular air service to Vancouver, as well as to many coastal communities. The Island Highway (Highway 19) reaches its northern terminus in Port Hardy, which also serves as the southern terminus for BC Ferries' Inside Passage route to Prince Rupert. The town has gone through a series of growth phases, the three most significant of which followed the opening of the Island Copper Mine at nearby Rupert Inlet in 1971, the completion of the highway connection from Campbell River in 1979, and the transfer of the BC Ferries terminal to Port Hardy from Kelsey Bay, also in 1979.

The economy of Port Hardy is relatively diversified, for the North Island, with forestry, fishing, mining, tourism and recreation, public administration, and commercial and business services all playing an important role. Since 1971, the largest employer and revenue generator has been the Island Copper mine (owned by BHP Minerals Canada Limited). At its peak, the mine provided direct employment for a workforce of almost 600, and generated an annual wage bill of between \$25 and \$30 million. Because of diminished reserves, the mine is scheduled to close in March 1996, at which time the remaining workforce of about 450 will be laid off. Adjusting to the mine's closure is a priority with the Port Hardy authorities. Some out-migration may be inevitable, although views differ on the probable extent. Between 300 and 350 of the mine's remaining workforce are residents of the Port Hardy area, and of these, the general consensus among community representatives interviewed is that about one-half would leave, (more likely those that are younger or without pensions) and one-half would stay. The possible departure of 150/175 residents, along with their families, when added to the loss of spending from non-resident workers, and from BHP itself, will inevitably have repercussions for local businesses and the Port Hardy property market, which community groups are actively working to minimize. Port Hardy municipal and business/economic development groups are devoting considerable effort to devising post-mine-closure adjustment strategies for the area. The mine site, which has its own power supply and deep water shipping facilities, is the focus of a range of industrial development proposals. Mining exploration is also continuing in the general area around Port Hardy.

There has been small but steady in-migration in recent years, attracted by the town's excellent communications links, affordable property values, range of municipal services, and outdoor

² Much of the following is based on information directly provided in meetings with community and Regional District representatives.

attractions. Port Hardy is the leading service centre for the North Island, with the North Island College, the Canada Labour and Unemployment Insurance office, law courts, and the offices of several provincial government ministries (including the Ministries of the Attorney General, of Environment, Lands and Parks, of Small Business, Tourism and Culture, and of Social Services and Housing).

Port Hardy has extensive facilities for tourist accommodation, with seven hotels (with a total of 330 rooms), four RV parks, and campsites. It is an ideal location for exploring various North Island outdoor attractions, which include the nearby historic Kwakiutl village of Fort Rupert, Cape Scott Provincial Park, world class underwater diving, and ocean kayaking and canoeing. Proximity to numerous fjords and island groups make Port Hardy an ideal site for touring boats, and for attracting pocket cruise ships. BC Ferries' Inside Passage sailings ensure high hotel occupancy levels from June through September, although in a somewhat uneven pattern related to the ferries' arrival and departure schedule (every second night). Continued improvement in the area's tourism infrastructure is a priority of Port Hardy development groups. The Quatsino Sound area is seen as particularly promising from an eco-tourism perspective. A proposed North Coast trail to Cape Scott Park, through the newly designated Low Intensity and Protected areas, is also viewed as having good long-term tourism potential.

Fishing is an important part of the town's resource industry base. Because of its proximity to important Mid-Coast fishing grounds, Port Hardy is the largest commercial fishing centre on the North Island. Its resident licensed fleet is estimated by the DFO (1993) at 115 commercial vessels (not all are active), although this can increase greatly from June to October when the migratory fleet berths in Port Hardy. Expanding the marine service capabilities of Port Hardy (such as retailing and wholesaling, equipment repair) is another economic development option, along with increased local processing of the fisheries catch. Currently there are three major processing facilities: Seafoods salmon cannery; the First-Nations-owned Port Hardy Processing and Cold Storage; and Anchor Sea Farms (opened November 1994), as well as a number of unloading/ice facilities, fish-smoking plants, and net storage facilities. These processing facilities provide year-round employment for up to 100 individuals, which can more than double for a two/three month period in the summer.

The marine area surrounding Port Hardy is also important from an aquaculture perspective, and there are an estimated seven fish farms currently established in the surrounding area. The large stretches of undeveloped foreshore and ideal biological and water conditions provide the area with an abundant supply of high quality sites for raising salmon (particularly Atlantic salmon). The opening of the Anchor Sea Farm processing facility is seen by the community as a promising development. The surrounding area also offers excellent sport fishing opportunities, without the congestion that can negatively impact the experience further south. Fifteen boats are currently registered with the Port Hardy Charter Boats Association, although only two or three are full-time operators.

Forestry is a major component of the Port Hardy economy, (The Kingcome TSA forest sector is profiled in detail in Section 4, below). About 500 local residents are employed in forestry. The major local forestry employers are: Interfor, with approximately 140 harvesting and staff positions; Western Forest Products (Holberg operation), with about 40 positions held by Port

Hardy residents; Shushartie Logging, with 70 to 80 positions; MacMillan Bloedel's Port McNeill Division, to which about 40 Port Hardy residents commute; Western's Port Alice pulp mill, to which about 50 individuals commute; and a number of independent local logging operations (the larger ones including Borer and Koprino Logging), the combined employment at which is estimated at about 100 positions. In addition, there are dozens of independently employed individuals resident in the area, such as shake salvage contractors. Port Hardy also has a small independent mill (Lukwa), which presently employs an estimated 12 individuals. In addition to the direct employment provided to Port Hardy residents, the town is also a supply base for many timber harvesting operations that occur along the coast.

Port Hardy community authorities see opportunities for additional locally-controlled activity in the forestry sector, particularly through access to a Community Forest Licence, a proposal for which they have made to the Ministry of Forests. They have identified low-value or low-intensity logging sites that they believe could be logged economically by smaller, independent contractors (for example, along the North Coast Trail, and salvage sites on the mainland). They believe there is sufficient wood that could be harvested in this way to secure a steady fibre flow for existing and possibly new small mills in the area.

Port McNeill

Port McNeill is the second largest population and business centre on the North Island after Port Hardy. Its 1994 population is estimated at 2 816 individuals. The population has been relatively stable (slightly increasing) throughout the 1980's and up to the present. There has been some relocation of forestry workers to Port McNeill from more remote camps in the North Island. Immigration from outside of the North Island has been on a small scale. Local sources have noted a recent tendency for residents to remain in the area upon retirement.

Forestry operations are the leading source of employment for Port McNeill residents. The largest local employer is MacMillan Bloedel, which employs 265 individuals at its Port McNeill Division, with an estimated 85% of these residing in Port McNeill. Lemare Lake Logging, which does contract work for MacMillan Bloedel and Canfor, employs another 90 individuals, most of whom are residents of Port McNeill. Local sources estimate that about 100 Port McNeill residents are employed at Canfor's Woss Lake, Nimpkish and Beaver Cove operations. About 100 are employed by Western Forest Products (WFP) in Port McNeill and about 75 by TimberWest in nearby Kokish. Employment is also provided in the approximately half-dozen small sawmills (the largest being Highland Mills) and value-added operations in the Port McNeill area, by independent shake salvage contractors, and in tree planting. Coast Forest Management, which provides silviculture and other forestry contracting services to major licensees, maintains an office in Port McNeill which employs approximately ten individuals. Also located in Port McNeill is the District Office of the Ministry of Forests, which employs 84 individuals, most of whom are residents of the Port McNeill area.

Port McNeill's business sector is closely tied to servicing and supplying the surrounding area's timber harvesting operations. There are two float plane and three helicopter operations, and about a half-dozen heavy equipment repair and supply businesses. The overall economy of Port

McNeill is predominantly forestry-oriented, although, as compared to Port Hardy, focused relatively more on TFL rather than Kingcome TSA-based operations.

Tourism and fishing are also important to the local economy. The Port McNeill marina can accommodate up to 100 boats, about half of which in summer are likely to be non-resident (many Alaska-bound). The ferry terminal to Alert Bay is viewed as having good, longer-term tourist potential, as is the nearby Broughton Archipelago Marine Park area. Port McNeill is the major supply centre for most of the estimated 26 sport fishing lodges located on the inlets and islands of the adjacent mainland. A 1990 survey sponsored by the Regional District estimated that there were approximately 180 full-time employment positions in tourist-related businesses (hotels, restaurants, gas stations) in the Port McNeill area, and that this increases to 220 in the summertime.³ This estimate is generally consistent with 1990 estimates generated by BC Stats. As noted in another recently completed study on tourist accommodation on northern Vancouver Island, a large proportion of the "tourism" base is also supported by business and commercial traffic.⁴ One local example are the three helicopter companies based in Port McNeill, client bases are for example, forestry and sport fishing traffic.

Port McNeill's commercial fisheries sector is much smaller than that of other North Island communities such as Port Hardy or Alert Bay. Based on 1993 DFO statistics, there are 21 resident-owned commercial fishing vessels in Port McNeill (15 of which are active). Because Port McNeill historically lacked a protected breakwater, a sizeable commercial fishing fleet never developed there. The relatively sheltered waters of the Broughton Archipelago and surrounding area support an estimated 15 fish farms, many of which provide employment to Port McNeill residents. Residents are also employed at the many fishing lodges located on the nearby mainland (generally for a two or three month period in the summer). There is a small number of fishing charter operations also based out of Port McNeill.

The Port McNeill School District is the largest public sector employer in Port McNeill. The next largest is the Ministry of Forests (84 positions), followed by the Port McNeill and District Hospital (about 35 individuals). Other public sector employees include the Mount Waddington Regional District, local government, and the Mount Waddington Community Futures branch.

Port Alice

The village of Port Alice is located on Neroutsos Inlet, approximately 50 kilometres south of Port Hardy, off Highway 19. It has an estimated population of 1518. The village was originally built in 1918 as a townsite for the original pulp mill; it was rebuilt at a new site as an instant municipality in 1965. The deep sea port is a major asset, and 95% of the Western Forest

³ Steve Mossop, *A Report on North Vancouver Island Tourism*, prepared for the Economic Development Committee of the Regional District of Mount Waddington, 1990.

⁴ *Supply and Demand Analysis for Accommodations - Northern Vancouver Island*, prepared by Mary Murphy Communications and Information Services for the Ministry of Small Business, Tourism and Culture, February 1995.

Product's pulp mill's production is exported offshore. The pulp mill dominates the village's economy, providing full-time employment to almost 500 individuals. About 80% are residents of Port Alice, 15% are from Port Hardy or Port McNeill, and another 5% (mainly younger shift workers) are residents of the Mid-Island area (Campbell River, Courtenay). The annual wage and benefits bill is approximately \$33 million a year. The mill provides over 70 % of the village's tax base (amounting to \$1.2 million in 1994). It is by far the most substantial wood processing operation in the North Island, and without it, the community of Port Alice as it is today would not exist.

The Western Forest Products pulp mill is the only sulphite mill remaining in the British Columbia. It produces a unique product range that has a more stable market cycle than standard kraft pulp. The mill has incurred over \$60 million in capital expenditures over the last ten years, dedicated to meeting new chlorine effluent and other pollution control regulations (which enter into effect in 1996), and general mill upgrades. Production capacity has increased from 140 000 tpa (tonnes per annum) to 160 000 tpa. Because of a combination of weak pulp markets (no longer the case), and fibre supply shortages, production downtimes and short-term layoffs have been in effect for the last three years. By early 1995, the mill was again approaching full production, although constrained by a shortage of fibre supplies. The mill's full capacity fibre requirement is 925 000 m³. On average, about 40% is supplied from Doman/Western tenures (particularly TFL 6), another 50% from other BC purchases, and about 10% from Alaska. Future fibre supply constraints could jeopardize the additional environmental investments needed by 2002 (to eliminate discharge of chlorinated organic compounds), and the capacity expansion required to justify such investments.

Aside from the pulp mill, the major sources of employment for Port Alice residents are: forestry (Western's Quatsino dryland sort and Jeune Landing operation, one silviculture contractor, and about six independent log hauling/falling/shake contractors); local government administration (including a school and a hospital); and retail, construction, and other services. One aquaculture facility and a small salmon hatchery are located at the head of Neurotsos Inlet, near Port Alice. Although currently under-developed, the area surrounding Port Alice has tourism potential. Mahatta River and the West Coast can be reached via a one and a half hour drive by logging road, passing some spectacular scenery. Several campsites suitable for RV's are found close to the village (at Marble River, Link River, and Spruce Bay), which also has a boat launch ramp for access to the fishing in Neurotsos Inlet or Quatsino Sound. The local economic development committee is examining the creation of a charter boat operation, as well as encouraging the establishment of bed and breakfast facilities. A new residential sub-division is also being considered. Another economic development initiative being considered is a wood-industry industrial park.

Alert Bay

Alert Bay (population 691) is situated on Cormorant Island about 10 kilometres offshore from Port McNeill. The village of Alert Bay has a long history as a communications and transportation centre for the North Island area, which predated the opening of road access to Port McNeill and Port Hardy. Because of its early development, Alert Bay retains a unique historical and cultural heritage, which underpins its continued development as a tourist attraction. The population of

Cormorant Island is about 1300, approximately half of whom reside in the village of Alert Bay. The Island is home to a large First Nations population, the largest component of which is affiliated with the Namgis First Nation. The Namgis and some other First Nations, as well as the Musgamagw-Tsawataineuk Tribal Council, maintain their administrative centres on Cormorant Island.

Commercial fishing is the dominant economic activity in the village of Alert Bay. Based on 1993 DFO statistics, the village has 48 resident-owned commercial fishing vessels, although significantly more can be stationed there during the peak fishing season. Three fish processing companies have operations in Alert Bay. The island has one identified (non-native) small logging contractor, and the other primary source of forestry-related employment for local residents is a local silviculture contractor (Marlita Forestry Ltd.).

Sointula

The community of Sointula (1991 population 672) is situated on the south shore of Malcolm Island (with a population of about 1000). It is accessible by ferry to Port McNeill and Alert Bay. The local economy is dominated by the commercial fishing industry, and Sointula has the second largest resident-based fleet on the North Island (estimated at 86 vessels in 1993). There are an estimated five small logging contractors resident on Malcolm Island, and a proposal for a Community Forest Licence is under preparation.

Hyde Creek

The community of Hyde Creek (1991 population 247) is located approximately 10 kilometres south of Port McNeill, off Highway 19. It has a small concentration of small milling operations (for example, Baer Woodworking, and Fred Poirier Lumber), and has an industrial park with available lots for small-scale forestry and related operations such as trucking. The adjacent Nimpkish Heights is the site of a large new residential sub-division.

Woss Lake

Located at the southern end of the Port McNeill Forest District, Woss Lake is the operational centre for Canfor's TFL 37 logging operations in the Nimpkish Valley area, as well as for smaller Strathcona TSA operations. The community began as a logging camp in 1948, when Canfor established its Englewood Logging Division. The 1991 census population estimate was 354 (local sources place it higher), about half of whom are Canfor employees. A trend to commuting from larger population centres (particularly Port McNeill) has been in evidence in recent years. The Englewood Division has recently been affected by a variety of logging delays and curtailments in its operating areas. The community has an elementary school, and is considering municipal incorporation (basic services such as water and sewage are currently supplied by Canfor, which also supplies rental housing). Consideration is being given to upgrading the nearby Mount Cain ski hill and area accommodation facilities.

Other Communities

These include Coal Harbour (1991 population 206), Holberg (1991 population 173), and Winter Harbour and Telegraph Cove/Kokish. Coal Harbour is within daily commuting distance of Port Hardy, and residential construction is steady. Local residents are employed in the fishing and forestry sectors. Holberg is the principal base camp for Western Forest Products' TFL 6 and Kingcome TSA logging operations; it is also the nearest sizable community to Cape Scott Provincial Park. The San Josef Canadian Forces base was located 8 kilometres away, but is now closed. Winter Harbour on Quatsino Sound is a fishing centre (with 5 registered commercial boats in 1993). Telegraph Cove is a popular tourist centre, and is famous for its Johnstone Straits whale watching charters. Smaller centres (primarily logging or fishing camps) include Quatsino, Nimpkish, and Vernon.

3.0 First Nations Profile

There is a large First Nations presence in the Port McNeill Forest District. Table 3.1 lists the eleven First Nations whose traditional territories lie largely or exclusively within the boundaries of the District.⁵ In early 1995, when this information was collected, six of the 11 First Nations were affiliated with the Kwakiutl District Council and five with the Musgamagw-Tsawataineuk Tribal Council. The following material profiles the eleven First Nations in the TSA. The federal Department of Indian and Northern Affairs estimates the combined population (1993) of these eleven First Nations at 4043 individuals. Of that total, approximately 2000 reside on reserves that are located within the Forest District's boundaries (this includes 250 to 300 individuals who reside on the Whe-La-La-U reserve near Alert Bay, which is unattached to any specific First Nation).⁶ Many of those living off-reserve are residents of Campbell River and Vancouver. The First Nations population has been increasing steadily over the last decade, due to natural increase and an increasing trend of band members living in urban centres returning home. These general trends are expected to continue.

Kwakiutl District Council

Quatsino First Nation: The Quatsino First Nation's traditional territories are located in the general Quatsino Sound/Cape Scott area, west of Port Hardy. There are 19 reserves in all. The main reserve is located close to Coal Harbour, and has an estimated 205 residents; the other reserves are not permanently populated. Total population (1993) is estimated at 307 individuals. Band members have a tradition of forestry work, which, along with fishing, has been the main source of employment and income. About 25 Band members are presently employed by Western Forest Products, in logging and silviculture (TFL tenures), and at the dryland sort at Western Forest Products' Port Alice pulp mill. The Quatsino First Nation has recently signed a contract to log 30 000 cubic metres per year for Western Forest Products. In addition, Western Forest Products has committed to provide 2000 person-days of silvicultural work to band members. An estimated ten trained loggers are currently unemployed, or temporarily employed in the fishing industry. There is a small Band-owned woodlot on the reserve.

Band representatives have expressed a strong interest in expanding forestry-based activities.⁷ Identified areas of interest include access to the Small Business Program in the Kingcome TSA and contract logging on Western's TFL lands. The log home market is viewed as having potential, including the construction of log homes for the main Quatsino reserve. Studies have

⁵ This list excludes the Oweekeno Band, a small part of whose traditional territories extend into the northernmost parts of the District (the Rivers Inlet area). The Oweekeno Band is unaffiliated with either the Musgamagw-Tsawataineuk or Kwakiutl Tribal Councils.

⁶ First Nations sources (Musgamagw-Tsawataineuk Tribal Council) view these Department of Indian and Northern Affairs population estimates as understated.

⁷ Ralph Wallis, Forestry Manager, Quatsino band.

been commissioned with this end in mind, and joint venture partners are actively being sought. A pool of trained labour, as well as some Band-owned logging equipment, are cited as positive factors.

The main sources of additional employment are Band administration, fishing (Band members own an estimated five commercial boats), the Port Hardy Processing and Cold Storage plant in Port Hardy, and occasional sub-contract trucking work.

Table 3.1: Kingcome TSA—First Nations Population

First Nation	Location	Population (1993)	On-Reserve
<i>Kwakiutl District Council</i>			
Quatsino	Coal Harbour	307	205
Tanakteuk	Alert Bay	147	7
Kwakiutl	Port Hardy	511	266
Gwa'sala-Nakwaxda'xw	Port Hardy	472	353
Tlatlasikwala	Hope Island	38	3
Mamalelegala-Qwe-Qwa Sot-Enox	Campbell River	278	n/a
<i>Musgamagw-Tsawataineuk Tribal Council</i>			
Kwa-wa-Aineuk	Hopetown	24	19
Kwicksutaineuk	Gilford Island	244	40
Namgis Band	Alert Bay	1 321	718
Tlowitsis-Mumtagila	Alert Bay	272	80
Tsawataineuk	Kingcome Inlet	429	111
Total		4 043	1 722

Source: Department of Indian and Northern Affairs (1993)

Gwa'sala-nakwaxda'xw First Nation: This First Nation has 26 reserves located mainly on northern Vancouver Island. An estimated 353 of the total population (1993) of 472 reside on the Tsulquate reserve, situated just outside of Port Hardy. Traditional territories are on the Mainland, in the general area between Smith and Seymour Inlets. The major source of employment and income is fishing, and Band members own and operate approximately a dozen fishing boats. A few are employed in the freezer plant in Port Hardy. Although without any significant background in forestry, this First Nation is interested in increasing its involvement, and is collaborating with the Quatsino First Nation in preparing business submissions to the Port McNeill Forest District that would access wood under the Ministry's Small Business Forest

Enterprise Program (SBFEP)⁸. The Gwa'sala-nakwaxda'xw First Nation has completed a brushing contract with the Ministry of Forests and are about to embark on a stream management project on the Tsulquate River.

Kwakiutl First Nation: The Kwakiutl First Nation has eight reserves, the largest of which is at Fort Rupert, approximately 12 kilometres south of Port Hardy. An estimated 266 of the total population (1993) of 511 reside on this reserve. Fishing comprises the main source of employment and income, although there is some employment in logging and silviculture work—some band members took part in recent logging on band reserves at Fort Rupert and on Malcolm Island. The Kwakiutl First Nation is relatively more economically active than some other North Island First Nations.

Tanakteuk First Nation: The Tanakteuk First Nation has seven reserves, located within its traditional territories in the islands and general mainland area. A stated long-term goal is that of restoring the traditional settlements on Dead Point reserve (Harbledown Island) as a permanent base. Few currently live on reserve. Many live on the Whe-la-la-U reserve at Alert Bay (a federal crown land village site), and in Campbell River. Band administration is currently based in Alert Bay. The commercial fishery is the main source of employment for those resident in the Alert Bay area. The Band operates its own logging company out of Campbell River, and is interested in procuring additional forestry-related work.

Tlatlasikwala First Nation: The Tlatlasikwala Band has five very small reserves, and one significantly larger one (the 3 445 hectare Hope Island Reserve). Only a handful of the Band population of 38 reside on these reserves. About half of the Band members reside at Whe-la-la-u, at Alert Bay, with some employed in the commercial fishery. The Band administration is handled out of Alert Bay.

Mamaleleqala-Qwe-Qwa Sot-Enox First Nation: This First Nation has three reserves, none of which are presently inhabited. Of the estimated (1993) population of 278, most reside in the Campbell River area, where the band's administration is also based. A small number also reside on the Whe-La-La-U reserve at Cormorant Island. Their traditional village on Village Island was abandoned in the early 1970s because of difficulty in obtaining education, health services, and general supplies.

Mus-Gamagw Tsawataineuk Tribal Council

Tsawataineuk First Nation: Sometimes referred to as the Kingcome Inlet Band, this Band has five reserves located on the Mainland. An estimated 111 of the Band's population of 429 reside on the Quae reserve in Kingcome Inlet; the other four reserves are very small and uninhabited. All reserves are accessible only by boat or air. Some Band members (up to 10) are occasionally employed in contract silviculture work, usually with Interfor, which logs in the surrounding Kingcome Inlet area. Band representatives blame logging for an increased incidence of flooding

⁸ Information from Chief Robert Walkus.

in their reserve land, much of which lies in a delta.⁹ Additional employment is provided in fishing, trapping, and Band administration.

Kwa-Wa-aineuk First Nation: This First Nation has 10 reserves, mostly situated in its traditional territories on the Mainland. The only inhabited reserve is the Hopetown Reserve on McNair Island, accessible only by boat or air north of Port Hardy. An estimated 20 of the Band's population of 25 live on that reserve. In winter and storm months, the Hopetown residents relocate to Port Hardy. Band representatives contacted stressed the importance of the local sockeye fishery, and the damage to that fishery from poor logging practices.¹⁰ Some interest in forestry work, such as log salvage, was separately expressed by individual Band members. Five or six band members do occasional silviculture work for Interfor at Caviar Cove.

Kwicksutaineuk First Nation: This First Nation has 10 reserves located on the Mainland. An estimated 40 of the Band population of 244 reside on the Gwayasdums reserve on Gilford Island (this Band is also often referred to as the Gilford Island Band). Many Band members reside in Campbell River, Victoria, and Vancouver. A small number of Band members (about eight) have had occasional silviculture/stream cleaning employment (partly through a Tribal Council sponsored Canada Jobs Program), and some are enrolled in a jobs training program run by Marlita Forestry of Alert Bay. Some Band members engage in seasonal clam harvesting. A Band spokesperson emphasized their concerns over the alleged damage to the Gilford Island reserve's water resource arising from logging activities in the Wakeman watershed.¹¹

Namgis First Nation: This is the largest First Nation in the Port McNeill Forest District, with an estimated population of 1321, 718 of whom reside on its main reserve on Cormorant Island. The Band has six other reserves, none of which are inhabited. The Cormorant Island site has historically been a Namgis fishing settlement, and the Band's major source of economic activity is commercial fishing, with an estimated twenty seiners and nine gill-netters operated by Band members from Cormorant Island. These provide employment to between 100 and 150 Band members. Approximately 10 band members are employed by the Aweena-K'Ola fisheries project based in Alert Bay. Another 70 Band members are employed in Band Council and administration activities, including operation of the health centre and the school. The Band also operates the Nimpkish River Salmon Hatchery, which provides employment to five Band members on a full-time basis, and six on a part-time basis. The Band operates a community health centre and drug and alcohol recovery home, which is used by members of all Bands in the area. The Band is currently examining ways in which to become more active in forestry, and ideas include: silviculture and timber harvesting on the Band's own reserve lands (currently the focus of a long-term development plan), and a range of projects on lands in the Nimpkish Valley area, within TFL 37.

⁹ Councillor Flora Dawson.

¹⁰ Chief Charlie Williams.

¹¹ Band Councillor Calvin Johnson.

Tlowitsis-Mumtagila First Nation: This First Nation's traditional territories lie in the Knight Inlet area, and extend beyond the boundaries of the Port McNeill Forest District into the Campbell River Forest District. The Band has 11 reserves, none of them inhabited. The main traditional settlement was on Turnour Island. An estimated 80 of the Band's population of 272 live on the Whe-La-La-U reserve on Cormorant Island, many others live in the Campbell River area. Band representatives expressed a strong interest in increasing Band member's involvement in forestry.¹² Currently, Band members are employed in silviculture work in the Nimpkish Valley (on Canfor's TFL), and negotiations on a range of forestry ventures are ongoing with individual forestry companies. An estimated 15 to 20 Band members have direct logging-related experience. Some Band members are employed in the commercial fishery. Band members are also giving consideration to tourism-related ventures, such as a sports fishing based destination resort.

¹² Band Councillor Tom Smith, and Band Business Advisor Bill Wagner.

4.0 Environment and Outdoor Recreation

4.1 Environmental Setting¹³

The Kingcome TSA covers a wet, mountainous area of north-central Vancouver Island and adjacent inlets on the mainland. The seven ecosections¹⁴ represented in the TSA are: Windward Island Mountains, Northern Island Mountains, Queen Charlotte Strait, Nahwitti Lowlands, Hecate Lowlands, Outer Fjordland, and Northern Pacific Ranges. There are many rivers and streams which are used for spawning and rearing by five species of salmon, as well as supporting significant numbers of resident and ocean-run trout. Protected, nutrient-rich estuaries provide critical habitat for over-wintering water birds, young salmonids that use the mixed fresh and salt water to acclimatize, and many species of mammals, including marine species such as seals and terrestrial species such as grizzly bear and moose.

The variation in topography, landform and climate has created a complex mosaic of ecological conditions. Most of the forested land in the Kingcome TSA is within the Coastal Western Hemlock (CWH) biogeoclimatic zone, which is the most productive forest ecosystem in Canada. Western Hemlock is the most common tree species in the CWH zone, with Douglas-fir, Western Red Cedar, Sitka spruce, yellow cedar, amabilis fir, mountain hemlock, shore pine, big-leaf maple, and red alder occupying the forest canopy, commensurate with local conditions and the disturbance regime of the stands.

Old-growth forests in the CWH zone provide important habitat for many varieties of birds, mammals, reptiles and amphibians. The old-growth canopy is an excellent snow interceptor and the litter-fall of arboreal lichens and needles provides a critical supply of winter forage for black-tailed deer. After clear-cutting, the regrowth of vegetation provides an abundant source of forage and habitat for many mammals and birds. Forest regeneration in the CWH zone is usually rapid, with openings quickly developing a dense canopy with little understory vegetation.

The other main forested ecosystem within the Kingcome TSA is the Mountain Hemlock (MH) biogeoclimatic zone. This ecosystem is characterized by short, cool summers and long, cool, wet winters. Mountain hemlock is the most prevalent tree species, with amabilis fir and yellow cedar also being common. The other common tree species are western hemlock, western red cedar, Douglas-fir, and western white pine. Tree growth in the MH zone gradually diminishes with

¹³ This section draws on communications with Ron Diederichs and other MELP staff from the Campbell River office.

¹⁴ The ecoregion classification system was adopted by the Wildlife Branch of the Ministry of Environment Lands, and Parks in 1985 to serve as a framework for recognizing small-scale ecosystems in British Columbia (D. Demarchi, 1993). The attributes of ecosystems at the landscape level are a function of topography, geology and subregional weather patterns. Related biogeoclimatic systems occur in elevational bands and are based on diagnostic plant associations that provide insight into the forest and wildlife values within ecosections.

increasing elevation until the tree canopy becomes discontinuous and interspersed with alpine tundra.

Old-growth forests in the MH zone provide habitat for birds that eat bark or wood-boring insects, conifer seeds or other birds or small mammals. Mammals using the area tend to be concentrated in avalanche tracks or south-facing rock outcrops. It is common for grizzly bears to establish winter dens in this ecosystem.

The two other biogeoclimatic zones that occur in the Kingcome TSA are the Alpine Tundra and Non-tidal Wetlands zones, which provide much critical wildlife habitat. Provided that forest planning is conducted carefully, forest management is likely to have little impact on these last two areas.

4.2 Wildlife¹⁵

The Kingcome TSA contains a rich and diverse array of wildlife. Various species of migratory and resident birds, mammals, amphibians, and reptiles are present in the area. Native mammals include black-tailed deer, Roosevelt elk, moose, black bear, grizzly bear, mountain goat, wolf, beaver, pine marten, wolverine, short-tailed weasel, and other fur-bearing species. Native and migratory birds include species of management concern such as marbled murrelets, Queen Charlotte Island goshawks (a coastal sub-species of northern goshawks), great blue herons, and pileated woodpeckers. Adjacent marine habitats and estuaries support populations of species such as Peale's peregrine falcons, bald eagles, trumpeter swans, and harlequin ducks. Relatively little is known regarding the current status and ongoing habitat requirements of the area's bird population, nor those of the amphibians and reptiles.

A number of the TSA's wildlife species are considered to be "at-risk" by the BC Ministry of Environment, Lands and Parks (MELP), and have been classified as Red-listed or Blue-listed. Those species are shown in Appendix D. Species on the Red list (such as sea otter, Vancouver Island wolverine, and Queen Charlotte goshawk) are defined as having low populations and are considered to be currently or potentially endangered or at risk of extirpation in BC. Species on the Blue list (such as Roosevelt elk, fisher, and marbled murrelet) are at less risk, but are still considered to be vulnerable.

The following review focuses on the two major categories of mammals: ungulates and predators.

¹⁵ The discussion in this section is based on information provided by MELP staff in Campbell River and Nanaimo, as well as the following primary sources: *Deer and Elk Habitat in Coastal Forests of British Columbia*, MOF and MELP, October 1990; and *Regional Wildlife Plan for the Vancouver Island Region*, Wildlife Branch, Ministry of Environment, September, 1988.

Ungulates

There are four species of ungulates found in the Kingcome TSA – black-tailed deer, Roosevelt elk, mountain goats, and moose, all of which are to be designated as regionally significant species under the Forest Practices Code.

Deer

Three sub-species of black-tailed deer are found in British Columbia: the Rocky Mountain mule deer; the sitka black-tailed deer; and the Columbian black-tailed deer. Only the Columbian black-tailed deer is found on the southern coast of British Columbia, where it inhabits forest lands at all elevations. The most recent population estimates for this species are for 1994, in which MELP identified a population of approximately 124 000 in Wildlife Region 1 (Vancouver Island and a small portion of the adjacent mainland). The Kingcome TSA share of this total is approximately 17%, or 21 000 animals. The mainland portion of the TSA has relatively low overall densities of deer, due to marginal habitats, and high snow fall and predation levels in much of the area. However, some site-specific areas provide suitable habitats and may require habitat consideration.

There are three leading mortality factors affecting the deer population: predators (particularly wolves); availability of winter habitat; and both legal and illegal hunting. Hunting is viewed by MELP as significantly less important than the other two factors in determining deer populations over the long term. Following a large increase in wolf numbers in the mid 1970s, wolf predation took a heavy toll on the deer population, which suffered a steep decline. This was notwithstanding favourable habitat conditions and mild winters. A wolf population reduction program on Vancouver Island was subsequently put into effect, the intent of which was to reduce wolf densities to the point at which deer populations could substantially recover. The program was successful in halting deer declines in a number of areas, but deer populations have not yet recovered in all areas.

Habitat conditions are the second most critical factor influencing deer populations, and one which forest management practices directly affect. In the moderate-to-heavy snow pack zones of Vancouver Island, provision of winter range is considered essential. Second-growth stands can function as winter range in lower elevation, shallow and moderate snow pack zones, but deeper and longer-lasting snow packs at higher elevations necessitate provision of old-growth winter range. The rate at which old-growth winter range might be logged under any future timber harvest scenario is a pertinent factor insofar as it can influence whether populations of black-tailed deer may be sustained. Since a significant portion of the Kingcome TSA falls in the moderate to deep snow pack zone area, retention of some old-growth winter ranges in these areas and scheduling of harvest in the larger remaining portions to maintain forage, are important considerations.

This transition requirement has been incorporated into the present timber supply analysis. With MELP input, critical old-growth winter range (EW1), was designated as an environmentally sensitive area, and was deleted from the landbase available for harvest. Areas of lower concern, or areas of second-growth to be managed as critical future winter range, were designated as EW2, and modelled on an alternate timber supply regime.

Vancouver Island in general, and the North Island area in particular, are significant contributors to the provincial deer harvest, respectively contributing approximately 36% and 10% of the total (1976 - 1986 average). Given relatively constant hunter participation rates, and continuing population growth on Vancouver Island, MELP is projecting a steady increase in demand for deer hunting over the next few decades. Deer hunting on the Island is almost entirely resident-based, with non-resident hunters accounting for 1% or less of the total deer harvest and effort. Demand is highest in the eastern and central portions of the Island. The Nimpkish Valley, in particular, is an area where deer production capability and hunting demand are both very high (this area lies outside of the TSA, in TFL lands).

Non-hunting uses, such as wildlife viewing, are also increasing, especially in areas relatively close to population centres, and in designated recreation areas. According to MELP officials, ungulates are second only to marine mammals, as a species group, in generating viewing interest.

Elk

Two sub-species of elk occur in British Columbia: Roosevelt elk and Rocky Mountain elk. Roosevelt elk occur in Canada only on Vancouver Island, and in a small number of mainland inlets. They also occur on the Sechelt Peninsula and in the Powell River area (to where they were transplanted in the late 1980s). Historically, elk were more widely distributed in coastal British Columbia than they are now, but human settlement and excessive hunting pressure, particularly on the lower mainland and southern Vancouver Island, led to local exterminations. Although now abundant in some areas of Vancouver Island, Roosevelt elk are considered to be well below their maximum sustainable population level.

MELP has estimated the 1994 population of elk in the Vancouver Island Region at 3200 animals, approximately 710 of which occur in the Vancouver Island portion of the Kingcome TSA. No elk occur on the mainland portion of the Kingcome TSA. Habitat requirements for elk are broadly similar to deer, except for more specific requirements for old-growth winter range. Valley bottom and adjacent south aspect old-growth provide optimum elk winter range. Thinning of second-growth stands can enhance forage production. Recent mild winters have helped increase elk populations. Wolf and possibly cougar predation are factors in areas where deer numbers are low. Because of the relatively clumped distribution of elk (which are herding animals) populations can be threatened through illegal kills. MELP is projecting stable or slightly increased elk populations for northern Vancouver Island over the next decade.

In addition to controlling unregulated hunting and illegal kills, achieving particular forest management objectives (such as the treatment of regenerating stands to encourage forage production, the deferment of critical old-growth winter range, and creation of second-growth winter range) will be necessary to achieve MELP's population targets. The legal hunting of elk is strictly controlled and divided between a native sustenance/ceremonial harvest and non-native Limited Entry Hunt harvest. MELP is projecting a slight increase in harvest in the North Island area. There is a very high level of interest in elk hunting, as indicated by ratios of Limited Entry Hunt applications to available authorizations. Due to high native and non-native resident hunter demand, non-resident elk hunting is and will remain a very small proportion of any overall harvest

allocation. As with deer, non-hunting uses such as wildlife viewing opportunities involving elk are extremely high, especially near human population centres.

Mountain Goats

Within the Kingcome TSA area, the occurrence of mountain goats is restricted to the mainland, primarily in the Northern Pacific Ranges ecosection. Mountain goat population estimates are based on limited survey data, and may vary considerably by area and year. Because of difficulties in accessing the area, hunting mortality on the mainland is low, and is not seen as a limiting factor in population growth. Harsh weather conditions, wolf predation, and availability of suitable winter range are viewed as more significant factors. The majority of mountain goats in this area are believed to winter in mature timber stands at mid-elevations. Since the majority of watersheds in this area are under active development, MELP is of the view that timber removal is affecting goat winter range. An ongoing goat research project in two subdrainages of the Kingcome River is attempting to more specifically define important goat winter range characteristics to help determine appropriate forest management practices where goats occur.

Moose

A small and vulnerable population of moose occurs from the estuary of the Klinaklini upstream for approximately 10 kilometres. It is believed that this is the only population of moose in the Kingcome TSA, and may consist of as few as 5 to 15 animals. Unregulated hunting appears to be the major threat to this isolated population, and efforts are underway to initiate joint inventory and co-management agreements with First Nations stakeholders. Critical winter ranges have not yet been identified for protection, but forest management practices that enhance forage production through thinning/spacing (without increasing road accessibility, which increases moose susceptibility to hunting) will likely benefit this population. MELP hopes to increase this population to a minimum of 50 - 75 animals over the next decade.

Predators

This wildlife category includes cougar, wolves, black bear, and grizzly bear. MELP population estimates of predators are less firm than those of ungulates. The following is largely anecdotal evidence based on the insights and experience of individual MELP staff. The population estimates are for those MELP planning units that overlap with the Kingcome TSA.

Cougar (population 200 - 260): Population trends are believed to be positive. Cougars prey largely on deer, and tend to do well when the deer population is doing well. Cougars are found largely on the Island portions of the TSA, with few on the mainland.

Wolf (population 100 - 150): After big increases in the 1970s and 1980s, the wolf population is now thought to be decreasing. This is partly in response to the wolf kill program, and partly in response to the earlier decline in deer numbers (while wolves are very adaptable to changes in habitat, they do need a prey base).

Black Bear (population 5700 - 7700): The black bear population on the Island is relatively healthy, and can benefit from the improved forage available after timber harvesting. However,

because black bear are old-growth attribute dependent for denning, conversion to second-growth forest may lead to long-term population declines. Extensive logging road networks facilitate hunter access.

Grizzly Bear (population 150): Grizzly bears are especially dependent on old-growth habitat (for denning). All of the grizzlies within the TSA are found on the mainland. Logging has negatively impacted grizzly bear populations through habitat alienation of estuaries, destruction of salmon spawning habitat, increased road access, resulting in high mortality, and poor camp maintenance, resulting in garbage bear mortalities. Knight Inlet has a good population of grizzly bear, but Wakeman and Kingcome inlets have very low populations.

4.2.1 Wildlife Hunting and Guide Outfitting

The Ministry of Environment Lands and Parks maintains records of hunting and trapping activity throughout British Columbia. Table 4.1 summarizes MELP's estimates of the numbers of resident and non-resident hunters, and their direct expenditures, within the general vicinity of the Kingcome TSA (some of this activity occurs in TFL areas).

Table 4.1: Kingcome TSA: Estimated Hunting Expenditures (\$1994)¹⁶

Species	Number of BC Hunters	Number of Non-BC Hunters	Total Expenditures
Black Bear	238	73	\$ 255 980
Cougar	29	5	36 970
Elk	103	2	67 280
Deer	2871	4	1 294 190
Wolf	146	--	314 240
Upland Birds	n/a	--	271 000
Waterfowl	n/a	--	159 000
Total	n/a	n/a	\$ 2 399 190

Source: BC Ministry of Environment, Land and Parks, Wildlife Branch, Victoria.

As Table 4.1 indicates, hunting in the TSA is mainly by BC residents, with deer the primary target. Non-resident hunting interest is focused on black bear, and (on the Mainland), occasional grizzly and goats (specific data is unavailable). There are three guide outfitters with operations partly or wholly in the TSA. Because of its more remote character, the Mainland portion of the TSA is considered to have good future guided hunting potential.

MELP data sources indicate a total of 52 trappers in the TSA, and trapping-related expenditures of approximately \$112 000 annually.

4.3 Fisheries

The fishery resource within the Kingcome TSA consists of three major components: commercial ocean fisheries, saltwater sport fishing, and the freshwater fishery. These are discussed below.

¹⁶ These expenditures generally break down as follows: Transportation/Travel 35%; Equipment 26%; Food/lodging 15%; Licenses 6%; Other 18%. Source: "Value and Characteristics of Resident Hunting", BC Ministry of Environment, April 1985. "Residents" are defined as residents of BC.

4.3.1 Commercial Ocean Fisheries¹⁷

There are an estimated 240 commercial salmon fishing vessels registered in the Mount Waddington Regional District. The largest home ports are Port Hardy, Sointula, and Alert Bay, with smaller numbers of vessels based out of Port McNeill and Coal Harbour. Although a major regional industry, the North Island commercial fleet is predominantly an interception fishery, pursuing a migratory fish resource (such as Fraser River stocks). Local stream systems contribute a proportionately small share of the local fleet's overall catch. For the five species of salmon, the general contribution of local streams is discussed below.

Commercial sockeye and chum harvesting is predominantly of non-local, migratory stocks. In some years the Nimpkish River (which lies entirely within TFL areas) can have very large sockeye runs, which on average account for 99% of the region's recorded escapements (the historical maximum for the Nimpkish is 250 000). Good runs of chum (historical escapement maximum of 100 000, on the Nimpkish) intermittently occur on other area streams, in particular the Nimpkish, Viner Sound Creek (Gilford Island), and Ahnuati Rivers.

Although more highly valued species, chinook and coho runs are generally too small in volume to attract the commercial net fishery. They are targeted by the smaller troll fishery, but the total commercial catch from these runs is relatively small. Because of their smaller overall numbers, chinook and coho stocks all along the BC coast are the focus of special DFO management efforts. Recent runs of coho in the Kingcome area are reported to be strong; more uncertainty surrounds the health of chinook runs. Based on DFO escapement records, the most important chinook streams are the Marble, Nimpkish (both on TFL land), Kingcome, Klinaklini, and Wakeman (all registering historical escapement maximum of up to 5000). No comparable escapement records are maintained for the coho, partly because of how it is dispersed over a broader small stream network (making enumeration more difficult).

The North Island salmon runs of most commercial interest are the high volume pink runs that often occur. Historically, the largest escapements have been recorded for the Mainland streams (all within the TSA) of Glendale (up to 700 000 in some years), Kakwiken, Wakeman, Ahnuati and Kingcome (up to 300 000 each).

To provide a relative benchmark, the following are the estimated average annual escapements¹⁸ (early 1990's) for the DFO statistical areas that most closely coincide with the Kingcome TSA area: Pink -- 1.7 million; chum -- 125 000; and chinook -- 5000. The region contributes less than 10% of the total Vancouver Island/Coast recorded escapements of chum and chinook, but over 50% of pink escapements. Almost all of the region's sockeye is sourced from the Nimpkish, which lies outside of TSA boundaries.

¹⁷ The following is based on DFO escapement records for the period 1981-1993 (maintained by DFO Nanaimo), and on interviews with DFO staff as well as local sources.

¹⁸ While recorded escapements (numbers returning to streams to spawn) are in an inverse relationship to numbers harvested, they provide a generally reliable index of the relative size of harvest.

*****PLEASE NOTE*****

The October 23, 1995 deadline indicated on pages 1 & 16 of this report and on the Response Form is incorrect. Public comments will be accepted until November 15, 1995.

Aside from its commercial fishery significance, the case for protecting salmon-bearing streams in the Kingcome TSA, and for fisheries habitat generally, also rests on intrinsic environmental and biological diversity grounds. Stream protection measures (in particular the Coastal Fisheries/Forestry Guidelines) are in effect in the Kingcome TSA, and are being enhanced as part of the new Forest Practices Code. Local DFO and outdoor industry sources offered the view that recent years have shown significant improvement in the protection provided to stream habitats.

4.3.2 Saltwater Sport Fishing

In contrast to the commercial fishery, the recreational and sport fishing that occurs within the Kingcome TSA is considerably more dependent on the local fishery and stream resource. It comprises a significant commercial component (serviced by lodges, charter boats and guides), and a largely resident-based non-commercial component.

From a commercial perspective, the largest single component is the sport fishing lodge sector. This comprises both individual charter operators and full-service fishing lodges. All of the charters and lodges offer saltwater fishing in the ocean inlets, and some lodges (estimated at six) offer helicopter lake and stream fishing (for example, for steelhead and lake trout) in Mainland areas. The primary attraction for the majority of the clientele (because of the much higher probability of success) is the salmon resource, particularly coho and chinook. The North Island area generally is viewed as having very good growth potential. Reasons for this view include good recent runs of salmon (particularly coho), the natural scenic setting, and the absence of congestion, which is beginning to mar the experience in other parts of Vancouver Island.

There are approximately 30 sport fishing lodges located within the Forest District's boundaries (this estimate is based on information provided by the Regional District, and excludes those located in the Rivers Inlet area). This sector is the most commercially significant outdoor recreation sub-sector on the North Island, and is experiencing strong growth. The estimated 30 operations represents almost a doubling of operations from the 17 estimated in an earlier study for 1988¹⁹. All but two of the operations identified are based on the islands or mainland areas of the Queen Charlottes Straits, including Malcolm Island, Gilford Island, Broughton Island, Hurst Island, and Hanson Island. The main service and supply centres are Port McNeill, Port Hardy, and Sointula. Two operations are located in the Quatsino Sound area (which lies outside the TSA).

These are all seasonal operations, the seasonal employment associated with which ranges between 300 and 400 positions, equivalent to about 80 full-time equivalents. Based on province-wide industry averages, the annual revenues from these 30 lodges is estimated to fall in the \$17 million

¹⁹ *Tourism on Northern Vancouver Island*, a report for the Mount Waddington Regional District by Steve Mossop, April 1989.

range, and wage income in the \$5 million range.²⁰ These averages conceal significant variation between the larger and smaller operations. The lodges are important customers for many local businesses, in particular the four helicopter operations based in the area. About 30% of their business base is derived from the sport fishing sector (the other 70% is forestry-based). These four operations provide an estimated 23 PY of local employment.

The lodge operators contacted expressed concern about the potential impact of timber harvesting on fish habitat and on the scenic areas surrounding their facilities. For both of these areas of concern, evidence of improvement in harvesting practices in recent years was noted. A policy of early replanting to accelerate green-up was generally suggested. Specific features of interest that were noted included hot springs (at the head of Knight Inlet, Canyon Creek) and outstanding waterfalls.

The sport fishing industry is also serviced by an estimated 20 to 25 independent (mostly part-time) charter operators, and by the four government wharves (Port Hardy, Port McNeill, Alert Bay, and Sointula) and four marinas (Port Hardy, Port McNeill, Telegraph Cove, and Sullivan Bay) in the area. These berthage facilities service considerable volumes of pleasure craft traffic that pass through the area in summer (as well as the commercial fishing fleet). Based on province-wide industry averages, the four marinas are estimated to provide between 30 and 35 employment positions (10-12 on a PY basis).

4.3.3. Freshwater Fishery

The freshwater fishery is mainly frequented by local residents. The North Island area has five of the top twenty Vancouver Island steelhead streams (ranked by user days). These are; the Quatse (#10), Cluxewe (# 13), Nimpkish (#14), Nahwitti (# 18) and Keogh (# 20). There are many other steelhead streams (such as the Kokish and the Marble), but these have considerably fewer user days, reflecting the difficulty of access. Overall, for the most recent period for which statistics are available (1992/93), a total of approximately 3000 user days were recorded in the general Kingcome TSA area. This compares with about 18 000 in the Strathcona TSA (in the Mid-Island), and 42 000 in the Arrowsmith TSA (in the South Island).

In addition to steelhead, the lakes and streams are fished for all five species of salmon, as well as cutthroat and rainbow trout and dolly varden. Although reliable region-wide user and productivity data for these non-salmon groups are not available, they are considered by MELP staff and local outdoor recreation interests to be a very valued resource. Together with the steelhead, these groups are generally non-prolific species, and can be vulnerable to over-fishing.

²⁰ These estimates are based on a combination of evidence from the Mossop report and from a March 1991 study by the ARA Consulting Group Inc. entitled *Marine Tourism in British Columbia*.

4.4 General Tourism and Outdoor Recreation

Aside from the sport fishery, the Kingcome TSA generally supports a broad range of other tourism and outdoor recreation activities. The following is a summary review of these other sub-components. Concerns regarding forestry mostly relate to maintaining scenic visual landscapes. For some there is an important positive interface, in that logging and Forest Service roads may provide access to the area's amenities.

Land-Based Outdoor Recreation

This comprises activities such as hiking, camping, caving, or canoeing. The area's main attractions are Cape Scott and Raft Cove Provincial Parks, the Brooks Peninsula Recreation Area (Schoen Lake Park lies within the District but well south of TSA operating areas), and the estimated 40 to 50 private and Forest Service/forest company campground sites located throughout the area. Both Cape Scott and Brooks Peninsula are extremely rugged and remote attractions; and the difficulty of access limits levels of use, particularly to the Brooks Recreation Area. An estimated 1676 overnight parties visited Cape Scott in 1993; this compares to the 20 164 parties that visited Strathcona Park.²¹ A North Coast trail (passing through newly designated Low Intensity and Protected areas) that would link Port Hardy to Cape Scott is now under active consideration.

Reliable and complete user data for the area's smaller facilities are not available. A recent Ministry of Forests survey of Forest Service recreation sites does shed some light on user origins: about 33% are local, 37% are from elsewhere in BC, about 26% are non-Canadian, and about 4% are from outside BC. Although providing incomplete coverage, this survey does suggest that recreation site use in the Port McNeill Forest District is increasing.²² Anecdotal evidence of increasing usage of area campgrounds and trails is also provided in another recent area tourism study.²³ This study also supports the premise of predominantly local use, although there has been an increasing proportion of overseas tourists in recent years. The role of the forestry companies in providing access to and helping to maintain many of these areas should be noted, and tours of working forest are a growing attraction. For the area generally, a particular attraction is the uncrowded surroundings. While outside demand is increasing, the greater travel access times (compared to Island attractions further south) are likely to curtail very large scale developments.

²¹ *Parks Data Handbook - 1993*, MELP, 1994.

²² *Recreation Use Statistics*, prepared by Karen Schawlm for the Port McNeill Forest District, January 31, 1995.

²³ *Supply and Demand Analysis for Accomodations on Northern Vancouver Island*, prepared for the Ministry of Small Business, Tourism and Culture by Mary Murphy, February 23, 1995.

Marine Recreation

Aside from sport fishing, the North Island area is a popular base for other forms of marine recreation activity, including coastal cruising (power and sail), whale watching, kayaking and scuba diving. Coastal cruising and kayaking in Broughton Archipelago Provincial Marine Park and whale watching in the Telegraph Cove/Robson Bight area are the major regional attractions. The numbers of boaters and kayakers in this area is increasing yearly. With more powerful and better equipped boats, and with the more crowded conditions of areas such as Desolation Sound, boaters are becoming more adventurous and cruising to more remote locations. The kayakers use Telegraph Cove as a staging area to access the numerous islands in the Broughton Archipelago. With the recent park designation of part of this area, the numbers of kayakers have increased, and several companies are now offering guided kayaking trips to this area.

Whale watching is a major activity for the Telegraph Cove/Robson Bight area, and the number of operators has steadily increased over the last ten years to over 15. Clients are picked up in Telegraph Cove. While a few of the operators provide accommodation on board or on shore, the majority offer day trips, and the clients stay overnight in Telegraph Cove, Port McNeill, or Port Hardy. A development proposal for a whale watching research centre, golf course, and accommodation facility is being considered for Telegraph Cove.

Telegraph Cove is the major regional supply centre and base for general marine recreation activities. Work on a major destination resort for Telegraph Cove has begun, and is due for completion around the year 2000. Other centres such as Port Hardy, Sointula, and Port McNeill are also slowly expanding their capabilities in this area, and the numbers of marine charters and boat and equipment rental businesses in these centres is steadily growing.

This marine activity is concentrated on the east coast of the Island. While the west coast is generally too exposed for these activities to develop on a major scale, the Brooks Peninsula area is acquiring a reputation as a challenging kayaking location.

General Touring and Ferry Traffic

The other major tourism component is the touring (motor and coach) market, most of which is channelled through the BC Ferries terminal in Port Hardy. Travel on the Inside Passage ferry route accounts for by far the largest share of North Island tourist traffic, and is particularly important to the hotel and accommodation sector (including bed and breakfasts) in Port Hardy, with facilities in Port McNeill also benefiting from traffic overflow.

The 1995 accommodation study referred to above indicates that there are approximately 20 hotels/motels with about 600 accommodation units (excluding Bed and Breakfasts) within the study area. This represents about a 20% increase in accommodation capacity from that estimated in the earlier 1989 study. Combining information from both of those studies, the indicated full-time-equivalent employment base is approximately 275 PY, although the related numbers of individuals employed may be three times higher, due to part-time and seasonal work. Estimated annual room revenues are in the \$7 to \$8 million range (spending on restaurants, and other accommodation-related services would be in addition to this).

These studies also suggest that there is an almost 50/50 commercial/tourism split in hotel patrons, with commercial patronage being of greater importance to facilities in many of the smaller centres located away from Highway 19 and the Inside Passage route (such as Port Alice or Quatsino). Room revenues have shown strong growth in 1992 and 1993, and support the anecdotal evidence of slow but steady growth in the general tourism market, independently of the BC Ferries trade. Outside of the summer overflow in the Port Hardy area, the accommodation infrastructure does not appear to be a limiting factor to developing that market, and many suggestions along those lines are contained in the 1995 study. At the present time, the 60 room complex under construction in Telegraph Cove, and a proposed 10 unit motel for Woss (to serve the Mount Cain ski market) are the only known new accommodation developments.

Overall therefore, the available evidence is of unspectacular but steady expansion in the tourism and outdoor recreation sectors in the North Island area. This is demonstrated particularly by the growth in the number of sport fishing lodges within the last ten years, and the continued growth in different forms of marine recreation, such as cruising and sailing. Expansion both in the area's natural amenities (e.g. Broughton Archipelago, or a North Coast trail), as well as its service amenities (e.g., at Telegraph Cove or Mount Cain) are laying a basis for continued growth. There is a broad community of interest in ensuring that this potential will not be compromised by any negative side-effects of timber harvesting (particularly with respect to viewsapes).

5.0 The Kingcome TSA Forestry Sector

5.1 North Island Harvest Levels

The Kingcome TSA represents a significant proportion of the North Island's timber harvest profile. This is shown in Table 5.1, which presents the recent harvest history profile for the Port McNeill Forest District.

Table 5.1: Port McNeill Forest District - Harvest History, 1992-1994

	1992	1993	1994	Average 1992-94	Average Percent of Total
('000 m ³)					
Tree Farm Licences (TFL) ¹	2262	2313	2456	2344	45.9 %
Private Forest Land	163	140	143	149	2.9 %
Timber Licences ²	1269	1328	1223	1273	24.9 %
Timber Supply Area (TSA)	1218	1424	1378	1340	26.2 %
Other ³	0.07	0.02	5	1.7	0.1 %
Total	4912	5205	5205	5108	100%

Source: Harvest Database System, Valuation Branch, Ministry of Forests.

Notes:

1. TFLs include Small Business Enterprise Forest Enterprise (SBFEP) timber sales on TFL land.
2. Timber Licences (TLs) are area based tenures that were issued in the early 1900s. After harvesting, the area reverts back into either the TSA, or a TFL. The majority of the TLs in the North Island are incorporated within the TFL timber harvesting land base, and are owned by the TFL licensees.
3. Includes timber harvesting on woodlots, and federal and Indian Reserve lands.

Overall, the contribution of timber from the Kingcome TSA accounted for approximately 26% of the total District harvest over the period 1992 to 1994. The largest share of the harvest was from TFL tenures, which accounted for approximately 46% of the total. Timber Licences were the other major source of timber in the District, comprising about 25%.

5.2 TFL Situation

The Port McNeill Forest District contains portions of seven TFLs. These have a combined estimated AAC within the District of approximately 3.4 million m³. Of this amount, about 3.2 million m³ is apportioned to major licensees (see below), and 175 000 m³ is allocated for SBFEP sales. The AAC of major Tree Farm Licences (TFLs) administered by the Port McNeill Forest District is close to double that of the TSA AAC (1 659 000 m³). It is broadly allocated among major licence holders as follows:²⁴

Western Forest Products Ltd: TFL 6, and a portion of TFL 25; estimated AAC of 1 515 000 m³.

MacMillan Bloedel: portions of TFL 39; estimated AAC of 435 000 m³.

TimberWest Ltd: portions of TFL 47; estimated AAC of 260 000 m³.

CanFor Ltd.: TFL 37, estimated AAC of 1 063 000 m³.

Interfor Ltd.: portion of TFL 45; estimated AAC of 100 000 m³.

Scott Paper Ltd.: portion of TFL 43; estimated AAC of 7800 m³.

The AACs on these TFLs are also currently under review, which may result in future timber harvest reductions. TFL areas within the Port McNeill Forest District will bear most of the land-base adjustments flowing from the Vancouver Island Land Use Plan. This broader timber supply context is important to a full evaluation of the implications of the Kingcome TSA review.

5.3 Kingcome TSA Allowable Annual Cut

5.3.1 AAC Apportionment

The Kingcome TSA supports an AAC of 1 658 770 m³, which is apportioned as shown in Table 5.2. This represents approximately 34% of the combined (TSA and TFL) Crown AAC of approximately 5.2 million m³ that is administered by the Port McNeill Forest District.

²⁴ The TFL AAC estimates provided are approximations prepared by Port McNeill Forest District staff. Many of the TFLs overlap with other Districts.

Table 5.2: Kingcome TSA—1995 AAC Apportionment

<i>Category</i>	<i>Volume (m³)</i>
<i>Forest Licences—Renewable</i>	
International Forest Products Ltd. (FL A19238)	733 743
MacMillan Bloedel Ltd. (FL A19244)	86 478
Mill & Timber Products Ltd. (FL A19242)	70 395
Richmond Plywood Corporation Ltd. (FL A19243)	69 720
Weldwood Ltd. (FL A19239)	221 140
Western Forest Products Ltd. (FLA 19240)	108 887
Renewable Forest Licence Subtotal	1 290 363
<i>Small Business Forest Enterprise Program</i>	
Categories 1 and 2 (Section 16)	242 985
Bid Proposals (Section 16.1)	96 587
SBFEP Subtotal	339 572
Timber Sale Licences (Major)($<10\,000\text{ m}^3$)	10 465
Forest Service Reserve	18 370
Total AAC	1 658 770

The TSA's total AAC shown above also includes an additional 139 500m³ AAC comprised of: a 15 year (expiry 2004) licence held by Shushartie Log Sales Ltd., with an apportionment of 112 000 m³; a deciduous licence held by Scott Paper Ltd., with an apportionment of 5000 m³, and a similar term and expiry date; another unassigned 20 000 m³ deciduous apportionment, and two woodlot licences with a combined apportionment of 2500 m³.

5.3.2 AAC and Historic Harvest Levels

The actual level of timber harvesting in the Kingcome TSA over the past several years has generally been below the AAC level. As shown in Table 5.3, over the three-year period 1992-1994, the average annual harvest level was approximately 1 340 000 m³ (about 80% of the AAC).

Table 5.3: Kingcome TSA - Harvest Levels (Coniferous), 1992-1994

	AAC (m³)	Actual Harvest (m³)	% of AAC
1992	1 658 770	1 217 627	73 %
1993	1 658 770	1 424 250	86 %
1994	1 658 770	1 378 405	83 %

Source: Billing History Report, Valuation Branch, Ministry of Forests.

The degree of undercutting has been substantially greater in the SBFEP than for the major licensees, although both groups have been harvesting under AAC levels. On average, the SBFEP harvest has been 221 000 m³, about 65% of its AAC. The major licensees have harvested an average of 1 078 000 m³, about 84% of the Forest Licence AAC²⁵.

For the purposes of this study, the average annual figure is used to reflect the current harvest level, or base year.

The following two sections provide current operational profiles of the major licensees and Small Business operators.

5.4 Major Licensee Operations Profile²⁶

There are six renewable Forest Licenses (FLs) held in the Kingcome TSA. The following discussion profiles their “steady state” level of operations.

Interfor (*AAC 733 743 m³*)

Interfor (International Forest Products Ltd.) holds the largest licence in the Kingcome TSA. It is administered by Interfor’s Port Hardy office, which was opened in January 1992. The need for an office in Port Hardy arose following Interfor’s acquisition from Fletcher Challenge of significant timber tenures in the area. Prior to then, Interfor’s North Island activities were administered from Vancouver and Campbell River.

Interfor harvests at five different locations in the Kingcome TSA, as follows:

- **Cleagh Creek:** This is a year-round company operation (with some contract support), located in the Quatsino Sound area on the west coast of Vancouver Island. Annual harvest levels are in the 165 000 m³ range, (occasionally supplemented with Mainland volumes). An estimated 60 PY (42 company and 18 contract) are supported by this operation. All of these employees are residents of the Port Hardy area. This operation supplies 30-35 000 m³ of pulp logs annually to the Western Forest Products pulp mill in Port Alice. The balance is transported to the Lower Mainland area, and allocated among Interfor’s sawmilling network.
- **Kingcome River/Caviar Cove:** This company operation is based out of the Kingcome Inlet area on the Mainland, and is open year-round. Annual harvest levels are approximately 165 000 m³. An estimated 60 PY (52 company and 8 contract) are supported by this

²⁵ Licensees are not obligated to harvest their total AAC allocations in any one year. A licensee's actual harvest may deviate by 50% in any one year. In the case of a small AAC allocation, the licensee may harvest for only one or two years in the five year period. However, over a five year period (or the term of the licence in the case of licences shorter than five years), each licensee's total harvest must be within 10 percent of its total AAC for the entire five years.

²⁶ Much of the company-specific information provided has been aggregated for reasons of company confidentiality and report conciseness.

operation. Crews are flown in from Campbell River and Port Hardy. An estimated 60% are residents of the Mid-Island area (mostly Campbell River), 30% are from the Lower Mainland, and 10% are residents of Port Hardy.

- **Scott Cove:** This company operation is based out of the Gilford Island area on the Mainland, and is also operated year-round. Annual harvest levels are approximately 200 000 m³. An estimated 68 PY (60 company and 8 contract) are supported by this operation, and are flown in from Campbell River and Port Hardy. Approximately 70% are residents of the Mid-Island (particularly Campbell River), 20% are from the Lower Mainland, and 10% are from the Port Hardy area.
- **Snowdrift/Warner Bay:** This year-round operation is based out of the Seymour Inlet area on the Mainland, and is logged by Campbell River-based Wolverine Contracting. Annual harvest levels are approximately 145 000 m³. The Wolverine crew (35 PY) is flown in from Campbell River. Another 5 PY are employed on road building, and are residents of the Port McNeill area (Port McNeill Tug).
- **Helifor Camp:** Approximately 55 000 m³ annually is logged off FL chart areas in the vicinity of Frances Point (expected to double in 1995). This provides approximately 3 months employment to a 40 member Helifor crew, equivalent to 10 PY (labour requirements are lower in helicopter logging due to the elimination of the hauling and loading phases; additional scaling/sorting is required at the log's destination). Different Helifor crews may be used at different times; they are all recruited from outside the North Island area.

The cumulative employment base directly accounted by these camp operations is 238 PY. Interfor employs an additional 40 PY in it's Port Hardy office, and 68 PY in general sub-contractor operations (such as scaling and road building) for a total of 346 PY that can be directly attributed to Kingcome TSA FL operations. The approximate residence distribution of the employees is as follows: Port Hardy 132 PY; Port McNeill 5 PY; Mid-Island (particularly Campbell River) 152 PY; and the Lower Mainland 57 PY. Because the conventional operations are open year-round, this PY total is also roughly equivalent to the actual numbers of individuals employed.

Additional individuals are employed by Interfor in silviculture work in the Kingcome area. This includes occasional contract work with Tsawataineuk (Kingcome Inlet) and Kwa-wa-aineuk (Hopetown) First Nations members. Up to now, little employment has been provided to Kwicksutaineuk (Gilford Island) First Nations; however, Interfor representatives expect that to change, as logging operations move closer to that First Nation's traditional territories. Interfor also employs a five-person all-native logging crew from the Tsawataineuk Band, for 6-9 month periods.

Aside from the pulp logs towed to Port Alice (an average of about 30-35 000 m³ per year), all of Interfor's FL harvest is barged or towed to the Lower Mainland. Of this, about 50 000 m³ annually is sold as pulp logs, another 100 000 m³ as sawlogs on the open market, and the balance of about 550 000 m³ is redirected to one of Interfor's seven Lower Mainland sawmills and

remanufacturing operations²⁷. Using Interfor-based 1994 employment ratios, the combined sawlog component of 650 000 m³ is estimated to support a total of 350 PY of mill and administration employment at Interfor and at those operations that purchase Interfor fibre. Almost 300 of these are Interfor employees, equivalent to about 20% of Interfor's 1994 Lower Mainland employment base of 1453 PY. The Kingcome FL log volumes directly routed to Interfor mills account for approximately 22% of the annual fibre requirements of these mills.

Additional employment and income is supported at the pulp mills that acquire pulp logs and chips from Interfor. These are estimated at approximately 285 PY, on the basis of 1987-1991 employment averages for the BC coastal pulp and paper industry, as estimated by the Ministry of Forests²⁸. This total includes some pulp mill employment at Port Alice accounted for by Interfor's pulp log sales to that facility. Fletcher Challenge's Elk Falls and Crofton mills are the major customers for both pulp logs and chips; other important customers are Westerns' Squamish mill, and MacMillan Bloedel's Powell River and Port Alberni mills.

Additional employment is supported in the transport of logs down the coast and to the Lower Mainland.

Overall, the employment directly supported by Interfor's FL AAC of 733 743 m³ is estimated at 1025 PY, about 165 of whom are North Island residents (140 in Port Hardy, 20 in Port Alice, and 5 in Port McNeill).

Expenditures by Interfor on materials and supplies are also very significant, although most occur outside of the North Island area, particularly in Campbell River. Important North Island suppliers include Wrights Rope and Finning, based in Port Hardy, and Fountain Tire and West Coast Helicopter in Port McNeill.

MacMillan Bloedel (AAC 86 478 m³)

MacMillan Bloedel's AAC is harvested from the Brooks Bay (Klaskino Inlet) and the Gilford Island (Knight and Call Inlets) operating areas. The Brooks Bay FL annual harvest is targeted at approximately 60-65 000 m³, and is harvested under contract by Lemare Lake Logging of Port McNeill. Most of the 90 person crew reside in the Port McNeill area. (Lemare also logs approximately 185 000 m³ annually of TFL timber for Canfor.) Lemare's operations have been scaled down because of the shrinkage of operating areas in the Brooks Bay area, brought about by the Vancouver Island Land Use Plan and related processes. Most of the remainder of MacMillan Bloedel's FL (about 20-25 000 m³) is harvested from the Gilford Island area, by Nanaimo-based W& D Logging.

²⁷ These are: Fraser Mills in Coquitlam; Hammond Cedar in Maple Ridge; Western Whitewoods in New Westminster; Bay Forest in Pitt Meadows; MacKenzie Seizai in Surrey; and MacDonald Cedar in Langley.

²⁸ *The Economic Impacts of Timber Harvesting in British Columbia*, Ministry of Forests, Economics and Trade Branch, 1994.

Overall, MacMillan Bloedel's Port McNeill Division has an estimated 265 full-time positions, and is responsible for harvesting approximately 745 000 m³ annually from four separate operating areas: the Brooks Bay and the Islands operating areas, and the Port McNeill and Namu (Mid-Coast) operating areas. TFL 39 accounts for the largest share, supplemented (for the Port McNeill area) by smaller Timber Licence and Strathcona TSA (Tahsish-Kwois) volumes. Borer Logging of Port Hardy is a primary sub-contractor to MacMillan Bloedel.

Within MacMillan Bloedel's Kingcome TSA operating areas, Lemare Lake Logging could be most directly impacted by any changes to the AAC of FL A19244 (subject to the requirement of Bill 13 that any AAC changes be equally distributed among all operations). As discussed, logging operations in the Brooks Bay area where Lemare Lake has been active are being curtailed. While temporary log around options are being pursued, both for the Lemare crew and the MacMillan Bloedel's company crews from the nearby Tahsish-Kwois area, the longer term options are still unclear.

Based on the staffing levels of the Lemare Lake and general MacMillan Bloedel operations, the Kingcome TSA FL AAC of 86 478 m³ is estimated to support approximately 31 logging and 5 administrative PY of employment. The residence pattern of the Lemare Lake and Gilford Island camps indicates that 28 of the 36 PY are residents of the Port McNeill area, with the other 8 being Nanaimo-area residents.

Aside from occasional small shipments of pulp logs to Port Alice, all the harvest from MacMillan Bloedel's licence is towed/barged to its South Island and Lower Mainland operations. The estimated processing employment generated is included in Table 5.4.

Mill & Timber (AAC 70 395 m³)

Established in 1951, Mill & Timber is a privately owned Surrey-based company specializing exclusively in Western Red Cedar. Mill and Timber's FL is harvested from operating areas in Drury and Knight Inlets on the Mainland. These areas are expected to remain the focus of operations over the next 5 to 10 years (with a gradual shift toward the Drury Inlet - McGowan Bay area). The logging is carried out by Fleetwood Logging of Sechelt. The FL supports an estimated 37 PY of logging employment. In addition, about 3 PY of administrative/supervisory employment are also supported by the FL (all Lower Mainland residents). Crews are flown from Vancouver to Port Hardy, and from there by Air Cab (Coal Harbour-based) to the operating areas. Supplies are barged up from the Sechelt area. All logs are towed to the Lower Mainland.

Annual production at Mill & Timber's Surrey mill is approximately 60 million board feet, and average mill fibre consumption is approximately 240 000 m³. Another 60-80 000 m³ is acquired by Mill & Timber from Section 16.1 SBFEP sales in the Kingcome TSA (from Landucci and Haida). A FL with an AAC of 20 000 m³ in the Mid Coast TSA is the third "guaranteed" source of fibre. The balance of mill needs are met through log-for-chip sales and purchase arrangements on the open market. Two-thirds of output is sold as a finished cedar product (for cedar panelling, decking, siding) while one-third is sold to the local remanufacturing sector. This company has lumber trading links with dozens of Lower Mainland value added/remanufacturing firms.

The Surrey mill has a workforce of 155 PY (130 hourly, and 25 salary). On the basis of the proportion of fibre supplied (approximately 26%, net of a small pulp log component), Mill & Timber's Kingcome TSA FL supports an estimated 40 PY at the Surrey mill (the Small Business fibre increases that proportion to the 50% level). Log transportation, silviculture, and pulp log and chip sales generate additional employment, accounted for in Table 5.4, below.

Western Forest Products (Doman) (*AAC 108 887 m³*)

Western Forest Products (WFP) conducts operations in the general vicinity of Quatsino Sound (the Stranby, Fisherman, and San Josef River drainages), adjacent to Western's TFL 6 and Managed Forest #61. A combined FL and TFL harvest of approximately 450 000 m³ annually is logged by Western crews based in Holberg.

Western's Holberg operating area is generally low-elevation terrain, with conventional logging systems in use. The operating season is 10 to 11 months long. Western provides an estimated 104 PY of employment at its Holberg operations, which also log significant TFL volumes. Based on Western's general TFL 6 employment ratios, about 33 of the Holberg crew are supported by FL volumes. About two-thirds are residents of the North Island (Holberg, Port Hardy and Port McNeill), and one-third from the Mid-Island or Lower Mainland areas. Local First Nations people are employed by silviculture sub-contractors (Marlita of Alert Bay). Since the closure of the Canadian Forces base at nearby San Josef, Western is the only significant employer in the Holberg area. Western employs 7 individuals at its Northern Administration office in Port McNeill, which oversees the company's operations on the North Island.

From the log dump at Holberg, the logs are towed (by DH Timber Towing of Coal Harbour) to Western's main log sorting area at Port Alice, or (high-grade cedar or spruce only) trucked to Port McNeill, and towed from there to the Lower Mainland. From Port Alice, the pulp logs are redirected to the local pulp mill, and the balance are barged to Doman's log merchandiser at Duke Point, Nanaimo. On average, of WFP's FL volumes, about 10% (10 000 m³) go to the Port Alice pulp mill, and 90% (90-95 000m³) go to Nanaimo or the Lower Mainland.

The Western pulp mill at Port Alice was profiled in Section 2.0. The approximately 90-95 000 m³ of sawlog fibre is reallocated among Western/Doman's six sawmills in the Lower Mainland/Vancouver Island area, and as pulp chips, directed either to Western's bleached kraft pulp mill at Squamish, or to Vancouver Island pulp mills. Doman operates six sawmills; two in the Greater Vancouver area, and four in the South Island area (Duke Point, Ladysmith, Nanoose Bay, and Cowichan Bay); a remanufacturing plant was recently opened in Chemainus. The one Doman mill that has a slightly higher than average dependence on timber from the Kingcome TSA is the Silvertree sawmill in Vancouver, a specialty cedar mill. It's annual fibre throughput is approximately 370 000 m³; supplies from the Kingcome TSA on average may provide between 5% and 10% of this requirement.

The estimated non-local processing employment supported by Western's Kingcome FL allocation is included in Table 5.4.

Weldwood (AAC 221 140 m³)

Weldwood's coastal logging tenures and associated logging and milling operations were recently acquired by Interfor. To date, no significant changes to Weldwood's operations, described below, have resulted.

The harvesting of Weldwood's FL AAC is overseen by its Campbell River and Vancouver offices. Harvesting is conducted at the following operating locations:

- **Gilford Island:** Weldwood runs conventional and helicopter logging operations in the Gilford Island area, with annual harvests, respectively, of approximately 100 000 m³ and 30 000 m³. A 75 person crew is employed from May to December (equivalent to about 55 PY) in the ground-based operation, comprising 50 company and 25 contract employees. The workers are drawn 40% each from Campbell River and Powell River, and 10% each from Nanaimo and Vancouver. The helicopter logging is carried out by Helifor, and employs a 40 person crew for about 2 months (7 PY); Helifor is Vancouver-based, and recruits its crew from the Lower Mainland and Vancouver Island. The combined Gilford Island operations therefore support approximately 62 harvesting PY, all non-local.
- **Thompson Sound/Lane Bay:** Weldwood logs another 50 000 m³ at its Thompson Sound location and 30 000 m³ at Lane Bay (Broughton Island). A Campbell River based contractor (Hulbruk-Dyson) manages both locations, providing employment to a crew of 30 from February through December (equivalent to 30 PY).
- **Rellim Creek:** This is a helicopter-based operation (Helifor), averaging 10 to 15 000 m³ annually, and providing approximately 3 PY of employment (all Lower Mainland residents).

Overall, an estimated 105 PY of direct harvesting-related employment (including administration) are supported by Weldwood's Kingcome TSA operations. Additional direct employment is supported through the transportation of the logs to the Lower Mainland, and through silviculture activities. Local First Nations members are occasionally employed in silviculture work (Gilford Island Band).

Weldwood's logs are all towed to the Lower Mainland area. The pulp log component averages approximately 15% (the principal buyer is Fletcher Challenge Elk Falls mill). Sawlogs are either traded or redirected to one of Weldwood's two Lower Mainland sawmills: Squamish Lumber or Flavelle Cedar (Port Moody). These two mills have a combined workforce of approximately 550. The modernized Squamish mill produces housing components, mostly for the Japanese market, while the Port Moody mill specializes in cedar siding. The Kingcome FL volumes (with allowance for trades) are equivalent to approximately 20% of the mills' fibre inputs, and support about 110 PY. Kingcome TSA supply sources are valued because of the relatively high proportion of cedar in the mix. Cedar is less easily acquired through trading, and is needed for the Flavelle cedar mill.

The bulk of Weldwood's "North Island" equipment and supplies expenditures occur in the Campbell River area, and include Finning in Campbell River and Coval Air. Crews are flown in,

and camps are supplied, from Campbell River. Fuel is barged in from Vancouver, and industrial materials such as wire rope are purchased from Madill of Nanaimo or from suppliers in Vancouver.

Richmond Plywood (*AAC 69 720 m³*)

In operation since 1956, Richmond Plywood is an employee-owned mill, one of the few remaining plywood mills on the South Coast. Logging is carried out by a Langley-based contractor (Barnes Logging), and supports, on average, about 28 PY of direct logging and supervisory employment (crew size can range from 12 to 30 individuals, depending on factors such as the terrain and road building required). About 12 PY are from the North Island area (8 from Port Hardy, and 4 from Port McNeill), 8 from the Campbell River area, and the remaining 8 are from the Lower Mainland area. Operating areas are in the Nahwitti-Shushartie valley areas of the North Island. The logs are trucked to the Beaver Cove dryland sort and towed from there to the Lower Mainland. Most are then traded for the peeler/veneer logs specifically required for the Richmond Plywood mill.

The mill has an annual fibre input requirement of approximately 330 000 m³, and a workforce of approximately 350 PY (full-time equivalents). The Kingcome TSA licence (allowing for trades) equates to about 20% of the mill's fibre base, supporting about 70 PY. Additional employment is created through silviculture, log transportation, and chip sales to pulp mills.

Shushartie Log Sales Ltd.

Shushartie Log Sales holds a non-replaceable licence (expiry date 2004) in the Kingcome TSA with an AAC of 112 000 m³. The licence was awarded to Shushartie in 1988, when it relocated operations from the South Island area. Shushartie currently has logging operations ongoing in the Woods Lagoon/Seymour Inlet area on the mainland. Aside from Western's Port Alice pulp mill, Shushartie is the only large licence holder to carry out further processing in the North Island area. It's milling operations are located close to Port Hardy. These comprise a primary sawmill, a shake and shingle mill, a pole and post mill, and a chipper. On average, approximately 50% of Shushartie's TSA fibre base is processed locally, with the balance being sold in the open log market, or traded for additional processing material for the Port Hardy operations. While Shushartie's operating areas are relatively low productivity sites, they have a high proportion of cedar shake material, which is suitable for their mill.

Shushartie's current employment base is estimated at 95 PY (55 logging PY and 40 administration/milling PY). Logging operations are carried out by a Sechelt-based firm (CN Danforth). Overall, about 70 of the work force are local. Capacity exists to add a second shift at the shake mill, which would double the existing 20 person employment level.

Shake mill capacity is 40-45 000 squares annually, but 1993/1994 production levels have been half of that. This is attributed to weak market conditions rather than wood supply problems. Over 95% of the shake mill's output is shipped to Washington State, where it is remanufactured into siding and shingles, for re-shipment to markets in the USA. These remanufacturing plants are owned by Fraser Valley shake and shingle companies, and are located in Washington State for labour cost, tax, and tariff reasons. Shushartie's sawmill is also operating below capacity, but

would require additional finishing capacity to expand (debarker, resaw edger, planer). It currently produces rough, unplaned lumber (fir), which is shipped (through lumber brokers) for resawing/edging elsewhere in BC. The chips produced (about 6000 BDU's annually) are shipped to the Gold River pulp mill.

Shushartie's non-replaceable Forest Licence permits harvesting only within low productivity sites in the TSA; these sites have not historically been considered to be economic to develop. As the Timber Supply Analysis Report examines only the impacts of current forest management practices on timber supply, all low sites, and therefore Shushartie's portion of the AAC, have been excluded from the timber supply analysis. To be consistent, direct employment related to Shushartie's operations are not included in Table 5.4 or in subsequent sections of this report. Any employment and revenues related to Scott Paper's non-replaceable deciduous Forest Licence (5000 m³ per year) has similarly been excluded from the analysis in this report.

5.5 Small Business Forest Enterprise Program (SBFEP)

As shown in Table 5.2, the SBFEP AAC for the Kingcome TSA is currently set at 339 572 m³, almost 20% of the total TSA AAC. The SBFEP AAC consists of the following two categories of Timber Sale Licences (TSLs):

Section 16 Sales: This AAC is set at 242 985 m³ and is for sales awarded on a highest monetary bid basis. Sales under this category are usually for a period of one or two years.

There are an estimated 37 SBFEP registrants from the local area (most from Port McNeill, Port Hardy or Sointula) eligible to compete for Section 16 sales, although not all are active. However, these registrants are generally smaller operations and often do not have the capital required to competitively bid on large volume sales. As a result, all of the approximately sixteen TSLs currently active within the TSA are held by larger, non-local firms. Many of these firms, in turn, sub-contract certain operations to North Island residents. At present, it is estimated that local contractors perform half of the harvesting and road construction work resulting from SBFEP sales.

Ministry of Forests staff are of the view (supported by local opinion) that as much as 95% of Section 16 wood leaves the North Island, and that the only fibre available to local mills on any kind of regular basis is non-quota logs or cants salvaged from older timber sales or road deactivation.

Section 16.1 Sales: This AAC is currently set at 96 587 m³. Sales under this category are awarded to SBFEP registrants who, among other criteria, present the highest "value-added" proposal. Sales under this category can range from terms of one to ten years.

Three Section 16.1 TSLs have been awarded in the Kingcome TSA since 1987. All of these sales have been awarded to non-local sources, and the resulting processing and value-added activities all occur outside of the TSA. This of course is not by design; at this point in time, the local capacity to add value, and bid for these sales, is limited. The three sales are:

- A 1990 sale to Landucci Industries of Surrey, averaging 52 746 m³ over five years. This sale was suspended for a period, but is currently being reactivated. Landucci has a supply/swap arrangement with Mill & Timber in Vancouver for the acquisition of this fibre.
- A 1992 sale to Haida Forest Products of Burnaby, averaging 27 845 m³ per year over five years. Haida is affiliated with Mill & Timber, which receives most of this volume in exchange for rough dimension lumber which is remanufactured by Haida.
- A 1994 sale to BCM Timber of Langley, averaging 28 036 m³ per year over five years.

SBFEP harvest levels in recent years have been consistently lower than the AAC, primarily in the Section 16 category. To more realistically reflect the current situation, this report utilizes actual harvest levels and not the AAC to determine employment and revenue estimates associated with the SBFEP.

5.6 BC Forest Service

There is additional forestry-related employment at the Port McNeill Forest District office of approximately 84 PY, only a portion of which is TSA-related. In addition, there are Forest Service employees who work at the Vancouver Region office and in branches located in Victoria, who undertake work related to the Kingcome TSA.

Forest Service employment was identified for profiling purposes only. Due to the broad stewardship role of the Forest Service, no direct relationship can reasonably be established with harvest levels. For example, the Forest Service has an increasing workload related to planning, the balancing of timber and non-timber resource values, and initiatives such as the Forest Practices Code and the Vancouver Island Land Use Plan. For this reason, Forest Service employment is not included in the impact analysis presented in the report.

5.7 Direct Employment Base

The following table summarizes the direct employment base associated with the current harvest level of 1 340 000 m³ (Forest Service employment is not included).²⁹ This has been estimated by proportionately reducing the AAC-related employment estimates obtained from industry sources, as described above - the difference is about 20%. The employment levels which would be associated with the AAC level, if it were being cut, are presented in Appendix C. Table 5.4

²⁹ The employment estimates shown are person-years and not actual "job" estimates. The two are reasonably close in most categories other than silviculture, marine transportation, and heli-logging. In conventional harvesting, 9, 10, and 11 month periods of employment are counted as "person-years", since this is generally the employment norm for that group.

shows the estimated employment income generated by this employment. The background to this is presented in Appendix C.

Table 5.4: Kingcome TSA Direct Employment Base

Category	North Island (Kingcome TSA)	Mid-Island (Campbell River area)	South Island/ Lower Mainland	Total
Harvesting	206	240	167	612
Silviculture	12	8	20	40
Marine Transport	4	4	32	40
Sawmilling	8	24	654	687
Pulp/Paper	20	80	422	523
Total	250	356	1296	1902

Table 5.5: Kingcome TSA Direct Employment Income Base (Before -Tax, \$1994))

Category	Kingcome TSA Wage Levels	Kingcome TSA Employment Income(\$millions)	Province-Wide Wage Levels ^{1,2}	Province-Wide Employment Income (\$ millions)
Harvesting	\$52 300	\$ 10.8	\$ 52 300	\$ 32.0
Silviculture	\$ 32 000	\$ 0.4	\$ 32 000	\$ 1.3
Marine Transport	\$ 50 000	\$ 0.2	\$ 57 500	\$ 2.3
Sawmilling	\$49 900	\$ 0.4	\$ 53 800	\$ 37.0
Pulp/Paper	\$55 600	\$ 1.1	\$ 54 000	\$ 28.2
Total	\$51 500	\$ 12.9	\$ 53 000	\$100.8

Notes:

1. Incomes shown have been reduced by 20% (15% for silviculture) to remove the estimated margin of non-cash benefits. Non-cash benefits include employer contributions to pension and extended health plans. Cash benefits, such as vacation and overtime pay, are included in the estimates.
2. The Province-Wide level comprises North Island, Mid-Island and South Island/Lower Mainland areas.

The overall estimated direct employment coefficient is 1.419 PY per 1000 m³ harvested in the TSA. This can be applied to any particular timber harvest level to generate the related direct employment. This information is used in Section 7 in the estimation of economic impacts associated with three of the timber harvest forecast scenarios from the Timber Supply Analysis Report. The Kingcome TSA timber supply forecasts are discussed in the following section.

6.0 Kingcome TSA Timber Supply Forecasts

The purpose of this report is to assess the economic, social, and environmental implications of changing future timber harvesting levels in the Kingcome TSA. The Kingcome TSA Timber Supply Analysis Report (TSAR) assesses how current forest management practices may affect the future supply of wood available for harvesting, and shows how the rate of harvest may change in order to reach a sustainable long-term harvest level (LTHL). Section 6.1 provides background discussion of the timber supply analysis; Section 6.2 describes the three harvest forecasts that are examined in this SEA report; and Section 6.3 identifies on-going forest management processes that may have additional implications for Kingcome TSA timber supply.

6.1 Kingcome TSA Timber Supply Analysis³⁰

6.1.1 Timber Harvesting Land Base

The Kingcome TSA covers approximately 1.13 million hectares of land on northern Vancouver Island and the adjacent coastal mainland area. As shown in Table 5.1, from the Timber Supply Analysis Report (TSAR), about 16% of the total area, or about 178 000 hectares, contributes to the timber harvesting land base. Significant areas excluded include the following:

- non-forest areas (such as rock or swamp), which cover about 49% of the total land base;
- non-Crown and non-TSA land, and areas managed by other agencies (for example, parks and recreation areas), which cover about 4.9% of the total land base;
- inoperable areas unavailable for harvest for terrain-related or economic reasons, which extend over an estimated 17.9% of the total land base;
- environmentally sensitive areas, covering 6.3% of the total land base;
- the Klinaklini area, in the northwest corner of the TSA, covering an estimated 3.2% of the total land base; and,
- a variety of smaller classification areas, including visual quality preservation areas, roads, lakeshore and streamside buffers, low sites, non-merchantable forest types, and woodlots.

³⁰This section summarizes discussion contained in the *Kingcome TSA Timber Supply Analysis Report*, Ministry of Forests, 1995.

Table 6.1: Kingcome TSA: Timber Harvesting Land Base

Classification	Area (hectares)	Percent of total	Percent of productive forest
Total land base	1 126 126	100.0	
Not managed by Forest Service	55 222	4.9	
Non-forest	551 210	49.0	
Total productive Crown forest	519 694	46.1	100.00
Current reductions			
Non-commercial cover (brush)	816	0.1	0.2
Klinaklini	35 923	3.2	6.9
Environmentally sensitive areas	70 825	6.3	13.6
Low productivity	25 478	2.3	4.9
Non-merchantable forest types	11 451	1.0	2.2
Visual quality preservation areas	7 702	0.7	1.5
Inoperable	201 228	17.9	38.7
Existing roads	3 840	0.3	0.7
Lakeshore and streamside buffers	4 071	0.3	0.8
Woodlot	401		0.1
Total current reductions	361 735	32.1	69.6
Additions ¹	20 050	1.8	3.8
Total current timber harvesting land base	178 009	15.8	34.2
Future reductions (roads)	7 370	0.6	1.4
Long-term timber harvesting land base	170 639	15.2	32.8

Source: Kingcome TSA Timber Supply Analysis Report

Notes:

1. These refer to Timber Licence and TFL reversions.

6.1.2 Background to Timber Supply Analysis

Forests of the TSA are primarily hemlock/balsam (56%) and red cedar (41%), with a small amount of Douglas fir and spruce (3%). Only an estimated 6.5% of the timber harvesting land base consists of good quality growing sites; the majority is medium and poor sites. However, since historical harvesting has been concentrated in the better sites, the majority of harvesting in the short term will have to take place on relatively poor cedar and hemlock/balsam sites.

The timber supply analysis shows that a large immediate decline in the allowable annual cut is required in order to avoid future disruptions in Kingcome TSA timber supply. There are three main reasons for this.

AAC Duration - The current allowable annual cut has not changed significantly since it was set in 1980 at 1.7 million cubic metres per year. However, many significant changes have occurred during this period that have reduced the size of the timber harvesting land base from an estimated 340 000 hectares in 1980 to its current size of 178 009 hectares. These changes include boundary changes (i.e. reductions) to the TSA area, withdrawal of parks and recreation areas from the TSA, improved inventories and management of non-timber values and more accurate mapping of operability.

Forest Age Class Distribution - There is a large age imbalance within the forests of the TSA. The TSAR illustrates that there are presently few stands in the middle age ranges (80 to 200 years) the majority of stands are either very old (many over 300 years) or young (less than 60 years). This means that existing mature (old-growth) stands must sustain harvesting within the TSA for at least 50 years, until the young (second-growth) stands become large enough to harvest. Due to the reduced size of the timber harvesting land base and a long history of harvesting in the TSA, the original abundance of mature forest which historically supported harvest rates well above the long-term level no longer exists.

Integrated Resource Management - Practices implemented to accommodate non-timber forest and landscape values restrict the availability of mature timber by limiting the amount that can be harvesting at any time. The TSAR shows that forest cover constraints designed to disperse harvesting across the landscape (greenup/adjacency) and preserve scenic values (Visual Quality Objectives) limit timber supply in the short term. It is important to note however, that even if these practices were changed, the timber supply forecast would predict an immediate decline in the harvest level because much of the original mature forest has already been harvested.

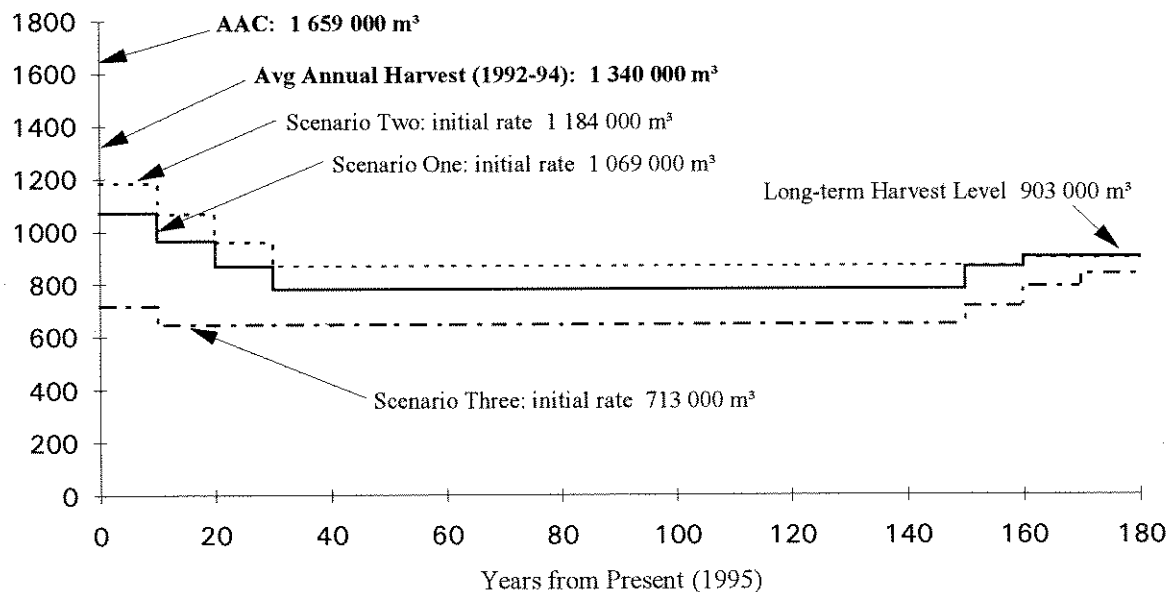
The TSAR presents a "base case" timber supply forecast, which is then used as a basis for assessing the timber supply impacts of a number of uncertainties associated with the timber supply analysis. These uncertainties and their potential impacts are discussed further in the TSAR and the Public Discussion Paper.

6.2 Harvest Forecast Scenarios

This SEA report focuses on three of the TSAR's harvest forecasts, as shown in Figure 6.1.

Examination of these particular scenarios is not intended to indicate an AAC recommendation--they are presented for illustrative and discussion purposes only. The Chief Forester must carefully examine all available information as required by Section 7 of the *Forest Act* and make an AAC determination based upon independent, professional judgement.

Figure 6.1 Kingcome TSA Timber Harvest Scenarios



Scenario One reflects the "base case" timber supply forecast from the TSAR. Under this scenario, the initial annual rate of harvest of 1 069 000 m³ corresponds to a 20% decline (271 000 m³) from the current harvest level of 1 340 000 m³, and a 35% decline (590 000 m³) from the AAC. (In the following sections of the report the AAC is rounded to 1 659 000 m³ from 1 658 577 m³, for analysis and presentation purposes.) The annual harvest falls by another 10% for each of the following three decades, to a level of approximately 779 000 m³ per year, where it remains for the following eleven decades. It then rises to the long-term harvest level of about 903 000 m³.

The base case timber supply forecast is meant to reflect current forest management practices within the Kingcome TSA. As mentioned above, and discussed in more detail in the TSAR and PDP, some uncertainty exists surrounding some of the data and forest management assumptions incorporated in the base case. Small changes to certain "critical" factors can result in significant changes to the timber supply forecast.

Scenarios Two and Three were generated by respectively relaxing and restricting the forest cover constraints modelled in the base case. When forest cover constraints are relaxed by 5% (decreased) more mature timber becomes available for harvesting, thereby raising harvest levels

above the base case (29% below the current AAC). When forest cover constraints are restricted by 5%, timber availability is reduced, necessitating further reduction in harvest levels below the base case (57% below the current AAC).

The incremental changes to harvest levels associated with each of the three scenarios are outlined in Table 6.2, below. These are initially calculated with reference to the current harvest level of 1 340 000 m³, which is used as the benchmark because the AAC has been undercut in each of the last three years.

Table 6.2: Base Case Incremental Harvest Changes ('000m³ per year)

Year	Scenario One		Scenario Two		Scenario Three	
	Harvest (000m ³ /year)	Incremental Change	Harvest (000m ³ /year)	Incremental Change	Harvest (000m ³ /year)	Incremental Change
Current	1340		1340		1340	
0	1069	(271)	1184	(156)	713	(647)
10	962	(107)	1065	(119)	644	(69)
20	866	(96)	959	(106)	644	(0)
30-149	779	(87)	867	(92)	644	(0)
150	864	85	898	31	790	147
160+	903	39	914	16	836	45
Cumulative Change		(437)		(426)		(504)

In addition to modifying the required forest cover constraints, the TSAR explored other possibilities for achieving a less drastic reduced initial rate of harvest. The following are two examples of what in theory might be possible, but that if pursued, would risk violating other forestry management aims (including that of long-term community stability):

- While respecting current forest cover guidelines, an initial harvest level of 1 496 300 m³, or 10% below the present AAC, is possible. Beginning in the second decade, however, the allowable harvest would drop dramatically to a level of 610 500 m³ per year;
- A second option examined, one which also respects existing forest cover guidelines, was one that would increase the rate of decline in the second and subsequent decades from 10% to 20% per year. The resulting increase in the initial harvest levels was however very small, i.e., only 70 000 m³ above that presented for the base case.

6.3 Parallel Forest Management Processes

There are parallel forest management processes that may have future TSA timber supply implications over and above those considered in the Kingcome TSA Timber Supply Review. The most notable of these are the following:

- The outcome of the ongoing Protected Areas strategy for the mainland TSA areas. A finalized protected area list may require removals from the TSA harvesting landbase assumed

for the present Timber Supply Review (as shown in Table 6.1 above). There are a number of study areas and areas of interest currently designated on the mainland, including a large Mt. Waddington/Klinaklini River study area, as well as portions of a number of large watersheds, e.g. the Ahta, Ahnuhati, and Kakweiken rivers.

- Future revisions to the protected and other management designation boundaries arrived at with the Vancouver Island Land Use Plan (VILUP). Such a possibility always exists, although the likelihood of major revisions is considered remote (the VILUP resulted in seven new Protected Areas being created within the Port McNeill Forest District boundaries, but only one, Nahwittie-Shushartie, is on the TSA land-base)³¹.
- Implementation of the Forest Practices Code.

These are the primary landbase/forest management processes that could alter the TSR timber supply forecasts for the Kingcome TSA. For the overall North Island forestry sector, the outcome of parallel timber supply reviews for the TFL's identified earlier are also of interest.

This section has provided a background to the timber supply situation in the Kingcome TSA, and has presented the three harvest scenarios from the TSAR which form the basis for the analysis presented in this report. The impacts associated with these harvest scenarios are grouped into sections dealing with economic impacts, community implications, First Nations implications, and environmental implications. These are presented in Sections 7, 8, 9, and 10, respectively.

³¹ These were: the Lanz and Cox Islands; Nahwittie-Shushartie; God's Pocket; Quatsino; Marble River; Lower Nimpkish; and Nimpkish Lake.

7.0 Economic Impacts

This section presents the estimated forest sector economic impacts associated with the three harvest forecast scenarios. These include impacts on employment, employment income, and provincial government revenues. Impacts are discussed in the context of the Kingcome TSA and the province as a whole. In addition, federal government revenue impacts are also presented. The incremental changes associated with the harvest scenarios are presented in Appendix B. A detailed explanation of the economic impact assessment methodology is provided in Appendix C.

7.1 Methodology and Assumptions

The Kingcome TSA timber harvest generates "direct" employment in the harvesting, silviculture, marine transport, sawmilling, and pulp and paper sectors. This was estimated for 1994 based primarily on survey information collected directly from companies (more detail is provided in Appendix C). "Indirect" employment is created in sectors supplying inputs to the forest industry such as transportation, machinery supply and repair, and business accommodation. "Induced" employment is supported by the local spending of forestry-related "direct" and "indirect" employment income, for example at retail outlets and restaurants. Indirect and induced employment were estimated using employment multipliers, which are explained in more detail in Appendix C. Impacts are presented in \$1994.

The analysis estimates economic impacts using coefficients that provide measures of employment and employment income in terms of thousand cubic metres of timber harvested. These coefficients are based on employment data for 1994, and the 1992-94 three-year average harvest level of 1 340 000 m³. The 1992-94 harvest level is used as the base reference for the impact analysis, and is referred to as the "current" harvest level. Several qualifiers apply to the impacts discussed below:

Threshold Levels - The analysis assumes that employment changes occur in direct proportion to harvest changes. While this is reasonably accurate for harvesting employment, it is more likely that processing employment at specific mills may not change until mill inputs drop below threshold levels, upon which one or two shifts, or even an entire mill, could shut down. The threshold level would depend on a number of complex interrelated operational factors, as well as on the availability of private wood and logs from outside the TSA. As a simplification, this analysis assumes smooth employment declines over time, whereas in reality, employment declines maybe larger and more sudden, but would occur at less frequent intervals. It is probable that over the longer term the cumulative impacts would likely be the same.

Timing of Impacts - Employment impacts are assumed to occur simultaneously with harvest reductions, whereas they may actually be postponed or avoided. If there are pending changes in factors such as markets or government policy initiatives, forest companies may wait to adjust employment levels until the longer term operational environment becomes clearer.

Indirect Employment Linkages - A linear relationship is assumed to exist between harvesting and indirect employment. This, again, is a simplification of the more likely occurrence that businesses would close if communities become too small to support certain services.

Technological Change - It is assumed there would be no job losses due to technological change, but in the past this has often led to considerable reductions in employment.

Income Support - The impacts were calculated without considering income support mechanisms, particularly Unemployment Insurance, which would mitigate short-term losses.

Government Expenditures - These are assumed to remain unchanged despite changes in harvest levels. In reality, public expenditures in a number of areas, such as schools and health care facilities, are likely to eventually change as community population levels change.

Degree of Precision - The employment coefficients were taken to three decimal places in order to accurately reflect the results of the survey information provided by the forest industry. However, the resulting impacts look much more precise than they actually are. There is, in fact, considerable uncertainty around these estimates; they are general indications provided for discussion purposes, rather than definitive projections.

7.2 Kingcome TSA Impacts

The full AAC level of 1 659 000 m³ would support an estimated 310 PY of direct employment and 139 PY of indirect/induced employment. The current harvest level is estimated to support 250 PY of direct forest sector employment in the TSA. This employment falls into the categories shown in Table 7.1, which also shows the relationship between employment and harvest levels.

Table 7.1 Kingcome TSA Employment

Sector	TSA Employment Coefficient (PY/000 m ³)	TSA Employment (PY)
Harvesting	0.154	206
Silviculture	0.009	12
Marine Transport	0.003	4
Sawmilling	0.006	8
Pulp and paper	0.015	20
Total	0.187	250

In addition to employment directly in the forestry sector, there are an estimated 111 PY in indirect/induced employment. This was calculated based on multipliers provided by the Ministry of Finance and Corporate Relations.

The total economic impacts are presented in Tables 7.2, 7.3, and 7.4. (Incremental, or decade-by-decade changes are provided in Appendix B). These tables are based on the harvest-related coefficients shown below:

Information for calculating employment and income impacts for Kingcome TSA harvest forecasts	
TSA direct employment coefficient (PY/'000 m ³)	0.187
TSA indirect/induced employment coefficient (PY/'000 m ³)	0.084
TSA direct income coefficient (\$/'000 m ³)	\$ 6 840
TSA indirect/induced income coefficient (\$/'000 m ³)	\$ 1 690

Table 7.2 Scenario One: Kingcome TSA Employment and Income Impacts

Year	Harvest (<i>'000 m³/year</i>)	Employment			Income		
		Direct (<i>PY</i>)	Indirect/ Induced (<i>PY</i>)	Total (<i>PY</i>)	Direct (<i>\$1994 mil.</i>)	Indirect/ Induced (<i>\$1994 mil.</i>)	Total (<i>\$1994 mil.</i>)
Current	1340	250	111	361	\$ 9.2	\$ 2.3	\$ 11.5
0	1069	200	90	290	\$ 7.3	\$ 1.8	\$ 9.1
10	962	180	81	261	\$ 6.6	\$ 1.6	\$ 8.2
20	866	162	73	235	\$ 5.9	\$ 1.5	\$ 7.4
30 - 149	779	146	65	211	\$ 5.3	\$ 1.3	\$ 6.6
150	864	162	73	235	\$ 5.9	\$ 1.5	\$ 7.4
160	903	169	76	245	\$ 6.2	\$ 1.5	\$ 7.7

Table 7.3 Scenario Two: Kingcome TSA Employment and Income Impacts

Year	Harvest (<i>'000 m³/year</i>)	Employment			Income		
		Direct (<i>PY</i>)	Indirect/ Induced (<i>PY</i>)	Total (<i>PY</i>)	Direct (<i>\$1994 mil.</i>)	Indirect/ Induced (<i>\$1994 mil.</i>)	Total (<i>\$1994 mil.</i>)
Current	1340	250	111	361	\$ 9.2	\$ 2.3	\$ 11.5
0	1184	221	99	320	\$ 8.1	\$ 2.0	\$ 10.1
10	1065	199	89	288	\$ 7.3	\$ 1.8	\$ 9.1
20	959	179	81	260	\$ 6.6	\$ 1.6	\$ 8.2
30 - 159	867	162	73	235	\$ 5.9	\$ 1.5	\$ 7.4
160	898	168	75	243	\$ 6.1	\$ 1.5	\$ 7.6
170	914	171	77	248	\$ 6.3	\$ 1.5	\$ 7.8

Table 7.4 Scenario Three: Kingcome TSA Employment and Income Impacts

Year	Harvest (<i>'000 m³/year</i>)	Employment			Income		
		Direct (<i>PY</i>)	Indirect/ Induced (<i>PY</i>)	Total (<i>PY</i>)	Direct (<i>\$1994 mil.</i>)	Indirect/ Induced (<i>\$1994 mil.</i>)	Total (<i>\$1994 mil.</i>)
Current	1340	250	111	361	\$ 9.2	\$ 2.3	\$ 11.5
0	713	133	60	193	\$ 4.9	\$ 1.2	\$ 6.1
10 - 149	644	120	54	174	\$ 4.4	\$ 1.1	\$ 5.5
150	712	133	60	193	\$ 4.9	\$ 1.2	\$ 6.1
160	790	148	66	214	\$ 5.4	\$ 1.3	\$ 6.7
170	836	156	70	226	\$ 5.7	\$ 1.4	\$ 7.1

Scenario One - The harvest level would fall immediately by 20%, to 1 069 000 m³. In the TSA, there would be a proportional loss of 50 PY of direct employment and 21 PY of indirect/induced employment. Employment levels would follow the drop in harvest levels over subsequent decades. By Year 30 there would be a cumulative drop of about 40 %, representing about 100 direct PY and 46 indirect/induced PY. After-tax income levels would follow a similar pattern.

Scenario Two - This scenario would involve an initial drop of about 12% in employment, with the loss of 29 direct PY and 12 indirect/induced PY. By Year 30, there would be a cumulative reduction of 35%, with the loss of about 88 direct PY and 38 indirect/induced PY.

Scenario Three - There would be an immediate harvest decline of 47%, with proportionate impacts on employment. Direct employment would fall by 117 PY, and indirect/induced employment by 51 PY. A further reduction of 10% would occur in Year 10, followed by employment level stability.

In comparison, if the AAC were used as a benchmark, rather than the current harvest level, employment levels would initially fall by larger amounts: by about 35% in Scenario One, (110 direct PY and 49 indirect/induced PY), 29% in Scenario Two, (177 direct PY and 79 indirect/induced PY), and 57% in Scenario Three (89 direct PY and 40 indirect/induced PY).

7.3 Provincial Impacts

Timber and primary wood products that are exported from the TSA for processing elsewhere create jobs outside the TSA that would be affected by lower timber harvest levels. About 90% of the TSA's harvest is shipped to southern Vancouver Island and the Lower Mainland for processing. This fibre outflow generates significant employment at sawmills and pulp mills, as well as in marine transport.

Including jobs in the TSA, the full AAC would support an estimated 2354 PY of direct forest sector employment and indirect/induced employment of 3531 PY. The current harvest level of 1 340 000 m³ is estimated to support 1902 PY of direct forest sector employment. This employment is allocated as shown in Table 7.5, which reflects the information presented in Table 5.4.

Table 7.5 Provincial Employment

Sector	TSA (PY)	Outside TSA (PY)	Provincial Employment (PY)	Provincial Employment Coefficient (PY/'000 m ³)
Harvesting	206	406	612	0.457
Silviculture	12	28	40	0.030
Marine Transport	4	36	40	0.030
Sawmilling	8	679	687	0.513
Pulp and Paper	20	503	523	0.390
Total	250	1652	1902	1.419

In addition, there were an estimated 2853 PY of indirect/induced employment, based on the application of a provincial employment multiplier of 2.5.

Province-wide, direct employment related to the Kingcome harvest accounts for 40% of total employment, whereas in the TSA direct employment accounts for about 70% of the total. This reflects the fact that much of the indirect and induced employment associated with the Kingcome TSA harvest is located outside the TSA. Indirect employment outside the TSA would include employment in companies supplying the TSA's forest industry with, for example, metal fabrication, sawmill and woodworking machinery supplies, and forestry consulting services. It would also include employment related to business accommodation. Induced employment outside the TSA relates to the jobs supported outside the TSA by the spending of forest sector employees whose jobs are related to the Kingcome TSA harvest. This would include, for example, jobs at car dealerships and at retail outlets selling household furnishings and appliances. Many of these indirect or induced jobs are in Campbell River and the Lower Mainland.

The provincial employment and employment income levels of the three harvest scenarios are set out in Tables 7.6 and 7.7, and 7.8 (incremental impacts are presented in Appendix B). These tables are based on the following coefficients:

Information for calculating provincial employment and income impacts for Kingcome TSA harvest forecasts	
Provincial direct employment coefficient (PY/'000 m ³)	1.419
Provincial indirect/induced employment coefficient (PY/'000 m ³)	2.130
Provincial direct income coefficient (\$/'000 m ³)	\$ 52 640
Provincial indirect/induced income coefficient (\$/'000 m ³)	\$ 52 780

Table 7.6 Scenario One: Provincial Employment and Income Impacts

Year	Harvest (<i>'000 m³/year</i>)	Employment			Income		
		Direct (<i>PY</i>)	Indirect/ Induced (<i>PY</i>)	Total (<i>PY</i>)	Direct (<i>\$1994 mil.</i>)	Indirect/ Induced (<i>\$1994 mil.</i>)	Total (<i>\$1994 mil.</i>)
Current	1340	1902	2853	4755	\$ 70.5	\$ 70.7	\$ 141.2
0	1069	1517	2277	3794	\$ 56.3	\$ 56.4	\$ 112.7
10	962	1365	2049	3414	\$ 50.6	\$ 50.8	\$ 101.4
20	866	1229	1845	3074	\$ 45.6	\$ 45.7	\$ 91.3
30 - 149	779	1105	1659	2764	\$ 41.0	\$ 41.1	\$ 82.1
150	864	1226	1840	3066	\$ 45.5	\$ 45.6	\$ 91.1
160	903	1281	1923	3204	\$ 47.5	\$ 47.7	\$ 95.2

Table 7.7 Scenario Two: Provincial Employment and Income Impacts

Year	Harvest (<i>'000 m³/year</i>)	Employment			Income		
		Direct (PY)	Indirect/ Induced (PY)	Total (PY)	Direct (\$1994 mil.)	Indirect/ Induced (\$1994 mil.)	Total (\$1994 mil.)
Current	1340	1902	2853	4755	\$ 70.5	\$ 70.7	\$ 141.2
0	1184	1680	2522	4202	\$ 62.3	\$ 62.5	\$ 124.8
10	1065	1511	2268	3779	\$ 56.1	\$ 56.2	\$ 112.3
20	959	1361	2043	3404	\$ 50.5	\$ 50.6	\$ 101.1
30 - 159	867	1230	1847	3077	\$ 45.6	\$ 45.8	\$ 91.4
160	898	1274	1913	3187	\$ 47.3	\$ 47.4	\$ 94.7
170	914	1297	1947	3244	\$ 48.1	\$ 48.2	\$ 96.3

Table 7.8 Scenario Three: Provincial Employment and Income Impacts

Year	Harvest (<i>'000 m³/year</i>)	Employment			Income		
		Direct (PY)	Indirect/ Induced (PY)	Total (PY)	Direct (\$1994 mil.)	Indirect/ Induced (\$1994 mil.)	Total (\$1994 mil.)
Current	1340	1902	2853	4755	\$ 70.5	\$ 70.7	\$ 141.2
0	713	1012	1519	2531	\$ 37.5	\$ 37.6	\$ 75.1
10 - 149	644	914	1372	2286	\$ 33.9	\$ 34.0	\$ 67.9
150	712	1010	1517	2527	\$ 37.5	\$ 37.6	\$ 75.1
160	790	1121	1683	2804	\$ 41.6	\$ 41.7	\$ 83.3
170	836	1186	1781	2967	\$ 44.0	\$ 44.1	\$ 88.1

Scenario One - Total employment would fall immediately by 20%, or about 960 PY, with an associated drop in after-tax income of \$29 million. By Year 30, there would be a cumulative drop of 40%, representing a total of almost 2000 PY and \$60 million in after-tax income.

Scenario Two - The initial 12% harvest drop would produce a drop of 554 PY of total employment and about \$16 million in after-tax income. By Year 30, the cumulative reduction would be 35%, with the loss of about 1680 PY and \$50 million of after-tax income.

Scenario Three - The 47% harvest decline would result in the loss in total of about 2200 PY and \$66 million in after-tax income. There would be a further reduction of 10% in Year 10.

As discussed in the TSA impacts section, this analysis assumes that employment changes occur in direct proportion to harvest changes. If the full AAC level were used as a reference, the initial employment reductions would be about 35% in Scenario One (837 direct PY and 1254 indirect/induced PY), 29% in Scenario Two (674 direct PY and 1009 indirect/induced PY), and 57% in Scenario Three (1342 direct PY and 2012 indirect/induced PY).

7.4 Government Revenue Impacts

7.4.1 Provincial Government Revenues

Provincial government revenues from a number of sources would fall if the timber harvest level is reduced. The major revenue sources affected would be stumpage and other forestry-related charges, and personal income taxes. These impacts are shown in Tables 7.9, 7.10, and 7.11, which are based on the coefficients below (these are explained further in Appendix C).

Information for calculating government revenue impacts for Kingcome TSA harvest forecasts	
BC Personal Income Tax coefficient (\$/000 m ³)	\$ 12 770
BC Stumpage, Rent and Fees coefficient (\$/000 m ³)	\$ 21 140
Other BC Forest Sector Taxes coefficient (\$/000 m ³)	\$ 7 570
Federal Personal Income Tax coefficient (\$/000 m ³)	\$ 25 540
Other Federal Taxes coefficient (\$/000 m ³)	\$ 1 380

Table 7.9 Scenario One: Government Revenue Impacts

Year	Harvest (^{'000 m³/year})	BC Government Revenues				Federal Government		
		Stumpage, Rent & Fees (^{\$1993 mil.})	Other Forestry Taxes (^{\$1993 mil.})	Personal Income Tax (^{\$1993 mil.})	BC Total (^{\$1993 mil.})	Personal Income Tax (^{\$1993 mil.})	Other Federal Taxes (^{\$1993 mil.})	Federal Total (^{\$1993 mil.})
Current	1340	\$ 17.1	\$ 28.3	\$ 10.1	\$ 55.5	\$ 34.2	\$ 1.8	\$ 36.0
0	1069	\$ 13.7	\$ 22.6	\$ 8.1	\$ 44.4	\$ 27.3	\$ 1.5	\$ 28.8
10	962	\$ 12.3	\$ 20.3	\$ 7.3	\$ 39.9	\$ 24.6	\$ 1.3	\$ 25.9
20	866	\$ 11.1	\$ 18.3	\$ 6.6	\$ 36.0	\$ 22.1	\$ 1.2	\$ 23.3
30 - 149	779	\$ 9.9	\$ 16.5	\$ 5.9	\$ 32.3	\$ 19.9	\$ 1.1	\$ 21.0
150	864	\$ 11.0	\$ 18.3	\$ 6.5	\$ 35.8	\$ 22.1	\$ 1.2	\$ 23.3
160	903	\$ 11.5	\$ 19.1	\$ 6.8	\$ 37.4	\$ 23.1	\$ 1.2	\$ 24.3

Table 7.10 Scenario Two: Government Revenue Impacts

Year	Harvest	BC Government Revenues				Federal Government		
		Stumpage, Rent & Fees	Other Forestry Taxes	Personal Income Tax	BC Total	Personal Income Tax	Other Federal Taxes	Federal Total
	(<i>'000 m³/year</i>)	(\$1993 mil.)	(\$1993 mil.)	(\$1993 mil.)	(\$1993 mil.)	(\$1993 mil.)	(\$1993 mil.)	(\$1993 mil.)
Current	1340	\$ 17.1	\$ 28.3	\$ 10.1	\$ 55.5	\$ 34.2	\$ 1.8	\$ 36.0
0	1184	\$ 15.1	\$ 25.0	\$ 9.0	\$ 49.1	\$ 30.2	\$ 1.6	\$ 31.8
10	1065	\$ 13.6	\$ 22.5	\$ 8.1	\$ 44.2	\$ 27.2	\$ 1.5	\$ 28.7
20	959	\$ 12.2	\$ 20.3	\$ 7.3	\$ 39.8	\$ 24.5	\$ 1.3	\$ 25.8
30 - 159	867	\$ 11.1	\$ 18.3	\$ 6.6	\$ 36.0	\$ 22.1	\$ 1.2	\$ 23.3
160	898	\$ 11.5	\$ 19.0	\$ 6.8	\$ 37.3	\$ 22.9	\$ 1.2	\$ 24.1
170	914	\$ 11.7	\$ 19.3	\$ 6.9	\$ 37.9	\$ 23.3	\$ 1.3	\$ 24.6

Table 7.11 Scenario Three: Government Revenue Impacts

Year	Harvest	BC Government Revenues				Federal Government		
		Stumpage, Rent & Fees	Other Forestry Taxes	Personal Income Tax	BC Total	Personal Income Tax	Other Federal Taxes	Federal Total
	(<i>'000 m³/year</i>)	(\$1993 mil.)	(\$1993 mil.)	(\$1993 mil.)	(\$1993 mil.)	(\$1993 mil.)	(\$1993 mil.)	(\$1993 mil.)
Current	1340	\$ 17.1	\$ 28.3	\$ 10.1	\$ 55.5	\$ 34.2	\$ 1.8	\$ 36.0
0	713	\$ 9.1	\$ 15.1	\$ 5.4	\$ 29.6	\$ 18.2	\$ 1.0	\$ 19.2
10 - 149	644	\$ 8.2	\$ 13.6	\$ 4.9	\$ 26.7	\$ 16.4	\$ 0.9	\$ 17.3
150	712	\$ 9.1	\$ 15.1	\$ 5.4	\$ 29.6	\$ 18.2	\$ 1.0	\$ 19.2
160	790	\$ 10.1	\$ 16.7	\$ 6.0	\$ 32.8	\$ 20.2	\$ 1.1	\$ 21.3
170	836	\$ 10.7	\$ 17.7	\$ 6.3	\$ 34.7	\$ 21.4	\$ 1.2	\$ 22.6

The full AAC level of 1 659 000 m³ would generate an estimated \$68.9 million in Government of British Columbia revenues. The current Kingcome TSA harvest of 1 340 000 m³ is estimated to generate BC government revenues of \$55.5 million. Approximately 30% of this is from stumpage and other timber-related charges, 20% is from personal income taxes, and the remaining 50% comprises other forestry-related taxes.

Under Scenario One, provincial government revenues would fall immediately by \$11.1 million, to \$44.4 million, and would continue to drop until Year 30, when they would stabilize at \$32.3 million. Under Scenario Two the initial reduction would be \$6.4 million, with further 10% drops in each of the next three decades. Provincial government revenues in Scenario Three would fall in Year 0 by \$25.9 million (47%), with an additional drop of \$2.9 million in Year 10.

The initial reduction from levels generated at the full AAC would be \$24.5 million under Scenario One, \$19.8 million under Scenario Two, and \$39.3 million under Scenario Three.

7.4.2 Federal Government Revenues

Federal government revenues would be affected by Kingcome TSA harvest changes. The biggest impact would be on personal income taxes, but also affected would be corporate income taxes, and excise, sales, and withholding taxes. These impacts are also shown in Tables 7.9, 7.10, and 7.11, and would follow the same harvest-related trends as provincial government revenues. There would be an immediate drop in federal revenues of \$7.2 million under Scenario One, \$4.2 million under Scenario Two, and \$16.8 million under Scenario Three. If the full AAC level were the reference point, the immediate reduction in federal revenues would be \$15.9 million under Scenario One, \$12.9 million under Scenario Two, and \$25.5 million under Scenario Three.

This concludes the presentation of aggregate economic impacts. The following section discusses the possible community and regional implications that may be associated with these impacts.

8.0 Community and Regional Implications

As illustrated in Table 5.4, the direct employment base supported by timber harvesting in the Kingcome TSA is dispersed among locations in the North Island, Mid-Island, and South Island/Lower Mainland. Based on the assumption that the overall employment and income impacts of various timber harvest scenarios (as presented in Section 7.0) would be distributed in a generally similar manner, the following sections explore how this would be experienced in these three regional areas. The discussion below will refer to Table 8.1, which presents estimates of the regional job impacts. These are based on harvest changes from the current level-impacts related to the full AAC would be greater, as discussed in Section 7. The impact estimates have been rounded slightly, to emphasize that they are simply intended for benchmarking purposes.

Table 8.1 Possible Job Impacts by Region¹

	Current	Scenario One	Scenario Two	Scenario Three
Harvest Level ('000 m ³)	1340	1069	1184	731
Change (%)		20 %	12 %	47 %
North Island				
Direct	250	(50)	(30)	(115)
Indirect/Induced	<u>111</u>	<u>(20)</u>	<u>(10)</u>	<u>(50)</u>
Sub-Total	361	(70)	(40)	(165)
Mid Island				
Direct	356	(75)	(40)	(165)
Indirect/Induced	<u>224</u>	<u>(45)</u>	<u>(25)</u>	<u>(100)</u>
Sub-Total	580	(120)	(65)	(265)
South Island/Lower Mainland				
Direct	1296	(260)	(150)	(610)
Indirect/Induced	<u>2519</u>	<u>(515)</u>	<u>(295)</u>	<u>(1 185)</u>
Sub-Total	3815	(775)	(445)	(1 795)
All of British Columbia				
Direct	1902	(385)	(220)	(890)
Indirect/Induced	<u>2854</u>	<u>(580)</u>	<u>(330)</u>	<u>(1 335)</u>
Total	4756	(965)	(550)	(2 225)

Notes:

1. Brackets indicate job loss.

8.1 North Island

As Table 5.4 shows, North Island employment directly supported by the Kingcome TSA current harvest levels (1 340 000 m³) is estimated at 250 PY, approximately 13% of the overall direct employment base. This is distributed among the North Island communities in the following general proportions: Port Hardy 65% - 70%, Port McNeill 20% - 25%, other communities (especially Port Alice, Holberg, and Coal Harbour) 5% - 10 %. The high Port Hardy share is mainly accounted for by Interfor's administrative operations, as well as its Cleagh Creek crew and other sub-contract operations that are based there. The crew of Lemare Lake Logging accounts

for the largest single number of Port McNeill residents. The relatively low direct North Island employment share of 13% underlines the pattern of fibre leaving the area for processing elsewhere, as well as the relatively high proportion of non-resident individuals and crews involved in harvest operations (estimated at 66% non-residents). When spin-off (indirect and induced) employment is accounted for, the North Island total increases by another 111 PY, for a total TSA-related North Island employment base of 361. This corresponds to approximately 6 % of the estimated North Island labour force of 6355 ³². As explained in Section 7.0, the economic impact analysis in this report assumes that changes in future employment would be directly proportional to changes in future timber harvest levels. Although this may not be precisely accurate in every specific situation, overall it is probably a generally reliable working assumption, effective for "benchmarking" purposes. However, situations can certainly arise when it will be less accurate. The following discusses some of these possible situations in the context of the Kingcome TSA and the North Island.

Most of the direct North Island employment occurs in timber harvesting and related areas such as woodlands management and road building. This accounts for about 80% of the forestry-related jobs held by local residents. As a general rule, changes in harvest levels and in harvesting employment correlate reasonably well: if trees are not being cut down, then harvesting jobs will not exist. This implies that the estimated North Island employment impacts, which are predominantly in harvesting-related positions, are reasonably accurate. Actual impacts could be higher or lower at different times, depending on whether "threshold" effects arise - such as the closure of entire logging camps. Impacts may also occur "step-wise", rather than in the immediate and linear way presented here.

This report does not assess the likelihood of thresholds occurring; these would be determined by the operational decisions of individual licensees, especially, those with a high proportion of locally-recruited crews. Among the major licensees operating in the Kingcome TSA, this would relate specifically to MacMillan Bloedel, Western, and particularly, Interfor. If the re-allocation of harvesting effort arising out of a lower overall harvest level had a disproportionately large impact on locally-recruited crews, then the scale of local impacts would be higher than what is indicated by the proportionally-based estimates presented here.

The possibility also exists of the estimated employment impacts being overstated. This may be the case if reduced future levels of harvest are associated with more labour-intensive harvesting or management methods than are presently in effect. Future employment per unit of harvest could increase in several different ways: for example if harvesting moved into more difficult terrain, necessitating greater use of cable and aerial systems, or if more intensive silvicultural treatments became the norm. On an industry-wide basis, the evidence of at least the last two years is of increased hiring in some of these occupational areas, particularly those involving compliance with new guidelines.

³² Use of a PY measure may understate the actual number of employment positions (because of some part-time employment), and may consequently also understate the labour force share.

However, although some of these offsetting employment effects may occur, and could prove to be very significant from the perspective of local employment stability, they tend to be unrelated to changes in the AAC levels, and are therefore separate from the employment effects discussed in this report.

As shown in Table 6.1, under all three harvest scenarios, most of the harvest reduction would occur immediately. Since the subsequent, relatively smaller, harvest reductions are deferred for another 10 years or more, it is the initial round of impacts that may create most community concern. The initial harvest decline from current levels, is respectively, about 20% in Scenario One, 12% in Scenario Two, and 47% in Scenario Three. These harvest declines would result in North Island direct job losses (estimated proportionally) of about 50 PY, 30 PY, and 115 PY, respectively, and of additional indirect/induced job losses of about 20 PY, 10 PY, and 50 PY, respectively. On the basis of the distribution of the current TSA-related employment base, 65%-70% of these losses would arise in Port Hardy, 20%-25% in Port McNeill, and the balance in Port Alice, Holberg, and other smaller communities. To emphasize an earlier point, variations in how individual licensees might respond could easily change this distribution pattern.

For Port Hardy the direct job losses that would occur in the first decade under Scenario One are estimated at about 7% of the locally resident forestry workers - about 35 out of 500³³. The proportion would be about 4% under Scenario Two and 15% under Scenario Three. For Port McNeill, the figure would be about 1.5% (about 10 out of about 650) under Scenario One, 1.0% under Scenario Two, and 3.5% under Scenario Three. These proportions are lower than might be expected for the following three principal reasons:

Total North Island Harvest - As presented in Section 5.1, the Kingcome TSA harvest has represented about 26% of the 1992-94 average total North Island harvest. The majority was accounted for by TFLs (46%), and Timber Licences also comprised a significant share (25%). Therefore, the forestry employment base in North Island communities is related mostly to harvesting outside the TSA.

Undercutting - As discussed in Section 5.3, the Kingcome TSA AAC was undercut by an annual average of about 20% annually over 1992-94. As a result, the harvest declines (and associated employment declines) required to comply with the forecast scenarios are correspondingly lower than if the full AAC were being cut. If an AAC rather than current harvest benchmark were to be used, the immediately required harvest (and employment) declines would be more than double those shown above.

Employment Outside the North Island - Almost 90% of direct employment associated with the Kingcome TSA arises outside of the North Island area, due to the use of non-resident harvesting crews and the location of wood processing facilities. The employment impacts of reduced TSA harvest levels would therefore occur mostly in the Mid Island, South Island, and Lower Mainland areas.

³³ The forestry-related employment in local communities is discussed in Section 2.

Although there exists more reliable direct evidence on the direct effects, the spin-off effects on other sectors could also be significant. Although many of the camp operations are supplied from further south, the local expenditures of forestry companies, and of forestry employees, are still significant for a wide range of businesses based in the North Island area (machinery and equipment repair and service, helicopter operations, food and accommodation, and many others). While TSA-based forestry operations are only part of their business, for some this component may be very important. The possible employment impact on these sectors is shown under spin-off effects in Table 8.1 above.

Other North Island Considerations

The direct impacts of any TSA harvest changes should be considered in the context of several factors pertinent to the North Island forestry situation.

North Island Wood Processing - Shushartie's non-replaceable licence for an AAC of 112 000 m³ is due to expire in 2004. If not replaced in some way, the largest local processing facility for TSA wood could be jeopardized and with it the local employment base, which currently stands at about 70 positions. In addition, although quite separate from the TSA, the future fibre supply of the Port Alice pulp mill, which employs about 500 people, is also a major consideration.

TFL Timber Supply Reviews - The Timber Supply Review process for the approximately 3.4 million m³ in TFL AAC held within the Port McNeill Forest District is still underway. The scale of TFL AAC changes could prove to be a very significant determinant of how the TSA AAC changes are accommodated.

Community Initiatives - The Regional District of Mount Waddington, as well as various other area groups, have clearly stated their goal of increasing forestry-based employment in the North Island area.³⁴ A variety of proposals have been made, including new Woodlot or Community Forest Licences (to be directed to local mills); more local tendering of silviculture contracts; terms of access more suited to bidding on Section 16.1 sales by local value-added firms. (Lukwa Mills, Highland Mills, and others); and the creation of a local forestry training centre. The recent establishment of a Community Resources Board for the Mount Waddington Regional District area is expected to provide a major impetus to realizing some of these longer-term community employment stability objectives (which include many others unrelated to forestry).

How Kingcome TSA harvest reductions are absorbed will depend on the final outcomes to these and other processes underway in the North Island area.

³⁴ For example, as articulated in a submission by the Mount Waddington Regional District to the Hon. Colin Gabelmann, dated May 20, 1994.

8.2 Mid-Island

As Table 5.4 showed, Mid-Island crews, particularly from the Campbell River area, account for about 40% of direct Kingcome TSA logging employment, compared to the 35% share accounted for by local North Island crews. Kingcome TSA fibre also supports employment at Fletcher Challenge's Elk Falls pulp mill, and some Campbell River sawmills. Slightly more than 350 PY of direct forest sector employment are estimated to be supported in the Campbell River area by the Kingcome TSA harvest. This represents 19% of the total employment related to the TSA harvest, compared to 13% within the North Island itself. Campbell River is also a very important supply centre for many licensees with Kingcome TSA operations.

The impacts of the harvest reductions laid out in Scenarios One, Two, and Three, would therefore also be felt in the Mid-Island/Campbell River area, most likely in rough proportion to the employment shares currently accounted for by that area. As shown in Table 8.1, direct forestry employment in the Campbell River area could fall initially by 75 PY under Scenario One, by 40 PY under Scenario Two, and by 165 PY under Scenario Three. About 65% of these would be logging jobs and about 25% would relate to pulp mill employment. Although this area has a large commercial and population base (estimated at over 26 000 and growing), these impacts are still potentially significant, particularly when considered in conjunction with the possibility of additional impacts arising out of the Ministry of Forests' review of the timber supply in the Strathcona TSA and nearby TFLs.

8.3 South Island and Lower Mainland

Almost 70% of the direct employment base related to the Kingcome TSA is generated in the Lower Mainland or South Island. This is due to the fact that about 90% or more of the Kingcome TSA harvest flows to the Lower Mainland or South Island for processing. The share of total employment (including indirect and induced) is even higher, due to the greater range and complexity of economic and expenditure linkages in this area, in contrast to the North Island area.³⁵

Although the direct employment of Lower Mainland/South Island residents in timber harvesting woodland operations is significant, by far the largest employment categories are, firstly, those of sawmilling and wood remanufacturing, and secondly, of pulp and paper processing. The current fibre outflow of between 1.1 to 1.2 million m³ annually is approximately equivalent to the annual fibre input requirements of about three medium-sized sawmills. Based on the information assembled for this report, some licensees are relatively more dependent on Kingcome TSA fibre for the operation of their mills (see Section 5.4 for details). The fibre reductions envisaged under all three scenarios would obviously pose more difficulties for this group of mills.

³⁵ The province-wide forestry employment multiplier presently used by the Ministry of Forests is 2.5 (1.5 indirect and induced jobs for each direct job), which implies that forestry-related spin-off employment is created in the Lower Mainland area to over three times the extent to which it is created that of the North Island area, (the forestry employment multiplier for the North Island has been estimated by the Ministry of Finance at 1.44).

Finally, although any employment losses in the Lower Mainland/South Island area may be dispersed more broadly than in the North Island or Campbell River areas, and although these may be areas of more varied economic opportunity, in light of the larger numbers involved (shown in Table 8.1), the impact on individuals and their families in these areas is a serious issue.

9.0 First Nations Implications

As reviewed in Section 3.0, there are 11 distinct First Nations, organized into two Councils, located primarily within the boundaries of the Mount Waddington Regional District. About half (approximately 2000 individuals) reside on reserves within District boundaries, accounting for almost 14% of the Regional District's total resident population. This is one of the highest relative concentrations of First Nations peoples in British Columbia. The locally-resident First Nations population has been growing at above the District-wide average, due to a combination of higher rates of natural increase, and a trend of those residing away returning to the area. This return-migration trend is expected to continue, and is encouraged by First Nations leaders.

The increase in population is leading to an increased emphasis on generating new economic opportunities for First Nations communities. Although distributed somewhat unevenly among the 11 Bands, there are a number of First Nations business and economic ventures, particularly in commercial fishing and fish processing (the largest single sector), forestry (logging), and tourism. Many First Nations members are also employed by non-native enterprises, such as silviculture-related work with forestry companies. Administrative, health-care, and education-related activities also employ a large number of members.

Increased involvement in a broad range of forestry-related activities is seen by many as an important means of improving the poor employment and income levels that currently exist. Initiatives underway include applications made both independently and on a joint venture basis for woodlots, Timber Sale Licences (under the SBFEP), and silviculture/creek cleaning contracts, and enrolment of Band members (particularly younger individuals) in silviculture and other forestry-related training programs. There is a conscious emphasis with these initiatives to increase the level of First Nations involvement and responsibility from what was often the case in the past.

Varying opinion exists however, regarding how and when economic development goals should be achieved. To some, these goals are best pursued within the broader context of land claims negotiations. This position is combined with a general emphasis on long-run resource sustainability, on the protection of traditional fishing and hunting rights, and on the ecological damage of timber harvesting (particularly in mainland areas). While not explicitly expressed by representatives of First Nations, it is assumed that AAC determinations with large initial reductions toward the sustainable harvest level would be preferred. In this context, the more immediate harvest reductions of Scenario Three would be favoured, since these would entail a slower rate of harvesting of the remaining mature forest, as well as reduced levels of impact on First Nations' traditional and non-timber values.

Others in the First Nations community would prefer more tangible and immediate economic benefits. Maintenance of the AAC at the highest possible level in the short-term would provide the most potential for economic development in the short-term, at least for ventures linked to timber harvesting or processing. Smaller initial reductions to the AAC would also represent the lower risk to the First Nations peoples who are currently employed in the forestry sector. Scenarios One and Two appear to offer a greater opportunity to realize these aims. This outcome is however not guaranteed, and the support that does exist among the First Nations community

for these higher harvest levels is conditional on achieving greater levels of fibre access than currently exist.

Finally, what should not be overlooked are the many individual First Nations members presently employed in or seeking employment in forestry, either with native or non-native owned operations. Not all necessarily share the political and/or management objectives of the groups consulted, and for at least some of them, the generally greater probability of employment opportunities under Scenario Two (and to a lesser extent Scenario One), may be the most compelling consideration.

10.0 Environmental and Outdoor Recreation Implications

10.1 Environmental Implications

This section identifies some of the potential environmental effects of current timber harvesting practices, and discusses how these effects may occur over the three timber harvest forecast scenarios. The discussion is based primarily on information and comment provided by BC Environment, Lands and Parks.³⁶ The discussion in this section is somewhat qualitative and tentative, due to the Timber Supply Review's focus on the aggregate TSA harvest level (rather than particular types of harvesting in specific areas), by the fact that this report is concerned only with the TSA land-base, and not with the extensive tracts of land that lie outside, such as in TFLs or in protected areas, and due to a lack of information about current wildlife populations, ecosystem processes and relationships, and the economic values of environmental attributes.

The impacts discussed in this section should be considered in light of the following considerations.

Timber Harvesting Land Base - The timber supply analysis reduced the total land base by 70 825 hectares (6.3% of the total area) to accommodate environmentally sensitive areas. These include areas for wildlife, and areas that are prone to excessive site degradation if harvested, because of geological and topographical conditions. However, BC Environment officials believe that these area netdowns do not adequately accommodate all of the TSA's wildlife and fish resources.

Forest Management Practices - The timber supply analysis assumed some protection of community watersheds and visual landscapes. However, it did not incorporate the provisions of the new Forest Practices Code, which could have a significant positive effect on environmental values.

Land Use Designations - The outcome of on-going Protected Areas Strategy (PAS) processes regarding mainland areas of the TSA is not considered. As mentioned in Section 6, a finalized protected area list may require removals from the TSA timber harvesting landbase assumed for the current timber supply analysis. Secondly, also not considered were future revisions to the protected and other management designation boundaries arrived at with the Vancouver Island Land Use Plan (VILUP). The VILUP resulted in seven new protected areas within the Port McNeill Forest District, but only one affects the TSA landbase.

Comparisons Between Harvest Scenarios - The basis for the comparison among scenarios is twofold. The first relates to the different rates with which they would reduce the harvest over time, which has a number of environmental implications. The second relates to the different

³⁶ Ron Diederichs, Forest Ecosystem Specialist, Fish and Wildlife Branch, Campbell River District Office, Ministry of Environment, Lands and Parks.

underlying assumptions regarding forest cover constraints, which has a number of implications for wildlife and biodiversity.

With those points in mind, the following is a brief discussion of the some potentially important environmental impacts of timber harvesting, the existing measures to deal with the impacts, and a brief discussion of how the Forest Practices Code may change management practices.

10.1.1 Habitat

Old-Growth Forest Habitat - Under all three scenarios, the shift in the age class distribution from old-growth to immature forests will reduce this habitat type. Several species of management concern in the Kingcome TSA (such as grizzlies, or certain bird groups such as the marbled murrelet) are dependent on old-growth, and may as a consequence suffer. However, some old-growth within the Kingcome TSA will be permanently excluded from timber harvesting, for reasons related to inoperability, or parks set-asides, etc. (37% of the Kingcome TSA land base is forested and is excluded from timber harvesting - see Table 6.1). Furthermore, two government initiatives that are yet to be fully implemented (or analysed in the timber supply scenarios) will protect more old-growth habitat in the Kingcome TSA. These are: firstly, the new Protected Areas designations (already determined for north Vancouver Island areas, and forthcoming for coastal mainland areas); and secondly, the Forest Ecosystem Networks provided for under the Forest Practices Code (under which, various functional attributes of old-growth, such as snags, wildlife trees and structural diversity, become an increasingly important component of stand management strategies in immature forests). However, BC Environment has noted that inoperable forest, current parks, and new PAS areas are not distributed across the landscape and will not in any major way ensure the survival of species that use large trees that grow in higher productivity parts of the operable landbase.

Riparian Habitat - Riparian habitats are found in areas adjacent to streams and water bodies, and are valuable to many species groups. The implementation of the Coastal Fish/Forestry Guidelines has alleviated many concerns regarding protection of fisheries values, although MELP has identified poor performance on some licence areas and is concerned that riparian wildlife and large floodplains are not adequately addressed. The Forest Practices Code riparian field guides currently under development are expected to require retention of more timber and landbase for riparian reserves and management areas than those modelled in the timber supply scenarios.

Wetland Habitat - These habitats are sensitive and vulnerable to disturbance from forest harvesting, roads, and other human activities. Several species groups use wetlands. Wetlands are usually mapped and protected from harvesting impacts during planning. It is anticipated that the existing level of protection for wetlands will be increased under the Forest Practices Code.

10.1.2 Wildlife and Biodiversity

The ability to accurately assess impacts on wildlife species is restricted by limited data and an incomplete understanding of population dynamics and habitat requirements. This section summarises possible types of impacts.

Forest Bird Species (cavity nesters, woodpeckers, raptors): These species are largely dependent on late successional forest and old-growth attributes such as large diameter trees, snags, and coarse woody debris. As this habitat is reduced (such as through timber harvesting), populations of these species may be at risk of decline. In general, the higher the rate of harvesting, the greater will be the degree of forest fragmentation and risk to species requiring mature forest. Forest fragmentation also favours generalist bird species, which then compete with forest birds for available habitat.

Deer and Elk: The deer and elk populations in the Kingcome TSA are largely confined to Vancouver Island (there are no elk on the mainland). Since this area has very little operable old-growth remaining, the loss of old-growth under the various harvest scenarios may be critical for deer and elk habitat (and is certainly of concern for biodiversity). These two ungulate groups can benefit (at least temporarily) from the creation of spring forage sites in proximity to winter range. Deer and elk populations do require the retention of winter range. Old-growth is required in moderate to deep snowpack zones, but older second growth managed for winter range may be adequate in low to moderate snowpack zones, which provides areas where snow accumulations are moderated and where arboreal lichens, branch tips and rooted understory forage provide important food sources in winter.

Mountain Goat: Within the TSA, the occurrence of mountain goats is restricted to the mainland. Goat winter range is not compatible with forestry operations (roads, harvesting, silviculture), and any activities within goat wintering areas would have an adverse impact on goat habitat. Identified winter ranges are protected from harvesting under guidelines currently in place in the TSA. There is ongoing research to more accurately identify goat winter ranges in the TSA.

Predators (grizzly, black bear, wolves, and cougar): Older forests are most needed by grizzly bears (found only on the mainland) for seasonal denning and day bedding requirements. As development on the mainland moves into more remote areas and as older forests are logged, the available habitat for grizzlies is reduced and disturbance and access by humans results in direct mortality which has and will lead to population declines. Although the populations of black bear and cougar (Island only) are considered by MELP to be relatively healthy, they too are negatively impacted by loss of habitat (wolves are more adaptable to habitat changes). All are at risk from the increased risk of hunting arising from greater road access.

Overall, since all the operable old-growth will be harvested under all three scenarios, the real difference between the three is the rate at which this will occur. Since harvesting of older age forest proceeds least rapidly under Scenario Three, this scenario would appear to provide forest and wildlife managers with the most time and flexibility to best accommodate the habitat and special protection needs of the species of interest. However, to the extent that developments such as the new Forest Practices Code, or new Protected Areas (particularly on the mainland)

effectively address these concerns, then any differences stemming from differential rates of harvest alone may be effectively overridden.

10.1.3 Fisheries

As discussed earlier in the report, the Kingcome TSA contains a number of significant freshwater and anadromous fisheries systems. Many have experienced habitat damage from past logging practices, and consequently have a major stake in the evolution of future logging practices. Some of these systems also support a growing saltwater and freshwater sport fishery, local native fisheries, and (in a more limited way), an ocean commercial fishery. Some are also important from a gene pool and wild species survival point of view.

Some of these fisheries concerns are addressed in existing resource management guidelines applied across the TSA (and incorporated in Scenarios One, Two, and Three). On the basis of anecdotal evidence assembled for this report, recent years have seen these guidelines more closely followed. The standards provided for under the Forest Practices Code (Biodiversity and Riparian Management Guidelines) will further improve matters. However, in some instances, and in those watersheds where harvesting has been largely completed, impacts have already occurred, some of which are already evident and some of which (such as LOD or large organic debris recruitment) may not be evident for years to come. Assessment of changes in watershed or channel stability due to cumulative effects of harvesting practices will affect short term availability of timber and will be guided by application of the Watershed Assessment Procedures under the Forest Practices Code.

Fisheries managers continue to stress the importance of adequate habitat protection. Maintaining wild, indigenous fish populations is of the highest importance, regardless of whether or not they contribute to a sport or commercial fishery. As was the case with the consideration of wildlife impacts however, one cannot conclusively assert the general superiority of one timber harvest scenario over another, since all scenarios share the same management guidelines, and since fisheries habitat impacts particularly occur on very site-specific bases. Under the premise that guidelines are least likely to be compromised under the lowest rate of harvest, Scenario Three would be preferred.

10.1.4 Watersheds

A watershed is a natural land drainage area, and can include several rivers, streams and lakes. Because most watersheds in BC are forested, timber harvesting practices can affect patterns such as the timing of peak flows, the water's flow rate, stream channel stability, as well as the quality and quantity of water received by nearby communities. Generally, the smaller the watershed, the more significant are the effects. Negative effects of nearby timber harvesting (such as flooding) have been noted by spokespeople for First Nations and environmental groups.

Although the precise relationships between some of these hydrological impacts and forestry development remain uncertain, blame is often laid on the road networks that accompany timber

harvesting (including skid trails, landings, drainage, and culverts). Since Scenario Three could give rise to a lower incidence of such effects, it may be preferred of the three on these grounds.

10.1.5 Terrain Stability

Timber harvesting and road building can increase the risk of landslides and other forms of mass-wasting on unstable terrain. To deal with these impacts, Forest Service staff have initiated a two-pronged approach to reduce the risk of mass-wasting. First, detailed terrain mapping has been undertaken to ensure that harvesting and road building practices are appropriate to the terrain (this includes no logging or road building in high-risk areas). Second, forestry prescriptions to protect against mass-wasting are being enforced.

10.1.6 Road Access

Timber harvesting activity requires the construction of roads, which can dramatically increase the types of recreational experience that a given area can provide (hunting, fishing, snowmobiling, etc.). One side effect may be the changing of an area from that of a wilderness setting to one modified by the presence of humans.

Roads themselves can impose considerable environmental hazards, particularly when they are not constructed, maintained or deactivated to appropriate standards. Poor roads can lead to increased mass wasting, surface erosion, sedimentation of fish creeks and higher rates of water delivery to streams. This can lead to reduced forest productivity, destruction of fish and wildlife habitat, and degraded visual landscapes.

Over the last several years, the Ministry of Forests has increased its efforts to ensure that roads are built and maintained to appropriate standards. With the Forest Renewal Plan in place, lack of funding has also become less of an impediment to dealing with the environmental liability of poorly constructed or maintained older roads. These roads are being deactivated at an increased rate. Because of the lower rate of road construction probably associated with Scenario Three, it might be preferred over Scenarios One and Two. However, lower harvest levels do not necessarily imply fewer roads, as the extent of road construction would also depend on factors such as the topography of specific operating areas and specific cut-block patterns.

On the other hand, concerns were expressed by community and recreational interests in the Port Hardy and Port McNeill areas about the increase in numbers of roads being deactivated to prevent or mitigate environmental impacts. Road deactivation is impeding recreational access, as well as access by the many shake salvage operators in the area.

10.2 Outdoor Recreation

As discussed in Section 4.0, there is a significant and expanding outdoor recreation sector located in or close to the Kingcome TSA. In terms of relative size, sub-sectors of note include sport fishing (both in ocean inlets and inland streams and lakes), boating (particularly coastal cruising and kayaking), and land-based activities such as hiking or camping.

A major interface with forestry activities is that of the visual aesthetics of the surrounding landscape. Unsightly views can have a significant deterrent effect on these activities, and are a concern of operators in the industry. For that reason, the visual quality guidelines incorporated into the timber supply modelling process are particularly important. In visually sensitive areas, which comprise 43% of the timber harvesting land base, more stringent green-up requirements have been imposed, which will restrict the volumes of timber that can be harvested from those designated areas. Since the variation in harvest levels under all three scenarios is largely a function of variations in forest cover constraints (including green-up requirements), this implies that a higher level of risk to visually sensitive areas may be present under Scenarios One and Two. Since it is logical to assume that a lower overall rate of harvest would be associated with less intrusive visual impacts, the more dramatic harvest reduction provided for under Scenario Three would be preferred.

In considering this issue, some qualifying considerations should be noted. Firstly, one cannot say with any degree of certainty that visual damage will ensure a drop-off in recreation activity; this would depend on the availability of access to other attractive areas, or on the individual preferences of recreationalists. Secondly, on strictly short-term economic and employment grounds, the case for higher levels of harvesting is probably a stronger one (though diminishing over time). Thirdly, to be effective, management for aesthetic values must be applied across the entire visual landscape - in many instances this encompasses TFL and TL areas, in addition to the TSA.

10.3 Local Environmental Stakeholders

A final point relates to the views of the locally-based Malcolm Island Protection Society. Representatives were asked for their views on varying harvest scenarios. Although they did not feel qualified to comment in detail, they offered the following principal perspectives. First, they are absolutely opposed to clearcutting as a harvest technique, and to aerial spraying. Secondly, they have a particular concern regarding the heavily logged condition of the Knight Inlet area (which is an accessible and highly valued fishing and recreation area for Malcolm Island residents). Thirdly, while the Forest Practices Code is seen as supporting a significant improvement over current practices, they remain to be persuaded of the effectiveness of its enforcement. Regarding the harvest scenarios considered in this report, they are of the view that because of the likely lower level of risk of infringement at lower harvest levels, Scenario Three would be preferred on general environmental grounds. This position is, however, highly qualified by the unknown influence of site-specific factors.

11.0 Summary and Conclusions

11.1 Report Background

The Ministry of Forests' Timber Supply Analysis Report for the Kingcome TSA indicates that the current AAC of 1 659 000 m³ cannot be maintained without precipitating severe future declines in annual timber harvest levels. The sustainable long run harvest level has been estimated by the Ministry of Forests as being almost half the present level. The forecast drop in available harvest volumes is largely the result of a sharp decline in the volumes of operable mature timber remaining in the TSA.

This SEA report has examined some of the major economic, community, and environmental implications of reducing Kingcome TSA harvesting to the long-term level. Three scenarios were selected for consideration, each with a different starting harvest level and rate of decline to the long-term level. These three scenarios are not the only ones that might have been chosen. They were selected only to provide a basis for examining a range of impacts, and should not be viewed as ones to which the Ministry is predisposed.

Insofar as the socio-economic and environmental analysis is concerned, the principal difference between the scenarios is in the starting annual harvest level. Under Scenario One this is set at 1 069 000 m³; under Scenario Two at 1 184 000 m³; and under Scenario Three at 713 000 m³. Scenario One corresponds to the "base case" timber harvest level in the Timber Supply Analysis Report. Scenarios Two and Three correspond to harvest forecast sensitivities, and were generated by respectively relaxing and tightening the forest cover constraints from those modelled in the "base case".

The focus of this report is on the implications resulting from the changes in harvest under each of these scenarios, from the current situation. In the three years 1992-94 the actual harvest has averaged 1 340 000 m³, about 20% below the AAC (mostly due to underselling in the Small Business program). The decline in actual harvest levels is therefore smaller than would be indicated from the full AAC. Since the current harvest level more accurately reflects existing conditions than does the AAC, it was used as the benchmark for the analysis of incremental impacts.

The following discussion summarizes the implications of lower Kingcome TSA harvest levels and draws a number of conclusions.

11.2 Summary of Implications

11.2.1 Employment

There could be significant levels of job loss associated with Scenarios One, Two, and Three, especially in the immediate period. Employment impacts are separated into direct impacts, which occur in the forestry sector and indirect/induced impacts, which occur as a result of changes in spending by forest companies and forest sector employees.

Direct Employment Impacts: The current harvest is estimated to support a direct employment base of 1902 PY. The North Island share is 250 PY (13%), the great majority being related to timber harvesting. Another 356 direct PY (19%) are supported in the Campbell River area (mostly harvesting and pulp mill related), and 1296 PY (68%) are supported in the Lower Mainland and southern Vancouver Island (mostly in sawmills and pulp and paper mills).

The first decade harvest declines result in estimated direct employment losses of about 385 PY in Scenario One, 220 PY in Scenario Two, and 890 PY in Scenario Three. After three decades there would be cumulative employment drops of about 800 PY in Scenario One, 670 PY in Scenario Two, and 990 PY in Scenario Three.

These proportionally-derived employment impacts should be referred to only as a benchmark, and should not be taken as precise.

Indirect/Induced Employment Impacts: The current harvest is estimated to support 2853 PY of indirect/induced employment overall, of which 111 PY are in the North Island area. The initial harvest reductions would result in indirect/induced job losses of about 575 PY in Scenario One, 330 PY in Scenario Two, and 1335 PY in Scenario Three. After three decades there would be cumulative loss of about 1200 PY in Scenario One, 1000 PY in Scenario Two, and 1500 PY in Scenario Three. These are distributed as follows: 4% North Island; 8% Mid Island; and 88% in the rest of BC.

These employment implications are potentially very large; they are also associated with declines in employment incomes and in provincial and federal government revenues. The level and timing of harvest reductions are clearly important considerations. Some mitigation could occur through the Forest Renewal Plan, short-term income support measures such as Unemployment Insurance, or through the adjustment strategies of workers and businesses. Although employment opportunities may arise related to factors such as increased value-added production, the use of more labour-intensive harvesting techniques, and growth in other sectors, such as tourism and outdoor recreation, these may occur independently of harvest level reductions. The impacts shown above could still represent net losses relative to otherwise higher employment levels.

11.2.2 Communities

Implications for communities largely stem from the potential decline in employment opportunities, and the possible resulting effects of reduced local expenditures, business failures, a risk of increased social problems, and possible out-migration.

North Island - Although there is in the North Island generally an awareness that the level of fibre outflows may help to cushion local impacts (albeit at the expense of other individuals and communities, such as Campbell River), there is still a high level of concern over the scale of any immediate reductions. Since approximately 65% of the local TSA-related employment is accounted for by Port Hardy area residents (mostly related to Interfor's operations), the concern is highest there. Potential employment losses in the Port Hardy area could be about 35 PY in Scenario One, 20 PY in Scenario Two, and 80 PY in Scenario Three, between about 4% and 15% of local forestry employment. Although these levels are not in themselves likely to cause much instability in the local economy, they do add to the other concerns in this regard, such as the scheduled closure in 1996 of BHP's copper mine, the town's largest employer, and the uncertainty surrounding the long-term fibre supply of Shushartie Log Sales, the North Island milling operation.

Estimated direct employment impacts in the Port McNeill area fall in the range of 1% to 3.5% of the area's forestry labour force. Elsewhere, the potential job losses are significantly lower, although not necessarily in relative terms for smaller communities such as Holberg.³⁷ The actual distribution of effects may not mirror the existing pattern of employment distribution, but will depend on the decisions taken by individual licensees regarding individual camp operations.

There are several forestry-based initiatives being pursued by North Island communities and organizations, focused on increasing the share of fibre for local processing beyond the present low level. These include proposals for new woodlot or Community Forest Licenses, improved terms of access to Small Business sales by local value-added firms, and creating a local forestry training centre. The newly-created Community Resources Board is serving as a focal point for some of these initiatives. The more graduated harvest reductions of Scenario One and Scenario Two may be more accommodating of these initiatives than Scenario Three.

Mid Island (Campbell River area) - A significant level of employment and business support activity associated with the Kingcome TSA is based in the Campbell River area. About 20% of the direct employment (356 PY) and 8% of the spin-off employment (224 PY) are estimated to be held by Campbell River residents. Although larger and more economically diverse than the smaller North Island communities, the losses of direct employment are still potentially serious: about 75 PY in Scenario One, 40 PY in Scenario Two, and 165 PY in Scenario Three. The local forestry labour force is estimated at about 3000 individuals, between 1% and 5% of which may be affected. Actual impacts would depend on the responses of licensees with a large local presence, such as Interfor and Weldwood. In addition, the impact on forestry supplier businesses could be

³⁷ The actual distribution of effects may not mirror the existing distribution of employment, but will depend on the decisions taken by individual licensees regarding individual camp operations.

significant. Finally, Campbell River is an important base for operations related to harvesting in the Campbell River Forest District: any curtailment of those operations would compound the effects of any changes in the Kingcome TSA.

South Island and Lower Mainland - An estimated 68% of the direct employment base related to the Kingcome TSA is in the South Island/Lower Mainland (about 1300 PY). Of this, 83% (about 1100 PY) arises in sawmilling or pulp and paper operations, so the greatest impact would be on the processing sector. The current estimated fibre outflow from the TSA corresponds to the needs of about 3 average-sized sawmills. Although the Interfor network is most dependent on that fibre flow, all of the licensees' operations are somewhat dependent. Impacts could include increased mill downtime, elimination of shifts, or potential mill closures, particularly under Scenario Three, with resulting effects on the communities and individuals involved. The South Island/Lower Mainland also accounts for most of the spin-off employment generated by the TSA harvest.

11.2.3 First Nations

There are differing views within the North Island First Nations regarding the desirability of a slower or faster rate of harvest reduction. Several First Nations are in the process of launching new forestry-related initiatives, which could have a substantial impact in alleviating the generally low employment and income levels that are common in the local First Nations communities. The feasibility of these ventures could be affected by the overall supply of fibre available. In addition, there is the individual interest of the many Band members employed in native and non-native forestry activities in the North Island area. Scenarios One and Two appear to offer greater opportunity to realize these aims.

On the other hand, a legacy of negative environmental impacts from timber harvesting in their traditional territories (such as flooding and loss of fisheries habitat), along with a history of minimal economic benefits, has led to a preference, among some Band leaders, for more far-reaching development options. The relatively greater emphasis by this group on preserving their traditional resource, and on environmental concerns, strongly suggested an implicit preference for the more drastically reduced harvest levels of Scenario Three.

11.2.4 Environment

The analysis of environmental implications deals mainly with the differences between harvests related to the rate of harvest decline to the long-term level, and to the different underlying assumptions regarding forest cover constraints. It is limited by the frame of reference, which precludes a range of land designation (e.g. possible new protected areas) and management changes (such as the Forest Practices Code) that are likely to have a major impact in the near future, and by the general lack of information on habitat and animal and plant species that are found within what is a very large and remote area.

The report focuses therefore on presenting a descriptive profile of the present situation, and a relatively brief review of the likely environmental trade-offs between the three scenarios. Input from the Ministry of Environment, Lands and Parks (MELP) was largely relied upon in describing the present situation. Because so much of what might occur under either scenario would depend on local conditions (which are not known), the evaluation of trade-offs had to be carried out at a very general level. Thus, the immediate and sharp decline in timber harvesting allowed for under Scenario Three, was generally considered to carry less environmental risk.

The following summarizes the conclusions for the major categories of interest.

Wildlife - The Kingcome TSA extends over large tracts of remote terrain, which compromises the reliability of the wildlife population inventory maintained by MELP (and the conclusions that can be reached regarding the effects of timber harvesting). Since Scenario Three would retain more old-growth habitat over a longer period, it is assumed that this would benefit certain wildlife species (such as forest birds and some mammals). However, there are some wildlife species that can benefit from timber harvesting, and a lower harvest is not in itself sufficient to guarantee lower levels of environmental impact, as this would depend mainly on where and how that harvesting would occur.

Fisheries - With respect to fisheries and riparian habitat, the benefits of a reduced harvest scenario would mostly arise from the resulting reduced risk of individual instances of habitat damage. This conclusion is subject to the effectiveness of new Coastal Fisheries Forestry Guidelines, which in principle should provide the same measure of protection irrespective of harvest levels. However, the past history of fisheries habitat damage on Vancouver Island (much of it logging-induced), the increasing rarity of the wild fisheries resource in the Pacific Northwest (particularly of steelhead), and the increasing attention being placed on wild fisheries management, would support the more cautious premise of Scenario Three, at least until the new guidelines have proved to be effective.

Watersheds and Landslides - The risk of watershed or landslide damage would also appear to be lowest under Scenario Three.

Road Networks - While a less extensive (and intrusive) road network would probably be the outcome of the lower harvest levels of Scenario Three, this is not certain, and would depend on factors such as the topography of specific operating areas and specific cut-block patterns.

Outdoor Recreation - Scenario Three would have the least impact on viewscales and environmental attributes of interest to the outdoor recreation sector, but may result in fewer access roads to be used by recreationalists.

11.3 Concluding Remarks

This study assesses the economic, social, and environmental impacts of changing timber harvest levels in the Kingcome TSA. The three timber supply scenarios examined could lead to significant losses in jobs, incomes, and provincial government revenues, although the timing of the losses would differ in each case. Forest Renewal BC, announced in April, 1994, was considered only in a very general way in this report, but may assist in offsetting these impacts. While reductions in harvest levels would have economic and social impacts, they would also most likely have environmental benefits.

It should be noted that the analysis in this report considers only impacts attributable to changes in the harvest level, and assumes no change in factors such as the land base, management, harvesting and processing technology, and timber prices. A change in any of these variables would require a re-examination of impacts.

APPENDICES

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Glossary of Terms

Allowable Annual Cut (AAC)	The volume of timber which may be cut from a forest management unit (such as a Timber Supply Area), set by the Chief Forester in accordance with Section 7.0 of the Forest Act.
AAC Apportionment	The allocation by the Minister of the AAC for a TSA among timber tenures in accordance with Section 8.0 of the Forest Act.
Basic Silviculture	A term used to refer to the silviculture treatments that are carried out to ensure the establishment of a free growing tree crop. This may include: surveying, site preparation, planting, direct seeding or brushing.
Biodiversity	The diversity of plants, animals and other living organisms and their habitats measured by factors such as genetic variability, number of species and variation in species composition.
Biogeoclimatic Zones	Areas which are defined by similar biological, physical and atmospheric characteristics.
Bone-Dry Unit (BDU)	A bone-dry unit of pulp chips weighs 2 400 even dry pounds. The volume of solid wood in a BDU of chips varies with species density.
Clear-Cutting	A type of silviculture system in which the crop is cleared from an area at one time and an even-aged, replacement stand is established. Clear-cutting is designed so that most of the opening has full light exposure and is not dominated by the canopy of adjacent trees. The minimum size of a clear-cut opening is generally considered to be one hectare.
Cutblock Adjacency Guidelines	Integrated management guidelines that specify the desired spatial relationship among cutblocks. They can be approximated by specifying the maximum allowable proportion of a forested landscape that does not meet green-up requirements.
Direct Employment	Employment in the forestry sector (harvesting, silviculture, and milling).
Ecosystem	Any complex of living organisms together with all the other biotic and abiotic (non-living) factors which affect them.
Environmentally Sensitive Area (ESA)	An area with significant non-timber values, fragile or unstable soils, problems in establishing a new tree crop, or where timber harvesting may cause avalanches.
Ecoprovince	An area of the earth's surface characterized by very broad ecological interactions between the four major environmental components of the ecosystem: air, water, land and biota.

Forest Cover Requirements	These specify desired distributions of areas by age or size class groupings. These requirements can be used to reflect desired conditions for wildlife, watershed protection, visual quality and other integrated resource management objectives. General adjacency and green-up guidelines are also specified using forest cover requirements.
Forest Licence (FL)	This licence is the major forest-tenure in BC. It provides a replaceable AAC in a TSA to an operator who has an established or proposed processing facility.
Forest Practices Code	A package of legislation, regulations, and standards that govern forest practices in British Columbia.
Green-Up Period	The time needed for a stand of trees to reach a desired condition (such as a certain minimum height) to ensure maintenance of water quality, wildlife habitat, soil stability, or aesthetics.
Harvest Forecast	The flow of potential timber harvests over time. A harvest forecast is usually a measure of the maximum timber supply that can be realised, over time, for a specified land base and set of management assumptions. It is a result of forest planning models and is affected by the size and productivity of the land base, the current growing stock, and management objectives, constraints and assumptions.
Hydrology	The science that describes and analyzes the occurrence of water in nature, and its circulation near the surface of the earth.
Indirect Employment	Employment in sectors which supply materials, equipment, and services to the forest sector.
Induced Employment	Employment supported by the local respending of the incomes of those employed in the direct (forestry) and indirect (service and supply) sectors.
Inoperable Areas	Areas defined as unavailable for harvest for terrain-related or economic reasons.
Long-Term Harvest Level	Refers to timber harvesting levels whereby the volume of timber harvested in any given period can be replaced by a similar volume from regenerated stands within the same period.
Management Assumptions	Approximations of management objectives, priorities, constraints and other conditions needed to represent forest management actions in a forest planning model. These include, for example, the criteria for determining the timber harvesting land base, the specification of minimum cutting ages, utilization levels and standards, integrated resource guidelines and silviculture and pest management programs.
Multiplier	Ratio of total income or employment impacts relative to direct impacts. Multipliers are greater than 1.0, since 1.0 represents the direct component.

Not Satisfactorily Restocked (NSR)	Productive forest land that has been denuded and has failed, partially or completely, to regenerate by natural or artificial means.
Non-Crown Areas	Areas not managed directly by the BC Forest Service (for example, private land, Indian Reserves, and provincial parks).
Non-Forest Areas	Areas not occupied by productive forest cover (such as rock, swamp and alpine areas).
Non-Commercial Cover Areas	Areas occupied by non-commercial tree or brush species.
Non-Merchantable Forest Types	Areas occupied by timber stands that are accessible and otherwise available for timber harvesting but are assumed to be non-merchantable due to stand characteristics such as small size, incidence of decay and low stocking.
Person-year (PY)	A measure of employment representing one full-time job for one year. The length of a work year will depend on the type of job and working conditions that prevail in the area. In this report a PY represents between nine and twelve months of full-time employment. A PY takes into account part-time or seasonal full-time work. For example, a person who is employed full-time for six months (half a year) accounts for 0.50 PY of employment. Using person-years allows employment of different duration to be compared on a similar basis. The number of PY will not necessarily equal the number of people working full-time and part-time in an area. In this report, forest sector PY generally equal the number of people employed, with the primary exceptions of silvicultural and marine transport employment, which have large seasonal and/or part-time components.
Protected Areas Strategy (PAS)	A process initiated by the government of British Columbia aimed at protecting representative examples of the major ecosystems across the province's ecosections, as well as, special natural, cultural and recreational features. Under the PAS, the provincial government is committed to developing and expanding a protected areas system that will comprise 12 percent of British Columbia. The 12 percent target is applied at the biogeoclimatic level within each ecosection.
Riparian Zone	The land adjacent to the normal high water line in a stream, river, lake, or pond and extending to the portion of land that is influenced by the presence of the adjacent ponded or channelled water. Riparian areas typically exhibit a rich and diverse vegetative mosaic, reflecting the influence of available surface water.
Seral Stage	The series of changes occurring in the ecological succession of a plant community.
Small Business Forest Enterprise Program (SBFEP)	This program permits the Forest Service to sell Crown timber competitively to individuals and corporations who are registered in the SBFEP. Approximately 10 percent of the province's timber allocation is directed towards this program.

Snag	A standing dead tree or part of a dead tree from which at least the smaller branches have fallen.
Stand	A community of trees sufficiently uniform in species composition, age, arrangement, and condition to be distinguishable as a group from the forest or other growth on the adjoining area, and thus forming a silviculture or management entity.
Tree Farm Licence (TFL)	A stewardship agreement between an individual forest company and the Forest Service that allows the company to occupy and continuously manage the forests of a specified area. The licence includes the right to harvest timber according to plans approved by the Forest Service, and the obligation to carry out all phases of forest management.
Timber Licence (TL)	A type of forest tenure issued in the early 1900s. It includes a right to harvest timber according to plans approved by the Forest Service, and an obligation to reforest. After harvesting, the area is rolled back into either a TSA or TFL.
Timber Harvesting Land Base	The portion of the total land area of a management unit considered to contribute to, and be available for, long-term timber supply. The harvesting land base is defined by reducing the total land base according to specified management assumptions.
Timber Sale Licence (TSL)	Licences providing established operators with a ten year AAC over undefined areas of Crown land in a TSA. These licences are replaceable in their last year. Shorter term timber sale licences are also issued to small business loggers and to timber processors who qualify for registration under the Small Business Enterprise Program.
Timber Supply Area (TSA)	An integrated resource management unit established in accordance with Section 6 of the <i>Forest Act</i> .
Unsalvaged Losses	The volume of timber killed or damaged annually by natural causes (such as fire, wind, insects and disease) and not harvested.
Visual Quality Objective (VQO)	Defines a level of acceptable landscape alteration resulting from timber harvesting and other activities. A number of visual quality classes can be defined based on the maximum amount of alteration permitted.
Watershed	An area drained by a particular stream or river. A large watershed may contain several smaller watersheds.
Woodlot Licence	A licence issued to an individual to manage a specific area of Crown Timber, plus any private woodlands the individual holds. Requires the holder to file a management plan and to harvest at a pre-determined rate.

Kingcome TSA Incremental Economic Impacts

This appendix presents the changes in employment and income that would occur under Scenario One, Scenario Two, and Scenario Three, starting with the levels associated with the 1992-94 average harvest level of 1 340 000 m³ (the "current" level). The changes relative to the full AAC can be calculated using the coefficients provided below. The change shown for each time period represents the change from the previous period. For example, changes shown for Year 0 under Scenario One represent changes from average 1992-94 ("current") levels. Provincial impacts include those in the Kingcome TSA.

D.1 Kingcome TSA Incremental Economic Impacts

Information for calculating TSA employment and income impacts for Kingcome TSA harvest forecasts	
TSA direct employment coefficient (PY/000 m ³)	0.187
TSA indirect/induced employment coefficient (PY/000 m ³)	0.084
TSA direct income coefficient (\$/000 m ³)	\$ 6 840
TSA indirect/induced income coefficient (\$/000 m ³)	\$ 1 690

Table D.1 Scenario 1: Kingcome TSA Incremental Employment and Income Impacts

Year	Harvest (000 m ³ /year)	Employment			Income		
		Direct (PY)	Indirect/ Induced (PY)	Total (PY)	Direct (\$1994 mil.)	Indirect/ Induced (\$1994 mil.)	Total (\$1994 mil.)
Current	1340	250	111	361	\$ 9.2	\$ 2.3	\$ 11.5
0	(271)	(50)	(21)	(71)	(\$ 1.9)	(\$ 0.5)	(\$ 2.4)
10	(107)	(20)	(9)	(29)	(\$ 0.7)	(\$ 0.2)	(\$ 0.9)
20	(96)	(18)	(8)	(26)	(\$ 0.7)	(\$ 0.1)	(\$ 0.8)
30 - 149	(87)	(16)	(8)	(24)	(\$ 0.6)	(\$ 0.2)	(\$ 0.8)
150	85	16	8	24	\$ 0.6	\$ 0.2	\$ 0.8
160	39	7	3	10	\$ 0.3	\$ 0.0	\$ 0.3

Table D.2 Scenario 2: Kingcome TSA Incremental Employment and Income Impacts

Year	Harvest (000 m ³ /year)	Employment			Income		
		Direct (PY)	Indirect/ Induced (PY)	Total (PY)	Direct (\$1994 mil.)	Indirect/ Induced (\$1994 mil.)	Total (\$1994 mil.)
Current	1340	250	111	361	\$ 9.2	\$ 2.3	\$ 11.5
0	(156)	(29)	(12)	(41)	(\$ 1.1)	(\$ 0.3)	(\$ 1.4)
10	(119)	(22)	(10)	(32)	(\$ 0.8)	(\$ 0.2)	(\$ 1.0)
20	(106)	(20)	(8)	(28)	(\$ 0.7)	(\$ 0.2)	(\$ 0.9)
30 - 159	(92)	(17)	(8)	(25)	(\$ 0.7)	(\$ 0.1)	(\$ 0.8)
160	31	6	2	8	\$ 0.2	\$ 0.0	\$ 0.2
170	16	3	2	5	\$ 0.2	\$ 0.0	\$ 0.2

Table D.3 Scenario 3: Kingcome TSA Incremental Employment and Income Impacts

Year	Harvest	Employment			Income		
		Direct	Indirect/ Induced	Total	Direct	Indirect/ Induced	Total
	(<i>'000 m³/year</i>)	(<i>PY</i>)	(<i>PY</i>)	(<i>PY</i>)	(<i>\$1994 mil.</i>)	(<i>\$1994 mil.</i>)	(<i>\$1994 mil.</i>)
Current	1340	250	111	361	\$ 9.2	\$ 2.3	\$ 11.5
0	(627)	(117)	(51)	(168)	(\$ 4.3)	(\$ 1.1)	(\$ 5.4)
10 - 149	(69)	(13)	(6)	(19)	(\$ 0.5)	(\$ 0.1)	(\$ 0.6)
150	68	13	6	19	\$ 0.5	\$ 0.1	\$ 0.6
160	78	15	6	21	\$ 0.5	\$ 0.1	\$ 0.6
170	46	8	4	12	\$ 0.3	\$ 0.1	\$ 0.4

D.2 Provincial Incremental Economic Impacts

Information for calculating provincial employment and income impacts for Kingcome TSA harvest forecasts	
Provincial direct employment coefficient (PY/'000 m ³)	1.419
Provincial indirect/induced employment coefficient (PY/'000 m ³)	2.130
Provincial direct income coefficient (\$/'000 m ³)	\$ 52 640
Provincial indirect/induced income coefficient (\$/'000 m ³)	\$ 52 780

Provincial Incremental Employment and Income Impacts**Table D.4 Scenario 1: Provincial Incremental Employment and Income Impacts**

Year	Harvest	Employment			Income		
		Direct	Indirect/ Induced	Total	Direct	Indirect/ Induced	Total
	(<i>'000 m³/year</i>)	(<i>PY</i>)	(<i>PY</i>)	(<i>PY</i>)	(<i>\$1994 mil.</i>)	(<i>\$1994 mil.</i>)	(<i>\$1994 mil.</i>)
Current	1340	1902	2853	4755	\$ 70.5	\$ 70.7	\$ 141.2
0	(271)	(385)	(576)	(961)	(\$ 14.2)	(\$ 14.3)	(\$ 28.5)
10	(107)	(152)	(228)	(380)	(\$ 5.7)	(\$ 5.6)	(\$ 11.3)
20	(96)	(136)	(204)	(340)	(\$ 5.0)	(\$ 5.1)	(\$ 10.1)
30 - 149	(87)	(124)	(186)	(310)	(\$ 4.6)	(\$ 4.6)	(\$ 9.2)
150	85	121	181	302	\$ 4.5	\$ 4.5	\$ 9.0
160	39	55	83	138	\$ 2.0	\$ 2.1	\$ 4.1

Table D.5 Scenario 2: Provincial Incremental Employment and Income Impacts

Year	Harvest (<i>'000 m³/year</i>)	Employment			Income		
		Direct (<i>PY</i>)	Indirect/ Induced (<i>PY</i>)	Total (<i>PY</i>)	Direct (<i>\$1994 mil.</i>)	Indirect/ Induced (<i>\$1994 mil.</i>)	Total (<i>\$1994 mil.</i>)
Current	1340	1902	2853	4755	\$ 70.5	\$ 70.7	\$ 141.2
0	(156)	(222)	(331)	(553)	(\$ 8.2)	(\$ 8.2)	(\$ 16.4)
10	(119)	(169)	(254)	(423)	(\$ 6.2)	(\$ 6.3)	(\$ 12.5)
20	(106)	(150)	(225)	(375)	(\$ 5.6)	(\$ 5.6)	(\$ 11.2)
30 - 159	(92)	(131)	(196)	(327)	(\$ 4.9)	(\$ 4.8)	(\$ 9.7)
160	31	44	66	110	\$ 1.7	\$ 1.6	\$ 3.3
170	16	23	34	57	\$ 0.8	\$ 0.8	\$ 1.6

Table D.6 Scenario 3: Provincial Incremental Employment and Income Impacts

Year	Harvest (<i>'000 m³/year</i>)	Employment			Income		
		Direct (<i>PY</i>)	Indirect/ Induced (<i>PY</i>)	Total (<i>PY</i>)	Direct (<i>\$1994 mil.</i>)	Indirect/ Induced (<i>\$1994 mil.</i>)	Total (<i>\$1994 mil.</i>)
Current	1340	1902	2853	4755	\$ 70.5	\$ 70.7	\$ 141.2
0	(627)	(890)	(1334)	(2224)	(\$ 33.0)	(\$ 33.1)	(\$ 66.1)
10 - 149	(69)	(98)	(147)	(245)	(\$ 3.6)	(\$ 3.6)	(\$ 7.2)
150	68	96	145	241	\$ 3.6	\$ 3.6	\$ 7.2
160	78	111	166	277	\$ 4.1	\$ 4.1	\$ 8.2
170	46	65	98	163	\$ 2.4	\$ 2.4	\$ 4.8

Economic Impact Methodology

This appendix provides a detailed explanation of the methods used to estimate the employment, employment income, and government revenue impacts associated with the Kingcome TSA AAC. Both TSA-level and province-wide impacts are discussed.

In simplified terms, the procedure for assessing economic impacts resulting from changes in harvest levels is as follows:

- *Determine direct forestry employment related to TSA harvest levels.* Major licensees and other sources provided data on employment and incomes attributed to current harvest levels. This information was used to derive direct employment coefficients and wage rates.
- *Determine indirect and induced impacts resulting from the direct forestry employment.* Employment multipliers provided by the Ministry of Finance and Corporate Relations and the Ministry of Forests were applied against the direct employment estimates derived from the survey of forest industry companies.
- *Determine government revenue impacts related to TSA harvest levels.* Government revenue rates provided by the Ministry of Forests (excluding provincial and federal personal income tax rates, which were obtained from tax tables) were applied against the TSA harvest forecast profiles.

C.1 Direct Employment and Income Estimates

Estimates of forestry employment and employment income generated by the TSA timber harvest are based on information collected from area forest products companies, area contractors, and the Forest Service office in Port McNeill, and relate to jobs attributable to the Kingcome TSA harvest volume and not to employment associated with non-TSA wood. The following employment estimates are based on the TSA AAC of 1 659 000 m³- major licensees provided the estimated "steady state" employment levels associated with their AAC apportionments. This information was used to calculate employment coefficients, or measures of jobs per 1000 m³ of timber harvested. These coefficients were then used to estimate the employment impacts associated with different timber harvest levels, starting with the current actual harvest level of 1 340 000 m³ (average 1992-94), which is the base year for the tables presented in Section 7 of this report. This approach assumes that changes in harvest levels lead to directly proportional changes in forestry employment. A number of cautionary points related to the interpretation and use of employment coefficients are noted in Section 7. Coefficients for the different categories of direct employment are presented in Tables C.1, C.2, and C.3. The province-wide employment coefficients in Table C.3 are obtained by adding those for the Kingcome TSA and those for outside the TSA.

Incomes shown include cash benefits, such as vacation pay and overtime, but exclude non-cash benefits, such as employer contributions to pension and extended health plans. Before-tax incomes were generally reduced by approximately 20 percent (15 percent for silviculture) to account for non-cash benefits. In addition, income impacts are calculated and presented on an after-tax basis (government income tax revenues are discussed in Section C.3, below). Non-cash benefits and income taxes were removed in order to provide a measure of the disposable income which is available to circulate in the local economy

and which is therefore consistent with the estimation of indirect and induced employment impacts using the multipliers discussed in Section C.2, below. Incomes are presented in \$1994, and have been rounded slightly.

Table C.1 Kingcome TSA Employment and Income (AAC 1 659 000 m³)

Sector	TSA Employment Coefficient (PYs/000 m ³)	TSA Employment (PYs)	TSA Average Income (before-tax \$)	Tax Rate	TSA Average Income (after-tax \$)
Harvesting	0.154	255	\$ 52 300	29%	\$ 37 100
Silviculture	0.009	15	\$ 32 000	22%	\$ 25 000
Marine Transport	0.003	5	\$ 50 000	29%	\$ 35 500
Sawmilling	0.006	10	\$ 49 900	29%	\$ 35 400
Pulp and Paper	0.015	25	\$ 55 600	30%	\$ 38 900
Total	0.187	310	\$ 51 500	29%	\$ 36 600

Table C.2 Outside Kingcome TSA Employment and Income (AAC 1 659 000 m³)

Sector	Non-TSA Employment Coefficient (PY/000 m ³)	Non-TSA Employment (PY)	Non-TSA Average Income (before-tax \$)	Tax Rate	Non-TSA Average Income (after-tax \$)
Harvesting	0.303	502	\$ 52 300	29%	\$ 37 100
Silviculture	0.021	35	\$ 32 000	22%	\$ 25 000
Marine Transport	0.027	45	\$ 58 300	31%	\$ 40 200
Sawmilling	0.507	840	\$ 53 800	30%	\$ 37 700
Pulp and Paper	0.375	622	\$ 54 000	30%	\$ 37 800
Total	1.232	2044	\$ 53 200	30%	\$ 37 200

Table C.3 Provincial Employment and Employment Income (AAC 1 659 000 m³)

Sector	Provincial Employment Coefficient (PY/000 m ³)	Provincial Employment (PY)	Provincial Average Income (before-tax \$)	Tax Rate	Provincial Average Income (after-tax \$)
Harvesting	0.457	757	\$ 52 300	29%	\$ 37 100
Silviculture	0.030	50	\$ 32 000	22%	\$ 25 000
Marine Transport	0.030	50	\$ 57 500	30%	\$ 40 300
Sawmilling	0.513	850	\$ 53 800	30%	\$ 37 700
Pulp and Paper	0.390	647	\$ 54 000	30%	\$ 37 800
Total	1.419	2354	\$ 53 000	30%	\$ 37 100

Harvesting

This includes logging, log transportation, and road building and maintenance. The figures presented are based on information provided by major licensees, and cover both company and contractor operations. Also included are the harvesting operations of independent loggers under the Small Business Forest Enterprise Program (SBFEP). The Small Business operators were assumed to have the same employment coefficient as the major licensees.

Harvesting employment income estimates are based on information provided by licensees, and in the case of Small Business contractors, on average IWA rates. The two wage rates were weighted according to their relative portions of the total TSA harvest. This yielded an average before-tax wage rate of \$52 300, which nets down to \$37 100 after income tax.

Silviculture

Information on silviculture spending was obtained from the Port McNeill Forest District office and from silviculture contractors. The Forest Service is responsible for funding silviculture for areas harvested under the SBFEP, while licensees are responsible for basic silviculture in their harvest areas. These activities include surveying, site preparation, planting, brushing, girdling, fertilization, and spacing. Most silviculture is seasonal, so actual employment totals would be higher than the PY estimates shown.

Silviculture employment was calculated based on an estimated \$3.3 million in annual average silviculture expenditures (\$2 per m³), half of which was payment for labour. Based on a 1600 hour PY and an average wage of \$23 per hour, a silviculture PY would have an income of about \$32 000 after the removal of non-cash benefits, and \$25 000 after income tax.

Marine Transport

Estimates regarding marine transportation were derived from information provided by licensees, and from interviews with representatives of Lower Mainland marine towing firms. The Kingcome TSA is estimated to generate 5 PY of direct employment for TSA residents, and 45 PY for non-TSA residents.

The before-tax annual wage rate was estimated at approximately \$50 000 for TSA residents. For non-TSA residents, the figure was \$58 300, which represents a weighted average consisting of Masters, loading crews, and deck hands.

Sawmilling

There are a few small sawmills operating in the TSA area, but most of the sawmilling of the Kingcome TSA harvest occurs in the South Island and Lower Mainland. Sawmilling employment was estimated based on information from major licensees, and supplemented by the use of the estimated average coastal sawmilling coefficient of 0.49 PY/000 m³ (Ministry of Forests, *The Economic Impact of Timber Harvesting in British Columbia, 1995*).

The TSA before-tax wage rate of \$49 900 was calculated based on information provided in the Price Waterhouse report *The Forest Industry in British Columbia - 1994*. At the province-wide level, the before tax wage of \$53 800 is based on information from licensees and from Price Waterhouse's report.

Pulp and Paper

The TSA-based employment of 25 PY was calculated by prorating the Port Alice pulp mill's employment level of about 500 PY by the proportion of its input accounted for by Kingcome TSA wood (about 5%). Most of the TSA's pulp fibre is processed in the South Island and Lower Mainland. Province-wide employment was estimated using a direct coefficient of 0.39 PY per 1000 cubic metres. This was based on 1994 data from coastal pulp and paper mills (Economics and Trade Branch, Ministry of Forests, *Major Primary Timber Processing in BC - 1994*).

An average before-tax annual wage rate of \$54 000 was derived on the basis of Price Waterhouse sources (*The Forest Industry in British Columbia - 1994*).

BC Forest Service

There is additional forestry-related employment at the Port McNeill Forest District office of approximately 84 PY, only a portion of which is TSA-related. In addition, there are Forest Service employees who work at the Vancouver Region office and in branches located in Victoria, who undertake work related to the Kingcome TSA.

Forest Service employment was identified for profiling purposes only. Due to the broad stewardship role of the Forest Service, no direct relationship can reasonably be established with harvest levels. For example, the Forest Service has an increasing workload related to planning, the balancing of timber and non-timber resource values, and initiatives such as the Forest Practices Code and the Vancouver Island Land Use Plan. For this reason, Forest Service employment is not included in the impact analysis presented in the report.

C.2 Indirect and Induced Impacts

In addition to the direct forest sector employment associated with the Kingcome TSA harvest, there is also indirect and induced employment that was estimated using employment ratios, or multipliers. Indirect employment is generated by forest company spending on goods and services. Induced employment is generated through the spending of direct and indirect employment income, for example in local retail outlets. The estimation of indirect and induced employment in the Kingcome TSA, and in the province as a whole, is discussed below.

C.2.1 Kingcome TSA

For the Kingcome TSA, indirect and induced employment and income were calculated using employment ratios developed by the Ministry of Finance and Corporate Relations. These ratios are shown in Table C.4.

Table C.4 Kingcome TSA Employment Ratios

	No Migration	Migration
Harvesting, Silviculture, and Marine Transport	1.28	1.46
Wood Processing	1.20	1.35
Pulp and Paper	1.14	1.31

These ratios show the potential impact of the gain or loss of one job in the local forestry sector. Two types of ratios were developed. In the *No Migration (With Safety Net)* case, when jobs are lost it is assumed that everyone who becomes unemployed stays in the area (that is, they do not migrate) and receives unemployment insurance benefits (the "safety net"). This is most appropriate for looking at immediate and short-term impacts, since unemployment insurance benefits can currently be claimed for a maximum of 44 weeks in the Port McNeill Forest District area.

The ratios in the *Migration (No Safety Net)* case assume that all those who have lost their jobs leave the area, they migrate, and do not use the local safety net. It is reasonable to assume that as time goes by there would be a tendency for the cumulative effects of a drop in local employment to move towards the *Migration* case. However, long-run impacts could in fact be underestimated even under this scenario if public sector activity in the region is reduced due to emigration and reduced government revenue.

This analysis uses the *Migration (No Safety Net)* employment ratios because the impact analysis covers a period of decades. This will tend to overstate the impacts in the first two years following the loss of jobs, due to the availability of unemployment insurance and social assistance programs. These would provide some income to those who lose their jobs, as well as maintaining some level of re-spending and induced employment in the community. The *Migration (No Safety Net)* employment ratios indicate, for example, that the loss of one direct logging (harvesting) job in the Kingcome TSA would also involve the loss of an estimated 0.46 local indirect/induced jobs.

The steps in arriving at TSA level indirect/induced employment and employment income associated with the AAC of 1 659 000 m³ are shown below.

Step 1 The information in the following table is the Kingcome TSA forest industry survey data collected for this study.

Sector	TSA Employment Coefficient (PYs/000 m ³)	TSA Employment (PYs)	TSA Average Income (before-tax \$)	Tax Rate	TSA Average Income (after-tax \$)
Harvesting	0.154	255	\$ 52 300	29%	\$ 37 100
Silviculture	0.009	15	\$ 32 000	22%	\$ 25 000
Marine Transport	0.003	5	\$ 50 000	29%	\$ 35 500
Sawmilling	0.006	10	\$ 49 900	29%	\$ 35 400
Pulp and Paper	0.015	25	\$ 55 600	30%	\$ 38 900
Total	0.187	310	\$ 51 500	29%	\$ 36 600

Step 2 Use the *Migration (No Safety Net)* employment ratios to calculate indirect/induced employment.

Sector	Direct Employment (PY)	Indirect/Induced Employment Ratio	Indir/Induced Employment (PY)	Indir/Induced Income (before-tax \$)	Indir/Induced Income (after-tax \$)
Harvesting, Silviculture & Marine Transport	275	0.46	127		
Sawmilling	10	0.35	4		
Pulp and Paper	25	0.31	8		
Total	310	0.44	139	\$ 25 300	\$ 20 200

Step 3 Calculate after-tax employment income by multiplying the number of PY in each category by the appropriate after-tax income level. For example, direct income for harvesting (\$9 460 500) is calculated by multiplying 255 PY by the after-tax income level of \$37 100. The indirect/induced income levels are based on information provided by the Ministry of Finance and Corporate Relations.

Sector	Direct Income (after-tax \$)
Harvesting	\$ 9 460 500
Silviculture	\$ 375 000
Marine Transportation	\$ 177 500
Sawmilling	\$ 354 000
Pulp and Paper	\$ 972 500
Direct Income	\$ 11 399 500
Indirect/Induced Income	\$ 2 807 800
Total Employment Income	\$ 14 147 300

Step 4 This employment and income information is then used to develop harvest-related coefficients for estimating employment and income levels associated with the Kingcome TSA timber harvest forecasts. These coefficients indicate employment and income levels per 1000 m³ of timber harvested. For example, the direct employment coefficient (0.187 PY per 1000 m³) is determined by dividing total direct employment (310 PY) by the AAC (1 659 000 m³). The income coefficients shown below have been slightly rounded.

Information for calculating Kingcome employment and income impacts for TSA harvest forecasts	
TSA direct employment coefficient (PY/000 m ³)	0.187
TSA indirect/induced employment coefficient (PY/000 m ³)	0.084
TSA direct after-tax income coefficient (\$/000 m ³)	\$ 6 840
TSA indirect/induced after-tax income coefficient (\$/000 m ³)	\$ 1 690

These coefficients were applied to the 1992-94 average annual harvest level of 1 340 000 m³, and to the three harvest scenarios, to calculate the impacts shown in Section 7. It should be noted that these coefficients could be applied to a wider range of harvest scenarios, such as those presented in the Timber Supply Analysis Report.

C.2.2 Provincial Impacts

The procedure for estimating provincial impacts is outlined below. These include impacts occurring in the TSA.

Step 1 The information in the following table is forest industry survey data collected for this study. The province-wide information is obtained by combining the information for the TSA and non-TSA areas.

Sector	Provincial Employment Coefficient (PY/000 m ³)	Provincial Employment (PY)	Provincial Average Income (before-tax \$)	Tax Rate	Provincial Average Income (after-tax \$)
Harvesting	0.457	757	\$ 52 300	29%	\$ 37 100
Silviculture	0.030	50	\$ 32 000	22%	\$ 25 000
Marine Transport	0.030	50	\$ 57 500	30%	\$ 40 300
Sawmilling	0.513	850	\$ 53 800	30%	\$ 37 700
Pulp and Paper	0.390	647	\$ 54 000	30%	\$ 37 800
Total	1.419	2354	\$ 53 000	30%	\$ 37 100

Step 2 Estimate total provincial employment and employment income. Determining indirect and induced impacts at the provincial level involves the application of a provincial employment multiplier of 2.5, which implies that each direct job in the forest sector is associated with 1.5 indirect and induced jobs. This multiplier is used by the Ministry of Forests and is based on a review of studies outlining the impacts of the forest sector on the BC economy. Indirect/induced employment at the provincial level is calculated by multiplying direct employment by 1.5, which is the indirect/induced component of the multiplier.

The indirect/induced before-tax income level of \$32 200 is an employment-weighted average of the \$25 300 used for the TSA and \$32 500 used for non-TSA indirect/induced employment. Provincial income is calculated by multiplying employment in each sector by the appropriate income level. For example, after-tax direct income (\$87 333 400) is estimated by multiplying direct employment (2354 PY) by after-tax direct income (\$37 100).

Current After-Tax Incomes			
Sector	Income (before-tax \$)	Tax Rate	Income (after-tax \$)
Direct	\$ 53 000	30 %	\$ 37 100
Indirect/Induced	\$ 32 200	23 %	\$ 24 800

Employment (PY)	
Direct	2354
Indirect/Induced	3531
Total	5885
Income (After-tax \$1994)	
Direct	\$ 87 333 400
Indirect/Induced	\$ 87 568 800
Total	\$ 174 902 200

Step 3 The figures presented above are the estimated provincial employment and income levels associated with the Kingcome TSA AAC (1 659 000 m³). This information is used to develop coefficients for estimating employment and income levels associated with the Kingcome TSA harvest forecasts. The coefficients indicate employment and income levels per 1000 m³ of timber harvested. For example, the direct employment coefficient (1.419 PY per 1000 m³) is determined by dividing direct employment (2354 PY) by the AAC level (1 659 000 m³).

Information for calculating provincial employment and income impacts for Kingcome TSA harvest forecasts	
Provincial direct employment coefficient (PYs/'000 m ³)	1.419
Provincial indirect/induced employment coefficient (PYs/'000 m ³)	2.130
Provincial direct after-tax income coefficient (\$/'000 m ³)	\$ 52 640
Provincial indirect/induced after-tax income coefficient (\$/'000 m ³)	\$ 52 780

Applying these coefficients to the 1992-94 average annual harvest level of 1 340 000 m³ and to the forecast timber harvest levels results in the estimates presented in Section 7 of the report. As at the TSA level, these coefficients could also be applied to a wider range of timber harvest forecasts than those examined in this report.

C.3 Government Forestry Revenues

The report estimates the impacts of timber harvest changes on BC and federal government revenues. These impacts are made up of the following components:

Personal Income Tax: The BC government receives about a third of the personal income tax revenues collected in BC, with about two-thirds going to the federal government. Impacts on personal income tax revenues were calculated by taking the difference between the before-tax and after-tax incomes for each category of employment and multiplying this by the number of PY in each category. Harvest-related coefficients for BC and federal personal income tax were calculated by dividing estimated revenues by the AAC harvest level of 1 659 000 m³.

Stumpage, Rent, and Fees: Annual stumpage was calculated at a rate \$20.53/m³ (Source: Valuation Branch, Ministry of Forests). This is a weighted average of 1994 stumpage rates on licensee and SBFEP wood for the Kingcome Forest District. Provincial rent and other fees comprised an additional \$0.61/m³, for a total of \$21.14/m³ (Source: *The Economic Impacts of Timber Harvesting in British Columbia*, Economics and Trade Branch, Ministry of Forests, 1995).

Other Taxes: Other provincial taxes, including taxes on corporations, logging, property, sales, and electricity, were calculated using an estimate of \$7.57/m³. Other federal taxes, such as corporate income tax, sales and excise taxes, and withholding taxes, were estimated at \$1.38/m³. (Source: *The Economic Impacts of Timber Harvesting in British Columbia*).

This information, summarized in the following table, was used in Section 7 to estimate BC and federal government revenues.

Information for calculating government revenue impacts for Kingcome TSA harvest forecasts	
BC Personal Income Tax coefficient (\$/000 m ³)	\$ 12 770
BC Stumpage, Rent and Fees coefficient (\$/000 m ³)	\$ 21 140
Other BC Forest Sector Taxes coefficient (\$/000 m ³)	\$ 7 570
Federal Personal Income Tax coefficient (\$/000 m ³)	\$ 25 540
Other Federal Taxes coefficient (\$/000 m ³)	\$ 1 380

As with the employment and income coefficients, these may be applied to harvest scenarios other than those examined in this report.

Red and Blue Listed Species in the Kingcome TSA

The BC Ministry of Environment, Lands and Parks (MELP) has distinguished two groups of wildlife species that it considers "at risk" in BC. *Red list* species are considered to be currently or potentially endangered or at risk of extirpation in BC. *Blue list* species are at less risk, but are still considered to be vulnerable. The following tables indicate the Red and Blue list wildlife species found in the Kingcome TSA, as compiled by MELP's Conservation Data Centre.

Blue Listed Species (1994)

AMPHIBIANS	FISH
tailed frog	(none)
BIRDS	MAMMALS
great blue heron	Roosevelt elk
marbled murrelet	grizzly bear
turkey vulture	fisher
Peale's peregrine falcon	Vancouver Island ermine
tufted puffin	Townsend's big-eared bat
Vancouver Island pygmy-owl	
bald eagle	
Vancouver Island white-tailed ptarmigan	
western screech-owl, kennicottii	
islands pine grosbeak	
short-eared owl	
sandhill crane	
Cassin's auklet	
surf scooter	

Red Listed Species (1994)

AMPHIBIANS	FISH
(none)	giant black stickleback
BIRDS	MAMMALS
Queen Charlotte goshawk	Vancouver Island wolverine
horned puffin	Keen's long-eared myotis
Brandt's cormorant	Vancouver Island water shrew
purple martin	sea otter
common murre	Triangle Island vole
thick-billed murre	

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