

# **Kalum South Socio-Economic Analysis**

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**Prepared for:**

**Economics And Trade Branch  
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**By:**

**Principal Investigator  
Randy Sunderman**

**G.E. Bridges & Associates Inc.  
Consulting Economists  
1031 Vancouver Street  
Victoria, British Columbia  
(604) 384-2355**



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## Executive Summary

### Introduction

- This report is one of four reports being prepared as part of the Timber Supply Review in the southern portion of the Kalum Timber Supply Area (Kalum South). The report assesses the major socio-economic implications associated with three harvest scenarios presented in the *Kalum South Timber Supply Analysis*.<sup>1</sup>
- Kalum South is part of the Kalum Forest District which is located in the Prince Rupert Forest Region. The boundaries of Kalum South correspond to the southern portion of the Kalum Forest District, but exclude Tree Farm Licence (TFL) areas. (See Figure 1-1).
- The implications of changing harvest levels are assessed within a multiple-accounts framework. Employment and government revenue impacts are presented in a quantitative format and three accounts (community, First Nations, and environment) are qualitative discussions. Table 1-1 provides a summary of these accounts.

### Socio-Economic Profile

- Kalum South has a population of about 32 032 residents (1991), the majority of which 22 738 (71 percent) live in the communities of Terrace and Kitimat. Other communities in Kalum South include Thornhill, Terrace East, Terrace South, Gitakdamix, Gitwinksihlkw, Kitsumkalum, Kitselas, and Kitamaat Village.
- The Nisga'a, Tsimshian, and Haisla Nations all have members that reside in Kalum South. First Nations activities and interests are discussed in Section 2.1.3.
- The labour force in Kalum South is primarily dependent on the industrial base which consists of forestry, aluminum smelting, and petrochemical production.
- Fishing, tourism, agriculture, botanical forest products, mining, hunting and trapping also contribute to the regional and provincial economies.

### Environmental Setting

- Kalum South has several distinguishing environmental features and is characterized by four different biogeoclimatic zones. Kalum South contains important aquatic habitats and includes portions of the Skeena, Nass, Tseax, and Kitimat river systems.
- Kalum South also contains many popular recreation sites and provides people from within and outside of the area a wide variety of recreational opportunities.

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<sup>1</sup> Ministry of Forests (1994), *Kalum South Timber Supply Analysis*.

## Current Forestry Operations

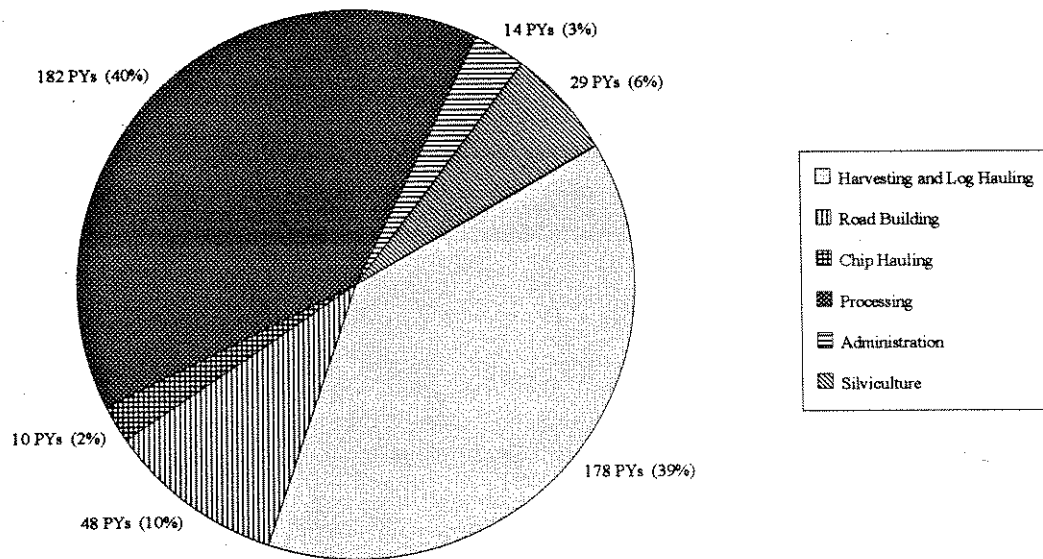
- Kalum South covers a total land area of 549 762 hectares of which 18.9 percent or 103 878 hectares are within the current harvesting land base.
- The current AAC in Kalum South is 480 000 cubic metres per year. Forest licenses held by Bell Pole Co. Ltd., West Fraser Mills Ltd., and Skeena Cellulose Ltd. represent 389 396 cubic metres or 81 percent of the total AAC.
- The current AAC supports direct forestry employment of 461 person-years (PYs) per year (see Figure ES-1). The majority of the forestry work force (87 percent) comes from communities within Kalum South. The community of Prince Rupert, which receives wood chips from Kalum South at the Skeena Cellulose pulp mill, is the major employment beneficiary outside of Kalum South.

## Description of Harvest Scenarios

- Figure ES-2 illustrates the three harvest scenarios examined in this report.
- Scenario 1 is the base case harvest forecast from the *Kalum South Timber Supply Analysis*. Under Scenario 1, the current harvest of 480 000 cubic metres per year is reduced to 464 000 cubic metres per year in decade one, and 418 000 cubic metres per year in decade two. In decade three, the long-term harvest level of 400 000 cubic metres per year is reached.
- In Scenario 2, the current harvest of 480 000 cubic metres is maintained for one decade. In decade two, the harvest declines to the long-term harvest level of 400 000 cubic metres per year.
- In Scenario 3, the current harvest of 480 000 cubic metres per year is maintained for the first two decades. Beginning in decade three, the harvest is reduced to 430 000 cubic metres per year and by decade four, the long-term harvest level is reached. Maintaining the harvest at 480 000 cubic metres for the second decade results in a significant decline below the long-term harvest level in decades 13 and 14.

**Figure ES-1**  
**Direct Forestry Employment Associated with Kalum South AAC**  
 (AAC: 480 000 m<sup>3</sup> per year)

**Provincial Direct Forestry Employment (461 PYs)**  
 (Including Kalum South Employment)



**Kalum South Direct Forestry Employment (403 PYs)**

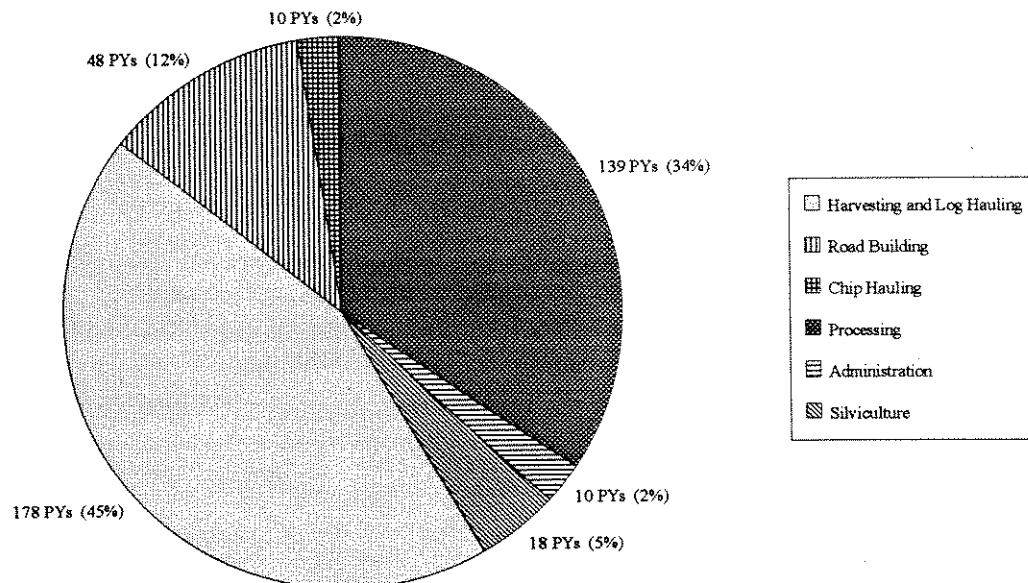
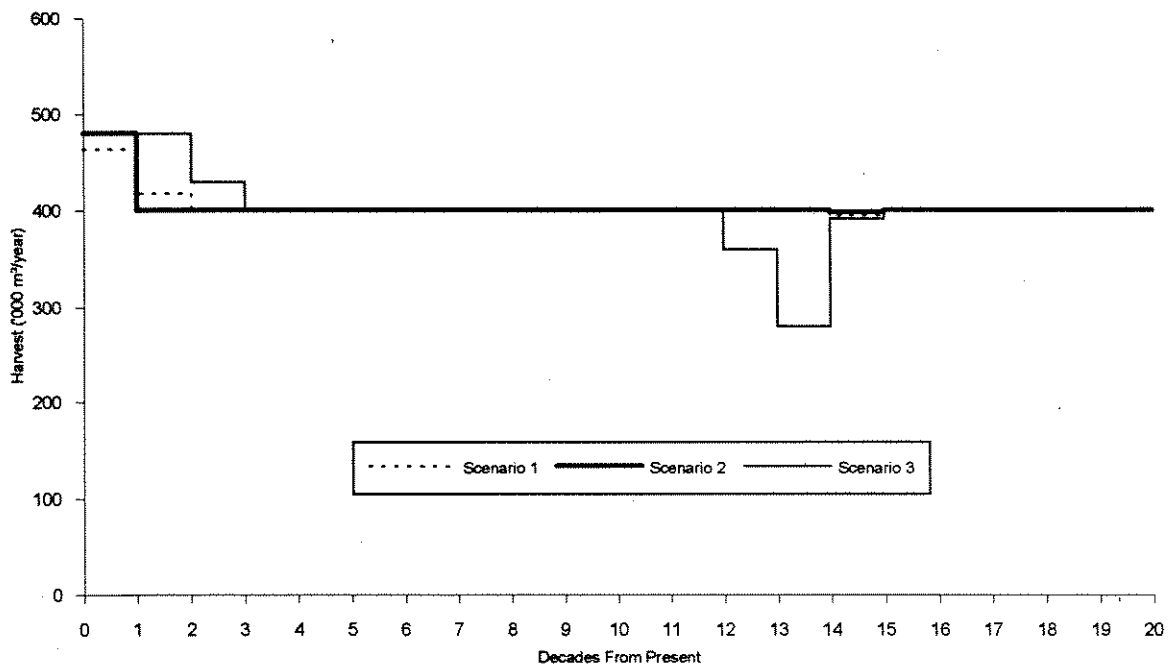


**Figure ES-2**  
**Kalum South Harvest Scenarios**



### Economic Impacts

- Employment and employment income impacts for Kalum South and the province are summarized in Table ES-1. Provincial government revenue impacts are also summarized in this table.
- Kalum South residents provide approximately 87 percent or 403 PYs of the 461 PYs of direct forestry employment derived from the Kalum South harvest. Prince Rupert is home to the majority of the labour force residing outside of Kalum South, but deriving employment from the Kalum South harvest.
- Under all three scenarios, reducing the harvest to the long-term harvest level of 400 000 cubic metres per year could eliminate 106 PYs from the Kalum South economy. Sixty-three percent (67 PYs) of these would be in the Kalum South forest sector.
- The overall decline in the harvest from 480 000 to 400 000 cubic metres, the long-term harvest level, reduces provincial government revenues from \$7.2 million to \$6.0 million annually.
- Scenario 1 would have an immediate impact, while impacts associated with Scenarios 2 and 3 would be deferred until future decades.

**Table ES-1**  
**Summary of Kalum South and Provincial Economic Impacts**

| Impact Account<br>(By Decade)                     | Scenario 1  |            | Scenario 2  |            | Scenario 3  |            |
|---------------------------------------------------|-------------|------------|-------------|------------|-------------|------------|
|                                                   | Kalum South | Provincial | Kalum South | Provincial | Kalum South | Provincial |
| <b>Employment and Employment Income: Decade 1</b> |             |            |             |            |             |            |
| Harvest Level (m <sup>3</sup> /year)              | 464 000     |            | 480 000     |            | 480 000     |            |
| Direct Employment (PYs/year)                      | 390         | 445        | 403         | 461        | 403         | 461        |
| Total Employment (PYs/year)                       | 617         | 1 113      | 638         | 1 152      | 638         | 1 152      |
| Direct After-Tax Income (\$1993 M/year)           | 12.4        | 14.1       | 12.8        | 14.6       | 12.8        | 14.6       |
| Total After-Tax Income (\$1993 M/year)            | 17.3        | 29.5       | 17.9        | 30.5       | 17.9        | 30.5       |
| <b>Employment and Employment Income: Decade 2</b> |             |            |             |            |             |            |
| Harvest Level (m <sup>3</sup> /year)              | 418 000     |            | 400 000     |            | 480 000     |            |
| Direct Employment (PYs/year)                      | 351         | 401        | 336         | 384        | 403         | 461        |
| Total Employment (PYs/year)                       | 556         | 1 003      | 532         | 960        | 638         | 1 152      |
| Direct After-Tax Income (\$1993 M/year)           | 11.2        | 12.7       | 10.7        | 12.1       | 12.8        | 14.6       |
| Total After-Tax Income (\$1993 M/year)            | 15.7        | 26.6       | 15.0        | 25.4       | 17.9        | 30.5       |
| <b>Employment and Employment Income: Decade 4</b> |             |            |             |            |             |            |
| Harvest Level (m <sup>3</sup> /year)              | 400 000     |            | 400 000     |            | 400 000     |            |
| Direct Employment (PYs/year)                      | 336         | 384        | 336         | 384        | 336         | 384        |
| Total Employment (PYs/year)                       | 532         | 960        | 532         | 960        | 532         | 960        |
| Direct After-Tax Income (\$1993 M/year)           | 10.7        | 12.1       | 10.7        | 12.1       | 10.7        | 12.1       |
| Total After-Tax Income (\$1993 M/year)            | 15.0        | 25.4       | 15.0        | 25.4       | 15.0        | 25.4       |
| <b>Government Revenues: Decade 1</b>              |             |            |             |            |             |            |
| Total Revenues (\$1993 M/year)                    | 6.9         |            | 7.2         |            | 7.2         |            |
| <b>Government Revenues: Decade 2</b>              |             |            |             |            |             |            |
| Total Revenues (\$1993 M/year)                    | 6.3         |            | 6.0         |            | 7.2         |            |
| <b>Government Revenues: Decade 4</b>              |             |            |             |            |             |            |
| Total Revenues (\$1993 M/year)                    | 6.0         |            | 6.0         |            | 6.0         |            |

## **Social and Environmental Implications**

- A summary of the social and environmental implications of the harvest scenarios is provided in Table ES-2.

### **Community**

- Reductions in forestry employment would increase unemployment in Kalum South communities. The community of Terrace could be affected due to its relatively high forestry labour force and significant dependence on the Kalum South harvest. Terrace could also be impacted through the loss of indirect jobs associated with Terrace's large service sector.

### **First Nations**

- Two major concerns of First Nations communities include: economic development and employment opportunities, and preservation of cultural and traditional resources.
- First Nations communities in the area have expressed an interest in gaining greater access to the employment opportunities afforded by silviculture and harvesting activities. Traditional and cultural resources may be affected by forestry activity, depending on where future harvesting actually occurs.

### **Environment**

- Various provincial guidelines have been implemented to improve the management of B.C. forest resources. Within Kalum South, several regional initiatives have been utilized to better manage and protect special areas and resources.
- Environmental concerns centre on the rate of harvest of old growth forest, impacts on aquatic habitat, and management of other forest resources.

**Table ES-2**  
**Summary of Social and Environmental Implications**

| <b>Scenario 1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Scenario 2</b>                                                                                                                                                                                                                                                                                                                          | <b>Scenario 3</b>                                                                                                                                                                                                                                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Community</b> <ul style="list-style-type: none"> <li>Community impacts occur immediately. Approximately 13 PYs of direct and 8 PYs of indirect employment will be lost immediately in Kalum South. Most of these employment impacts will occur in the community of Terrace.</li> </ul>                                                                                                                                                                            | <ul style="list-style-type: none"> <li>All employment impacts are deferred until decade two. However, beginning in decade two area communities would expect to see a reduction in direct employment by 67 PYs and indirect employment by 24 PYs.</li> </ul>                                                                                | <ul style="list-style-type: none"> <li>Employment impacts are deferred until decade three. In decade three and four employment will decline with the harvest reductions.</li> </ul>                                                                             |
| <b>First Nations</b> <ul style="list-style-type: none"> <li>The immediate harvest reduction could have a negative impact on First Nations forestry employment. Much of this employment is provided by relatively new companies which may be the first affected under a harvest decline. However, the harvest reduction could assist in addressing First Nation concerns related to timber harvesting and impacts on traditional uses of forest resources.</li> </ul> | <ul style="list-style-type: none"> <li>Maintaining the current harvest level may allow more flexibility in addressing First Nations' desire to obtain forest tenures. However, maintaining harvest levels would conflict with expressed interests among First Nations to conduct timber harvesting at a more sustainable level.</li> </ul> | <ul style="list-style-type: none"> <li>Implications would be similar to Scenario 2.</li> </ul>                                                                                                                                                                  |
| <b>Environment</b> <ul style="list-style-type: none"> <li>May provide more flexibility to incorporate decisions from land use planning processes such as PAS and the LRMP.</li> </ul>                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Because the current harvest level is maintained in decade one, Scenario 2 may not afford the same flexibility for addressing environmental and preservation concerns as does Scenario 1.</li> </ul>                                                                                                 | <ul style="list-style-type: none"> <li>Scenario 3 affords less flexibility for integrating environmental and preservation concerns into harvesting plans relative to Scenario 1 or 2. Old growth forests are utilized more rapidly under Scenario 3.</li> </ul> |



## 1.0 Introduction

A province-wide Timber Supply Review is currently being conducted by the Ministry of Forests (MOF). One of the objectives of the Timber Supply Review is to identify the economic, environmental, and social consequences of existing forest management practices. This includes an examination of the effects of current forest management practices on short- and long-term timber supply. Using information gathered in the review, the chief forester will make appropriate adjustments in the allowable annual cut (AAC) for each of the province's 36 timber supply areas (TSA). The *Forest Act* requires the chief forester to reassess the AAC for each TSA at least every five years.

This socio-economic analysis is the second of four documents prepared as part of the Timber Supply Review in the southern portion of the Kalum TSA (hereafter called Kalum South). The first report, released in June, 1994, provided technical information on the results of the timber supply analysis.<sup>2</sup> The socio-economic analysis assesses the socio-economic implications of changing timber harvest levels in Kalum South. A third report summarizes the first two documents to provide a focus for public discussion.<sup>3</sup> A final report will provide a description of the chief forester's AAC decision for Kalum South and the reasoning underlying the decision.

The purpose of the Kalum South socio-economic analysis is to assess potential socio-economic and environmental impacts associated with three harvest scenarios from the *Kalum South Timber Supply Analysis*. These scenarios were selected to illustrate a range of impacts do not represent preferred options for the Kalum South AAC. The chief forester will determine the AAC after considering many factors in addition to the information presented in this report.

### 1.1 Approach

The socio-economic implications of the harvest scenarios are evaluated within a multiple accounts framework. Separate evaluation accounts are used to discuss employment (Kalum South and provincial), government revenue, community, First Nations, and environmental implications of changing harvest levels. The report also provides an overview of the Kalum South area, describing the environmental and socio-economic setting and highlighting some of the environmental, community and First Nations concerns with respect to current forest management practices.

In this analysis, only those impacts that can be identified as being directly attributable to changes in the Kalum South harvest have been examined. In effect, this study assumes that all other variables (e.g., the land base, technology, harvesting costs, timber values, etc.) remain constant. This implies that the results of this report are valid only until the next timber supply analysis is conducted, at which time these and other factors that may have changed can be incorporated into the analysis.

The timber harvesting land base may be affected by other current and future land-use planning processes including the settlement of First Nations land claims. The Kalum South LRMP process and Protected Areas Strategies may result in land being removed from the timber harvesting land base. Several First Nations have either begun or are close to beginning discussions with the federal and provincial governments about their land claims in the area.

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<sup>2</sup> Ministry of Forests (1994), *Kalum South Timber Supply Analysis*.

<sup>3</sup> Ministry of Forests (1994), *Kalum South: Timber Supply Review Discussion Paper*

| Table 1-1<br>Summary of Accounts <sup>4</sup> |                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ECONOMIC IMPACTS</b>                       |                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Employment</b>                             | <ul style="list-style-type: none"> <li>• identifies direct and indirect effects on the Kalum South's employment and employment income over the short and long-term;</li> <li>• identifies direct effects on employment and employment income outside of Kalum South;</li> <li>• identifies total direct and indirect effects on employment and employment income for British Columbia.</li> </ul> |
| <b>Government Revenues</b>                    | <ul style="list-style-type: none"> <li>• identifies impacts on government revenues derived from the Kalum South timber resource.</li> </ul>                                                                                                                                                                                                                                                       |
| <b>SOCIAL AND ENVIRONMENTAL IMPLICATIONS</b>  |                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Community</b>                              | <ul style="list-style-type: none"> <li>• discusses possible effects on local residents and families who lose their jobs;</li> <li>• discusses local communities ability to adapt to forestry impacts, and opportunities for mitigation.</li> </ul>                                                                                                                                                |
| <b>First Nations</b>                          | <ul style="list-style-type: none"> <li>• discusses possible effects on local First Nations, and identifies areas of concern of First Nations communities.</li> </ul>                                                                                                                                                                                                                              |
| <b>Environmental</b>                          | <ul style="list-style-type: none"> <li>• discusses possible effects on the forest ecosystems.</li> </ul>                                                                                                                                                                                                                                                                                          |

Timber prices and new technology can affect determination of the operable land base. Higher timber prices could result in an increase in harvesting employment, as it could become economically feasible to harvest more inaccessible areas. Higher prices or more efficient harvesting methods could make previously marginal timber more valuable, thus potentially increasing the operable land base. However, a decrease in lumber or pulp prices could make harvesting of marginal quality stands or in difficult terrain uneconomical and result in a lower timber supply.

Other factors may affect the actual amount of employment in the future. To some extent, forest sector employment may decline due to the further adoption of labour-saving technologies.<sup>5</sup> It is also possible that as the harvest is reduced, "threshold levels" could be reached resulting in shutdown of entire camps or layoffs of entire shifts. This could also result in the restructuring or consolidation of labour or processing values that could affect employment in the area. If this were to occur, employment losses could be greater than the linear impacts estimated in this report.

On the other hand, harvesting employment could increase due to changes in forest management practices. For example, the impacts of the Forest Renewal Plan, announced in April, 1994, are not included in this report. More employment may be required to maintain roads and to harvest smaller cut blocks and sensitive watershed areas. Licensees may begin utilizing alternative wood sources such as grades 3, 4, 5, and 6 wood or deciduous timber volumes. Another possibility is that although harvesting employment may decline, greater value-added processing could increase processing employment. The various trends affecting future labour requirements and their net impacts on total employment are difficult to determine.

## 1.2 Report Structure

The report is organized as follows:

<sup>4</sup> Adapted from Marvin Shaffer and Associates (1992), *Interim Social and Economic Impact Assessment of Forest Land Management Options*.

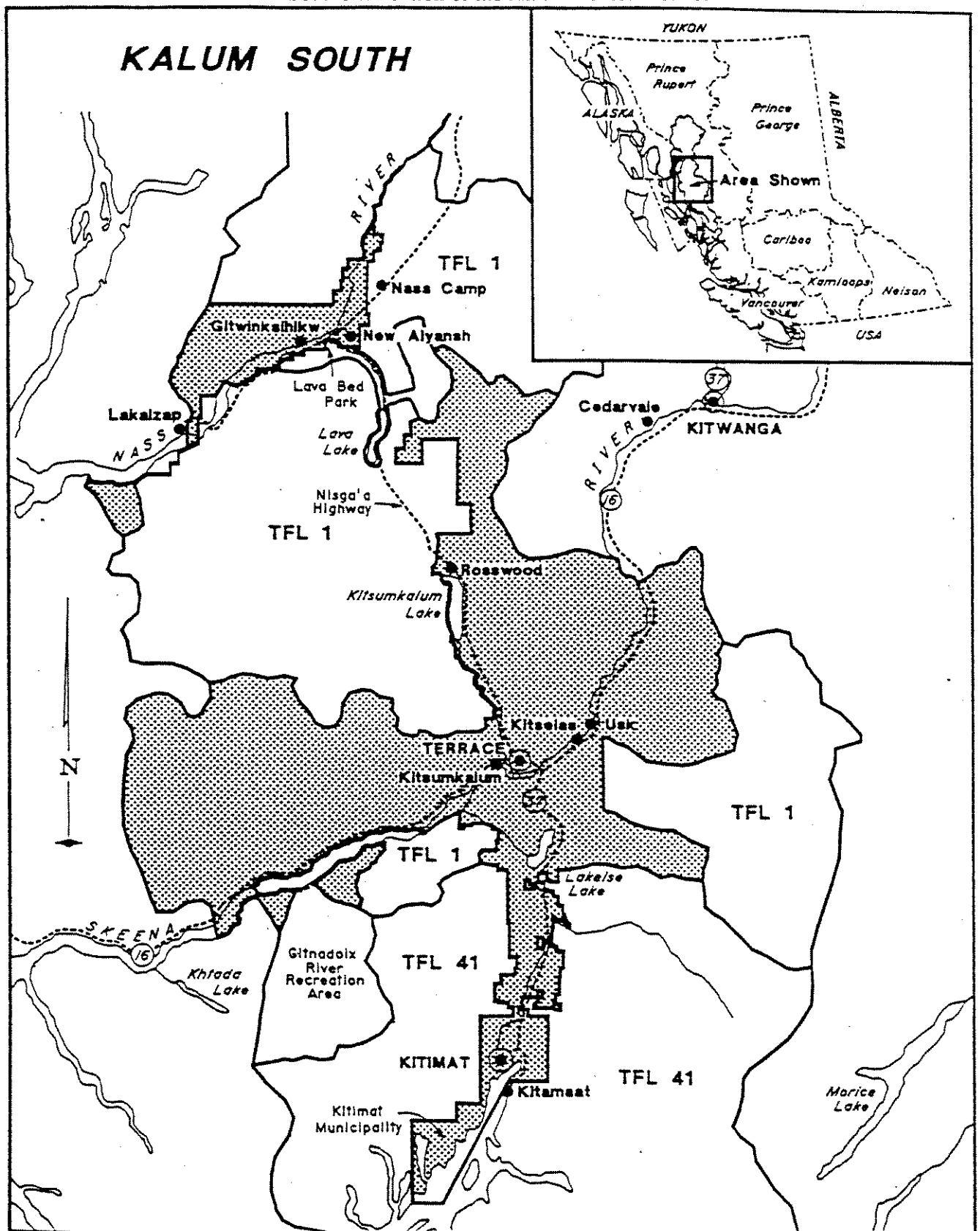
<sup>5</sup> For example, employment per unit harvested on the coast has declined by about 2% annually since the late 1970s.

- Section 2.0 provides a socio-economic profile of Kalum South, including a description of communities, social setting and First Nations. The structure of the labour force by industry and the major resource sectors are also described;
- Section 3.0 contains descriptions of the environmental setting and recreational areas and activities;
- Section 4.0 describes the current forestry operations in Kalum South with discussions on the timber harvesting land base, current management practices, historical AAC levels, current Kalum South apportionment, and current forestry employment;
- Section 5.0 contains descriptions of the three harvest scenarios investigated in this report;
- Section 6.0 presents the Kalum South and provincial economic impacts for the three harvest scenarios and focuses on employment, employment income, and government revenue impacts;
- Section 7.0 discusses the social and environmental implications of the three harvest scenarios;
- Finally, detailed appendices are provided to explain how the estimates presented in this report were derived.

### 1.3 Study Area

The Kalum Timber Supply Area (TSA) is one of eight TSAs within the Prince Rupert Forest Region. This report focuses on the southern portion of the Kalum TSA (Kalum South) which is located in the Kalum Forest District. The boundaries of Kalum South correspond to the southern portion of the Kalum Forest District, but exclude Tree Farm Licence (TFL) areas. Kalum South represents 549 762 hectares of the 21 866 234 hectares in the Prince Rupert Forest Region (Figure 1-1).

Figure 1-1  
Southern Portion of the Kalum Forest District



## **2.0 Socio-Economic Profile**

This section contains a socio-economic profile of the communities including a description of social settings, and First Nations activities and concerns in Kalum South. The profile also includes a description of the Kalum South labour force and economic activities directly associated with the area's land base.

### **2.1 Community and Social Setting**

#### **2.1.1 Overview**

In 1991, the population of Kalum South was estimated at 32 032, of which 22 738 (71 percent) resided in the two largest communities of Terrace and Kitimat. Between 1986 and 1991, the population increased by about 4.6 percent, a population growth rate less than half the provincial average of 13.8 percent. However, population growth rates showed considerable variation, as Terrace experienced a population increase of 8.6 percent, while the population of Kitimat increased by only 1.0 percent. Since 1991, there has been a slight increase in population, and from 1993 to 2000 the population is expected to increase by a further 16.0 percent.<sup>6</sup>

Incomes and unemployment rates for residents of the study area are higher than provincial averages. In 1991, average reported income was \$28 845, while the provincial average was \$27 620.<sup>7</sup> The higher income level in the area is attributed to the relative strengths of the industrial base, with forestry, aluminum smelting and petrochemical production contributing significantly to the employment of the area.

From 1988 to 1992, the annual percentage of the workforce claiming unemployment insurance was in the range of 8.2 - 9.5 percent annually, compared to provincial averages between 6.2 - 7.0 percent over the same period. Within Kalum South, unemployment insurance claims for Kitimat were 5.6 percent in 1988, increasing to 7.4 percent in 1992. These rates were below those for Terrace, which experienced unemployment insurance claims totaling 10.8 percent of the workforce in 1988 and 11.5 percent in 1992.<sup>8</sup> The high unemployment rates in Terrace correspond to a period of low prices for lumber and pulp products.

#### **2.1.2 Community Profiles**

##### **Terrace**

Referring to Figure 1-1, Terrace is centrally located on Highway 16, with Kitimat to the south and Prince Rupert to the west. The 1991 population of Terrace was 11 433, making it the largest community in Kalum South.<sup>9</sup> Terrace is the service centre for many northwestern communities, drawing shoppers from as far away as Smithers.

The largest employment sector in Terrace is the service sector, with major department stores, supermarkets and hotels providing approximately 550 person-years (PYs) of full-time employment and 400 part-time

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<sup>6</sup> B.C. Statistics, Ministry of Government Services. Based on average projected growth for the Kitimat and Terrace Local Health Areas between 1993 and 2000.

<sup>7</sup> These income values include both part-time and full-time earners.

<sup>8</sup> B.C. Statistics, Ministry of Government Services.

<sup>9</sup> Statistics Canada, 1991 Census.

jobs annually.<sup>10</sup> The provincial and federal governments provide an additional 400 PYs of employment annually. Other large employers in Terrace include School District #88, Mills Memorial Hospital, Skeena Sawmills, Skeena Cellulose Inc., Northwest Community College, B.C. Telephone Company, and the City of Terrace.

### **Kitimat**

Kitimat is the second largest community in Kalum South, with a population of 11 305.<sup>11</sup> Kitimat is a planned community built in the 1950s by Alcan Smelters and Chemicals Ltd. (Alcan) and the provincial government to service the aluminum smelter. Kitimat is situated on the Douglas Channel, which provides tidewater access to the Pacific Ocean.

The largest employer in Kitimat is Alcan, which currently supports 2 150 PYs of employment annually. The Eurocan Pulp and Paper Co. mill supports 550 PYs of employment annually, and Methanex provides 90 PYs of employment annually in the petrochemical sector. Other large employers in Kitimat are the Kitimat General Hospital, the District of Kitimat, and School District #80.

### **Thornhill**

The unincorporated community of Thornhill is a residential suburb of Terrace. The population of Thornhill is 4 533 (not including the 108 residents of the Kitselas reserve). The main employers in Thornhill are School District #88, several transportation firms, and several service companies.

### **Kitselas**

Kitselas, a Tsimshian community, is located in Thornhill, and has a population of approximately 108. The community is a member of the Tsimshian Tribal Council and the Band Council administers nine reserves covering 1 103 hectares. The most important employment activity in the community is carpentry.<sup>12</sup>

### **Kitsumkalum**

Kitsumkalum, a Tsimshian community, is located just outside of Terrace and has approximately 190. The community labour force is distributed between the service sector (60 percent), logging and silviculture (30 percent), and band employment (10 percent).<sup>13</sup> Kitsumkalum is a member of the Tsimshian Tribal Council. The Kitsumkalum Band Council administers three reserves covering 558 hectares.

### **Gitlakdamix (New Aiyansh)**

Gitlakdamix, or New Aiyansh as it is also called, has a population of about 620. Gitlakdamix is the largest Nisga'a community and is located near the Nass River, approximately 100 kilometres north of Terrace. The forest industry is the single largest employer in the community, providing approximately 36 PYs of employment annually in silviculture, 12 PYs in logging, and 3 PYs in log booming annually. Other

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<sup>10</sup> Person-year (PY) is a standard measure of employment that takes into account part-time or seasonal full-time work. Person-years allow different types of employment to be compared on a similar basis. In this report, 1 800 hours per year represents one person year of employment.

<sup>11</sup> Statistics Canada 1991 Census.

<sup>12</sup> M. Bevan, Chief Councilor, Kitselas Band Council.

<sup>13</sup> A. Bolton, Band Councilor Researcher, Kitsumkalum Band Council.

employers in Gitlakdamix include the Band construction operation, the Band office, the school, several small stores, and arts and crafts operations. The Gitlakdamix Band Council oversees administration of 2 000 hectares of reserve land.

### **Gitwinksihlkw (Canyon City)**

Gitwinksihlkw, or Canyon City, is a Nisga'a community located on the Nass River, west of Gitlakdamix. The community has a population of approximately 207. The largest employers in the community are the forestry sector, with Tower Logging and Sim Gan Logging providing approximately 30 PYs of employment annually. The community also has several individuals employed in the production of Nisga'a arts and crafts. The Gitwinksihlkw Band Council administers 655 hectares of reserve land.

### **Kitamaat**

Kitamaat Village is a Haisla community located near Kitimat. The population of Kitamaat Village is approximately 518. The largest employer in Kitamaat Village is the commercial fishing industry. There is some employment in the forest industry, with six people employed at the Eurocan Pulp and Paper mill, some seasonal work in fire suppression, and one forest contractor operating in the community. The Kitamaat Village Council oversees administration of 665 hectares of reserve land.

### **Other Rural Communities**

The history of settlement in the Greater Terrace area has been characterized by the development of several small unincorporated rural communities which have retained their original identities. Most of these communities trace their beginnings back to gold mining or railway development at the turn of the century. As Terrace expanded in the 1960s and 1970s, many of these small communities became popular locations for rural living.

The communities of New Remo (pop. 140), Rosswood (pop. 190), Copperside (pop. 310), Gossen Creek (pop. 143), Kleanza (pop. 108), Usk (pop. 108), Chimdemash (pop. 23), Jackpine Flats (pop. 260), Old Remo (pop. 210), Brauns Island (pop. 159), and Lakelse Lake (pop. 323) are located around the Terrace area and in 1991 had a collective population of 1 974.<sup>14</sup>

### **2.1.3 First Nations**

#### **Treaty Negotiations**

On December 15, 1993 the B.C. Treaty Commission began accepting statements of intent from First Nations to commence treaty negotiations.<sup>15</sup> In Kalum South, the Nisga'a, Tsimshian, and Haisla Nations all have outstanding land claims. The Gitksan - Wet'suwet'en Nation, which has communities outside Kalum South, also has a land claim in the area.

Currently, the Nisga'a Nation are in the process of negotiating their land claim. The Nisga'a have an Interim Protection Measures Agreement in place with the government to protect Nisga'a interests in the area until their land claim is resolved. There is no specified timetable for concluding the treaty negotiation process.

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<sup>14</sup> A. Webber, Economic Development Officer, Regional District of Kitimat-Stikine.

<sup>15</sup> Commission on Resources and Environment (1994), *Cariboo-Chilcotin Land Use Plan*.

### **Nisga'a Activities and Forestry Concerns**

The Nisga'a Nation is centred on the Nass River, approximately 100 kilometres north of Terrace. Nisga'a communities are active in the logging industry with Nisga'a employment in the forest industry reaching a peak when Westar operated TFL 1 in the Nass area.<sup>16</sup> Since that time, participation in the forest industry has declined.

In order to become more active in the forest industry, the Nisga'a have started the Nisga'a Economic Enterprise Corporation (NEE). This operation has been in place for the past two years and has provided approximately 28 PYs of employment annually. Interfor's helicopter logging operation, which operates throughout coastal B.C., employs 23 Nisga'a people full-time.<sup>17</sup> The Nisga'a have also become more active in silviculture in the past two years.

Other employment for the Nisga'a in Kalum South is derived from the commercial fishery and band council employment. Pine mushroom harvesting is also an important economic activity in the Kalum portion of Nisga'a traditional lands. Trapping provides some economic opportunities, but this activity is currently seen more as a cultural activity than an economic endeavour.

The Nisga'a are concerned that much of their activity in the forest industry is not secure from year to year. As a result the Nisga'a are hesitant to make long-term investments that would allow them to operate more efficiently in the forestry industry.<sup>18</sup> The Nisga'a are also in the process of registering with the Ministry of Forests in the Small Business Forestry Enterprise Program (SBFEP). The Nisga'a have expressed concerns over timber harvesting that occurs in areas having high traditional and economic value outside of the forest industry (i.e., pine mushroom areas, yellow cedar stands, and trapping).

### **Tsimshian Activities and Forestry Concerns**

Both Tsimshian communities in Kalum South have members employed in the forest industry. The most important forestry activities are logging and silviculture. Recently, with the help of the Kitsumkalum Band Council, a member of the Kitsumkalum community was able to start his own silviculture contracting company and is currently providing employment for 11 persons.

The Tsimshian have expressed several concerns associated with forestry activities in Kalum South. The Tsimshian depend upon the area's forests for cultural, medicinal and food sources which have been compromised in the past by forestry activities. The Kitselas and Kitsumkalum bands have identified the removal of culturally important red and yellow cedar trees as restricting their ability to obtain the proper materials for traditional activities such as totem pole carving and traditional clothing products.<sup>19</sup> Today, the communities must purchase cedar from the major licensees and hope that special consideration would be given to the harvest of cedar in the future.<sup>20</sup>

There is also a concern that the old growth in the area has been logged too quickly, causing impacts to other resources in the forests. In particular, the Tsimshian feel that the valley bottoms have been logged in

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<sup>16</sup> A. Mercer, Nisga'a Tribal Council, Economic Development Officer.

<sup>17</sup> B. Rosenberg, International Forest Products.

<sup>18</sup> A. Mercer, Nisga'a Tribal Council, Economic Development Officer.

<sup>19</sup> The removal of yellow cedar has caused particular concern because it was so rare in the area to begin with and is highly prized for carving finer crafts.

<sup>20</sup> M. Bevan, Chief Councilor Kitselas Band Council.

a short period and not properly restocked. The Giluts'aaw tribe once lived in the Lakelse Lake area and today are affiliated with the Lax kw'alaams Band in Port Simpson. The Lax kw'alaams band are concerned with logging that they feel is too intensive near Lakelse Lake towards the Gitnadoix area.<sup>21</sup>

The Kitselas state that they have incurred impacts to their traplines, elimination of hunting areas, and significant damage to cultural sites as a result of logging activity.<sup>22</sup> The Kitsumkalum are concerned that the continued removal of old growth will result in damage to the area's valuable medicinal plants and create additional access to traditional fishing stations. The Tsimshian would like to see a more complete integration of wildlife habitat, recreational, and cultural resources into forest management practices.

### **Haisla Activities and Forestry Concerns**

The Haisla community at Kitamaat Village expressed similar concerns as the Tsimshian in regard to the rate of timber harvest. The Haisla would like more consideration given to other forest resources as well and have identified impacts to traplines, cultural sites, and fish habitat as a result of logging.<sup>23</sup>

## **2.2 Labour Force**

The labour force of Kalum South in 1991, categorized by industry, is summarized in Table 2-1. Labour force data for the communities of Terrace and Kitimat are reported separately for comparative purposes. The largest portion of the labour force is employed in manufacturing, which consists primarily of aluminum smelting and pulp and paper manufacturing in Kitimat and sawmilling in Terrace.

A diversity index developed by the Ministry of Finance and Corporate Relations can be used to measure a community's relative dependency on various sectors of the economy.<sup>24</sup> The more sectors contributing to the economy in an area, the higher is the diversity index. For the Terrace-Kitimat area, the diversity index is 63. This diversity index rating suggests that two sectors (forestry and manufacturing) contribute significantly to the economic well-being of the area.

Communities that are dominated by fewer industries have lower diversity indices. Forest-dependent areas such as the North Thompson area (49), the Quesnel area (53), and the Hazelton area (40) are representative of the single-sector category. Areas that are more diversified, such as Fort St. John (79) and Peachland (78), have higher diversity indices, reflecting a more diversified economic base.

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<sup>21</sup> J. Bryand, Chief Councilor, Lax kw'alaams Band Council.

<sup>22</sup> M. Bevan, Chief Councilor, Kitselas Band Council.

<sup>23</sup> J. Wier, Kitamaat Village.

<sup>24</sup> G. Horne and L. Robson (1993), *British Columbia Community Economic Dependencies*, prepared for the British Columbia Round Table on the Environment and the Economy.

| <b>Table 2-1</b><br><b>Labour Force By Industry for Kalum South<sup>25</sup></b><br><b>(Individuals in Labour Force)<sup>26</sup></b> |              |              |                           |                       |
|---------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------|---------------------------|-----------------------|
| Industry                                                                                                                              | Terrace      | Kitimat      | Balance of<br>Kalum South | Total Labour<br>Force |
| Logging and Forestry                                                                                                                  | 435          | 125          | 610                       | 1 170                 |
| Mining                                                                                                                                | 40           | 10           | 40                        | 90                    |
| Manufacturing                                                                                                                         | 570          | 2 660        | 380                       | 3 610                 |
| Transportation                                                                                                                        | 480          | 145          | 355                       | 980                   |
| Agriculture                                                                                                                           | 75           | 20           | 80                        | 175                   |
| Retail trade                                                                                                                          | 920          | 575          | 540                       | 2 035                 |
| Construction                                                                                                                          | 335          | 290          | 410                       | 1 035                 |
| Wholesale trade                                                                                                                       | 305          | 50           | 240                       | 595                   |
| Accommodation                                                                                                                         | 490          | 310          | 375                       | 1 175                 |
| Government                                                                                                                            | 425          | 340          | 430                       | 1 195                 |
| Education                                                                                                                             | 490          | 340          | 395                       | 1 225                 |
| Health and social service                                                                                                             | 565          | 230          | 300                       | 1 095                 |
| Other                                                                                                                                 | 985          | 730          | 700                       | 2 415                 |
| <b>Total Labour Force</b>                                                                                                             | <b>6 115</b> | <b>5 825</b> | <b>4 855</b>              | <b>16 795</b>         |

### 2.3 Forestry

The total Allowable Annual Cut (AAC) available in southern portion of the Kalum Forest District is approximately 1 630 000 cubic metres.<sup>27</sup> This timber comes from several different tenure arrangements. The largest component of the AAC is associated with Tree Farm Licences (TFLs) 1 and 41 (1 150 000 cubic metres). Kalum South's AAC, which is the focus of this report, represents approximately 30 percent (480 000 cubic metres) of the total AAC available in the southern portion of the Kalum Forest District.

A small amount of timber is also harvested under Timber Licences. Another source of timber is grade 3, 4, 5 and 6 wood volumes.<sup>28</sup> This wood is not included in the AAC apportionment, but is recovered from sites that are harvested under the AAC apportionment. In 1993, these volumes represented approximately 3.0 percent of the total billed volume in Kalum South.<sup>29</sup>

Besides these tenure arrangements, forest companies also purchase timber from private lands on the open market and trade with other licensees to obtain fibre most suitable for their processing requirements. Timber harvesting from all sources creates a significant amount of direct forestry employment. The types of direct employment generated include harvesting and log transportation, road building, road maintenance,

<sup>25</sup> Statistics Canada, 1991 Census. Labour force information was derived from the enumeration areas that represent Kalum South.

<sup>26</sup> Table 2-1 represents figures for the experienced labour force, defined as persons who, during the week prior to June 4, 1990, were employed or unemployed but who had worked since January, 1990. Census information is based on individuals who are residents of Kalum South; it does not include individuals who work in the area but live elsewhere. These employment numbers are not comparable with employment numbers (i.e., person-years) found elsewhere in this report.

<sup>27</sup> Effective January 1, 1994 the AAC on TFL 41 was reduced by 30 000 cubic metres. The impacts of this reduction are not included in this report. Based on information collected for this analysis, 30 000 cubic metres would support approximately 29 PYs of direct forest sector employment.

<sup>28</sup> Grades 3, 4, 5, and 6 wood represents timber volumes that are 50% sound solid wood, or less.

<sup>29</sup> J. Perras, Ministry of Forests, Terrace. This could represent an additional volume of 48 900 cubic metres to the entire area which would support approximately 47 forestry jobs.

chip and hogfuel hauling, timber processing, administration and engineering, and silviculture work.<sup>30</sup>

Table 2-2 illustrates direct employment associated with the TFLs and Kalum South AAC. This profile represents the larger employment profile associated with forestry activity in the Terrace and Kitimat area. Total employment supported by the AAC of 1 630 000 cubic metres is approximately 1 565 PYs,<sup>31</sup> with Kalum South AAC component supporting approximately 461 PYs of forest sector employment annually.<sup>32</sup>

The majority of forestry employment (approximately 87 percent) accrues to residents of Kalum South, with every community in the area having some residents involved in the forest industry. Terrace residents receive the largest share of harvesting, road building and transportation employment. Terrace, with two large sawmills and three small processing facilities, also receives a significant amount of the timber processing employment.

Kitimat benefits from processing employment provided by the Eurocan Pulp and Paper Co. (division of West Fraser Mills Ltd.) pulp mill. However, the operations of this pulp mill depend to a large degree on fibre from Morice and Bulkley TSAs. Kitimat residents also benefit from forestry employment in road building, harvesting, and transportation. The residents of Gitlakdamix (New Aiyansh) and Gitwinksihlkw (Canyon City) also receive employment benefits from silviculture and harvesting activities.

| <b>Table 2-2</b><br><b>Forestry Employment from AAC in the Southern Portion of the Kalum Forest District</b><br><b>(1993)</b> |                                                                   |                                                                           |                                                                    |
|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------|
| <b>Sector</b>                                                                                                                 | <b>Kalum South AAC<br/>Employment<br/>(480 000 m<sup>3</sup>)</b> | <b>TFL 1 and 41 District<br/>Employment<br/>(1 150 000 m<sup>3</sup>)</b> | <b>Total Employment<sup>33</sup><br/>(1 630 000 m<sup>3</sup>)</b> |
| Harvesting and Log Hauling                                                                                                    | 178                                                               | 425                                                                       | 603                                                                |
| Road Building                                                                                                                 | 48                                                                | 115                                                                       | 163                                                                |
| Chip Hauling                                                                                                                  | 10                                                                | 23                                                                        | 33                                                                 |
| Timber Processing                                                                                                             | 182                                                               | 437                                                                       | 619                                                                |
| Administration                                                                                                                | 14                                                                | 35                                                                        | 49                                                                 |
| Silviculture                                                                                                                  | 29                                                                | 69                                                                        | 98                                                                 |
| <b>Total Employment</b>                                                                                                       | <b>461</b>                                                        | <b>1 104</b>                                                              | <b>1 565</b>                                                       |

The large regional forestry labour force can be partly attributed to the processing that occurs within Kalum South. Two large sawmills in Terrace, owned by West Fraser and Skeena Cellulose, provide an additional 414 jobs and process 1 425 000 cubic metres annually. Three smaller processing facilities, providing approximately 25 jobs, also operate in the Terrace area: Bell Pole, Terrace Precut Mill, and Copper Mountain Cedar Products. Several individuals in Kalum South are also involved in small scale processing such as cedar shake and shingle manufacturing.

Two pulp mills operate in close proximity to the sawmills, with West Fraser's Eurocan pulp mill in Kitimat

<sup>30</sup> Marine transportation and rail employment associated with TFL timber volumes is not considered here but does create additional employment.

<sup>31</sup> Billed volumes for the entire Kalum Forest District indicate that in 1993 approximately 2 710 000 cubic metres were harvested (Kalum South represents only a portion of this area).

<sup>32</sup> Person-year (PY) is a standard measure of employment that takes into account part-time or seasonal full-time work. Person-years allow different types of employment to be compared on a similar basis. In this report, 1 800 hours per year represents one person year of employment.

<sup>33</sup> Represents all employment derived from the harvest in the Kalum Forest District and does not include employment in the Kalum Forest District dependent on timber harvested elsewhere in the province.

and Skeena Cellulose's pulp mill in Prince Rupert. The Eurocan pulp mill processes 1 470 000 cubic metres annually and provides employment for 550 employees. The Skeena Cellulose pulp mill processes 2 500 000 cubic metres annually and employs 640 salaried and hourly employees and creates an additional 40 PYs of employment in special maintenance activities among contractors.<sup>34</sup>

The Skeena Cellulose pulp mill is outside Kalum South but lies in close proximity. The processing of TFL #1 and Kalum South AAC at the Skeena Cellulose's pulp mill supports approximately 170 PYs of employment annually. The total regional processing labour force inside Kalum South (excluding Skeena Cellulose's pulp mill employment of 640) is 989 employees.

Some individuals are not residents of Kalum South, but are employed in silviculture and road building activities in Kalum South. Employment generated by the Kalum South harvest accruing to individuals residing outside of the boundaries of Kalum South is included in provincial employment totals (see Table 4-3 and Figure 4-1).

## 2.4 Commercial Fishing

Commercial fishing does not provide significant employment or employment income to residents of Kalum South. Activities at the Kitimat River Hatchery provide 11 PYs of fishery related employment annually to Kitimat residents.<sup>35</sup> Fisheries resources in the area contribute to fishery activities and revenues realized outside of Kalum South.

The Skeena River and its tributaries are considered the second-largest salmon-producing system in B.C. All five species of Pacific salmon, as well as steelhead, migrate up the Skeena River to spawn in creeks and streams within the watershed.<sup>36</sup> The Nass and Kitimat systems are also important for Pacific salmon stocks and add to Kalum South's importance to the commercial fishery. Although these rivers provide important habitat to all migrating salmon, these waterways are particularly critical to fish as spawning and rearing grounds.

Table 2-3 outlines the total stock and the value of the stock attributed to fish reared in spawning beds inside the Kalum South portion of the Nass, Skeena, and Kitimat systems. The total wholesale value for the salmon catch attributed to the Kalum South is approximately \$2.65 million.<sup>37</sup> Most of the Kalum South salmon harvest is taken by the B.C. and Alaska fishing fleet.

The local First Nations commercial and food fishery is an important activity for First Nations communities in Kalum South.<sup>38</sup> The Tsimshian inland commercial fishery targets enhancement sockeye in the Skeena River system incorporating passive harvest methods in order to live release non-target stocks. The Nisga'a and Haisla Nations in the area are also active in the eulachon food fishery.

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<sup>34</sup> F. Fominoff, Skeena Cellulose. Contractors with special skills are required throughout the year to perform specialized tasks, especially when the pulp mills are off-line.

<sup>35</sup> D. McNeil, Kitimat River Hatchery.

<sup>36</sup> Orenda Forest Products (1991), *Kitimat/Terrace Groundwood Pulp and Paper Mill Environmental and Socio-Economic Impact*, Volume 2.

<sup>37</sup> This value reflects the catch as a commercial harvest and does not isolate the Indian Food Fishery (IFF) and sport fishery component.

<sup>38</sup> P. Lemieux, Department of Fisheries. DFO has a program which allows aboriginal communities to take surplus fish for commercial purposes.

| <b>Table 2-3</b><br><b>Salmon Catch and Value by Species in Kalum South<sup>39</sup></b><br>(Average catch for period 1990 to 1992) |                                 |                                        |                                                        |                             |
|-------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|----------------------------------------|--------------------------------------------------------|-----------------------------|
| <b>Species</b>                                                                                                                      | <b>Total Stock<br/>(pieces)</b> | <b>Catch<sup>40</sup><br/>(pieces)</b> | <b>Wholesale Price<sup>41</sup><br/>(\$ per piece)</b> | <b>Total Value<br/>(\$)</b> |
| Chinook                                                                                                                             | 19 109                          | 5 733                                  | 42.94                                                  | 246 157                     |
| Sockeye                                                                                                                             | 39 978                          | 23 987                                 | 22.19                                                  | 532 260                     |
| Coho                                                                                                                                | 110 070                         | 77 049                                 | 1.73                                                   | 903 785                     |
| Pink                                                                                                                                | 395 028                         | 197 514                                | 4.77                                                   | 942 142                     |
| Chum                                                                                                                                | 3 255                           | 1 953                                  | 13.30                                                  | 25 975                      |

## 2.5 Tourism

Kalum South has many exceptional tourism opportunities including world-renowned fishing. In particular, the freshwater fishery on the Skeena River system attracts a significant number of visitors from Europe and the United States. These anglers travel to the area to fish for a variety of species, however the most desirable are steelhead and salmon.

Freshwater fishing represents the largest portion of the area's tourism industry. In 1990, approximately \$2.05 million in revenue was generated by individuals who spent 6 500 guided angler-days in the Kalum South portion of the Skeena River watershed.<sup>42</sup> The Kitimat, Nass and Tseax systems supported an additional 1 940 guided angler days.<sup>43</sup> On the basis of these estimates, approximately 38 PYs of guiding employment and \$2.66 million in revenues are generated from guided freshwater fishing activity inside Kalum South.<sup>44</sup> The future of the freshwater fishery depends on the health of the fish resource and the maintenance of viable and productive fish spawning and fish rearing areas.

Saltwater fishing attracts tourists to the area near Kitimat on the Douglas Channel. This area is renowned for its large chinook and coho runs in June and August. Opportunities to fish for pink, chum and halibut are also abundant in this area. Tourists also travel to the area for a variety of other resource-based activities including rafting, hiking, hunting and wilderness viewing. Tourism activities supports a considerable number of associated accommodation and service sector jobs in the hospitality industry in Kalum South.

<sup>39</sup> G. Serbic, Department of Fisheries and Oceans Canada, Nanaimo. The escapements from waterways inside Kalum South (not including the hatchery production or watershed productions in TFL 1 and 41) have been averaged for the years 1990 to 1992.

<sup>40</sup> D. Peacock, Department of Fisheries and Ocean, Prince Rupert. The average exploitation rate for the past ten years have been used to derive total stocks. These numbers are considered to be only preliminary estimates.

<sup>41</sup> M. Hobbes, Department of Fisheries and Oceans, Vancouver. Based on average wholesale prices from 1989 to 1993.

<sup>42</sup> B.C. Ministry of Tourism (1991), *Economic Impacts of the Skeena River Freshwater Sport Fishery*. Includes the guide activity for the Skeena River, Kitsumkalum River, and Zymoetz River.

<sup>43</sup> B. Hooton, Ministry of Environment, Lands and Parks, Smithers. The Ministry of Environment believes that some guiding activity is not reported, therefore the numbers presented here reflect a lower bound on this activity.

<sup>44</sup> The average guide cost per guided angling day in 1990 was \$220 with an another \$64 spent locally as a result of the fishing experience. B.C. Ministry of Tourism (1991), *Economic Impacts of the Skeena River Freshwater Sport Fishery*, prepared by ARA Consulting Group.

## 2.6 Agriculture

Agricultural activity in Kalum South is centred along the Terrace-Kitimat corridor. Commercial agricultural activity in the area reached its peak during the 1940s, after which higher-paying forestry jobs, improved transportation links and year-round supplies of produce from southern B.C. and the United States eroded the local commercial agriculture base.<sup>45</sup>

In 1991, Kalum South had approximately 72 farms with a total farm area of 2 500 hectares.<sup>46</sup> Of the total farmland, approximately 625 hectares was planted with crops, the largest single crop being tame hay (440 hectares). Approximately 21 farms reported raising beef cows, while six farms maintained dairy cattle. Area farms also produce a variety of berries and vegetable crops and have approximately 11 028 square metres of greenhouse area. Most of the agricultural activity in the area is carried out on a part-time basis; however, 19 farms provided 30 PYs of paid labour. Total gross farm receipts in 1991 were reported to be \$2.5 million.

## 2.7 Botanical Forest Products

It is estimated that more than 190 botanical forest products are harvested in British Columbia.<sup>47</sup> Several of these commercial products are available in Kalum South, providing an important and expanding component to the Terrace-area economy.

The most important single economic product is the pine mushroom. Due to the high value of the pine mushroom crop, the harvest--occurring between late August and November--has caused labour shortages in traditional forestry activities such as silviculture and harvesting. The Terrace-Hazelton-Nass River triangle represents the most valuable pine mushroom area in North America. Another commercial mushroom, the yellow chanterelle, is also found in the southern portion of Kalum South.

In addition to the wild mushroom harvest, a variety of other plant products are also harvested and utilized by local residents. Specific local information is unavailable, but examples of other plant products harvested in B.C. include medicinal plant products, floral and greenery products, fruit and berry products, herb and vegetable products and landscaping plants.<sup>48</sup>

The local First Nations communities are particularly knowledgeable about the various botanical forest products in the Kalum area and utilize several plant products for a variety of medicinal, food and cultural purposes. For example, the Tsimshian use the cambian layer of area's hemlock trees as a component in a traditional food dish, while two medicinal products identified from the area's forests include juice extracted from devil's club and tea made from dried blueberry leaves.

To the Tsimshian and Nisga'a communities in Kalum South, yellow cedar and red cedar have important cultural value. The yellow cedar is regarded as the "living tree" because its bark is useful in making traditional bedding and clothing. The core of the cedar tree is used in making wood carvings and totem

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<sup>45</sup> Dr. N. Kerby (1984), *Greater Terrace Official Settlement Plan: Background Studies and Planning Recommendations*.

<sup>46</sup> 1991 Census. Kalum South is approximated by Kitimat-Stikine, Subdivision C.

<sup>47</sup> N. deGeus (1993), *Agroforestry Industry in British Columbia: Identification of Issues, Responsibilities and Opportunities for the Ministry of Forests*.

<sup>48</sup> N. deGeus, (1993) *Agroforestry Industry in British Columbia: Identification of Issues, Responsibilities and Opportunities for the Ministry of Forests (Draft Report)*.

poles.<sup>49</sup> The red cedar is used for making traditional canoes and totem poles. Today the yellow cedar is extremely rare in traditional territories of the Nisga'a and Tsimshian Nations and it is used for the making of finer traditional products.

## 2.8 Mining

Mining played an important role in attracting the first European settlers to the area. The discovery of placer gold in Kleanza, Chimdemash, Fiddler, Lorne, and Hankin Creeks brought a number of early pioneers to the Terrace area by 1884.<sup>50</sup> At present, there are still several active placer claims in the Terrace area.

Currently, there are no active mines in Kalum South area, and Serb Creek is the only proven mineral reserve. Outside Kalum South, near Kemano, there is a inactive gold and silver mine, in the Emerald Glacier area that has several proven ore bodies.

## 2.9 Hunting and Trapping

Most hunting in Kalum South involves residents who hunt moose, mule deer, grizzly bear and goat. In 1992, an estimated 798 resident hunters and two non-resident hunters spent 5 004 hunter-days harvesting 151 moose.<sup>51</sup> A further 164 resident hunters spent 1 054 hunter-days hunting mule deer and harvested 18 animals.<sup>52</sup> In 1992, grizzly bear and goat hunting involved 114 residents and seven non-residents, and resulted in nine grizzly bear and 34 goats being harvested over 684 hunter-days. There are also a variety of upland game birds in Kalum South, including ruffed, spruce and blue grouse. These birds provide recreational hunting opportunities for resident hunters.

Trappers in the area view their activity as a lifestyle choice that provides supplementary income during the winter. Between 1990 and 1993 an average of 625 martin, 24 mink, 61 beaver, 13 otter, 40 squirrel, 4 bobcat, and 6 fox were harvested annually. Annual fur sales were valued at approximately \$39 250.<sup>53</sup>

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<sup>49</sup> A. Bolton, Kitsumkalum Band Council Researcher and A. Mercer, Economic Development Officer for the Nisga'a Tribal Council.

<sup>50</sup> Dr. N. Kerby (1984), *Greater Terrace Official Settlement Plan: Background Studies and Planning Recommendations*.

<sup>51</sup> Resident hunters refers to individuals who have obtained B.C. resident hunting licenses. Non-resident hunters reside outside of B.C.

<sup>52</sup> Ministry of Environment, Lands and Parks (1993), *Wildlife Branch Summary Statistics Data Base, Hunter Harvest and Effort*, for the years 1990-93. Management Units 603, 611, 615 have been used as the boundaries to reflect Kalum South.

<sup>53</sup> Ministry of Environment, Lands and Parks (1993), *Annual Report 1991-1992*. The value of furs has been depressed in recent years, however it is expected to recover.



### 3.0 Environmental Setting

This section consists of a brief overview of the area's biophysical values and associated outdoor recreation values.

#### 3.1 Biophysical Setting

The biophysical components of the area include several ecosystems, important aquatic systems, and a variety of plants and wildlife.

##### 3.1.1 Ecosystems<sup>54</sup>

Kalum South has a variety of ecosystems ranging from the nutrient-rich, moist alluvial soils of the Skeena, Kitimat, Nass, Lakelse, and Kitsumkalum rivers to the high-elevation alpine meadows found on Sleeping Beauty Mountain. Four distinct biogeoclimatic zones predominate: the Coastal Western Hemlock zone, the Interior Cedar-Hemlock zone, the Mountain Hemlock zone, and the Alpine Tundra zone.

The Coastal Western Hemlock zone dominates the large, wide valley region that extends from Douglas Channel at Kitimat. This zone is located at low-to-middle elevations, primarily west of the Coastal Mountains. It is the wettest biogeoclimatic zone in B.C., and is characterized by an abundance of western hemlock and, to a lesser extent, western red cedar and Sitka spruce. Red alder is widespread on disturbed sites while black cottonwood is typically found along large rivers with extensive flood plains.

The Interior Cedar-Hemlock zone is located in the Nass Basin and parts of the Skeena mountains and ranges in elevations from 100 to 1 000 metres. This zone is characterized by the highest diversity of tree species of any zone in the province. In Kalum South, white x Sitka spruce hybrid (Roche spruce), subalpine fir, western red cedar, and sometimes yellow cedar comprise many climax stands. Engelmann spruce, white spruce, various spruce hybrids, and subalpine fir are often climax species within specific soil types in moist to wet ecosystems. Lodgepole pine, trembling aspen, and paper birch are common seral species throughout the zone.<sup>55</sup>

The Mountain Hemlock zone, located at middle to high elevations, is characterized by short, cool summers and long, cool winters, with heavy snow cover for several months. Mountain hemlock, amabilis fir (balsam), and yellow cedar are the most common tree species. Forests are not continuous in the Mountain Hemlock zone, and are largely confined to lower elevations.

The Alpine Tundra zone is located at higher elevations (i.e., above 1 650 metres). The harsh alpine climate is cold, windy and snowy, with low growing-season temperatures. This zone is often dominated by stunted vegetation. The most common stunted species are subalpine fir and mountain hemlock. Plants in this area typically grow close to the ground and are often separated by bare soil or rock.

##### 3.1.2 Aquatic Systems

Kalum South has several important water bodies that support a rich variety of habitat and fishery resources. Kalum South contains portions of the Skeena, Nass, Tseax, and Kitimat rivers within its

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<sup>54</sup> Ministry of Forests (1991), *Ecosystems of British Columbia*.

<sup>55</sup> Seral species refers to an organism which is part of a biotic community which is in a developmental or transitory stage in an ecological succession.

boundaries. The largest drainage area in Kalum South is the Skeena River area. This system has 4 of 5 Class 1 waterways and 13 of 42 Class 2 waterways in the province.<sup>56</sup> One of the Class 1 and 5 of the Class 2 waterways are in Kalum South.<sup>57</sup> The Skeena River supports a major sport and commercial fishery and provincially significant fish populations. The Skeena Islands are considered to be the richest growing sites in Kalum South, and they provide provincially rare habitat and contain an ecological reserve. Flood plains along the river also provide areas of important biodiversity.<sup>58</sup>

The lower Kitimat River is slow and meandering, with several sand bars and extensive bog areas near the river. Major tributaries are the Wedeene and Little Wedeene rivers. The Kitimat River watershed has a large anadromous fish population. Among the abundant species in the river system are dolly varden, coastal cutthroat trout, and eulachon. Due to the lack of lakes in the Kitimat River system--important for rearing habitat--the population of sockeye salmon is relatively low. The estuary has a wide variety of bird populations and is an important component of the area's biodiversity.<sup>59</sup>

The Nass system supports important sport, commercial and eulachon fisheries. It also provides wildlife habitat along the lower Nass flood plain, the Nass River estuary and the Nass Islands. Gingietl Ecological Reserve is situated on the west side of the river within Kalum South.

### 3.1.3 Plants and Wildlife

Kalum South contains an abundance of terrestrial and marine wildlife, ranging from moose, grizzly bear, and black bear to sea mammals and marine birds. The fish stocks in the area represent an important ecosystem component, with many wildlife species in the area highly dependent on these stocks for food.

The area supports a number of plant and animal species that require special consideration due to their rarity or restricted ranges. As shown in Table 3-1, a number of species of plants and wildlife in Kalum South are considered "extremely rare" (S1 ranked) or "rare" (S2 ranked). These species are potentially vulnerable to extirpation (extinction within part of their historical range). Other species in Kalum South are considered to be "uncommon" (S3 ranked) and are susceptible to large-scale disturbances within the province.

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<sup>56</sup> B.C. Ministry of Tourism (1991), *Economic Impacts of the Skeena River Freshwater Sport Fishery*.

<sup>57</sup> The Class 1 waterway in Kalum South is the Zymoetz River (above Limonite Creek). The Gitnadoix River is also a Class 1 waterway and is located in close proximity to Kalum South but is inside the Gitnadoix Recreational Area. The Class 2 waterways in Kalum South include the Kitsumkalum River, Lakelse River, Skeena River (Exchamsiks - 1.5 above Kitsumkalum River), Skeena River (above Zymoetz River), and Zymoetz River (below Limonite Creek). (See Appendix A for definition of Class 1 and Class 2 waterways.)

<sup>58</sup> Kalum South Interagency Planning Team (1992), *Kalum South Land and Resource Management Plan*.

<sup>59</sup> Orenda Forest Products (1991), *Kitimat/Terrace Groundwood Pulp and Paper Mill Environmental and Socio-Economic Impact*, Volume 2.

**Table 3-1**  
**Rare or Uncommon Plant and Wildlife Species in Kalum South**<sup>60</sup>

| <b>S1 and S2 Ranked Plants</b>                                                                                                                                                                                                         | <b>S1 and S2 Ranked Wildlife</b>                                                                    | <b>S3 Ranked Wildlife</b>                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Lance-fruited draba<br>Coastal shield fern<br>Kamischatica spike-rush<br>Hornemanns willowherb<br>Arctic eyebright<br>Bog adder's-mouth orchid<br>Regel's rush<br>Bog rush<br>White malaxis<br>Eminent bluegrass<br>Macoun's buttercup | Queen Charlotte Goshawk<br>Keen's Long-Eared Myotis<br>Short-Eared Owl<br>American peregrine falcon | Tailed Frog<br>American Bittern<br>Marbled Murrelet<br>Trumpeter Swan<br>Peale's Peregrine Falcon<br>Bald Eagle<br>Western Screech Owl<br>(Kennicotti subspecies)<br>Wolverine<br>Fisher<br>Grizzly Bear<br>Western Golden Plover<br>Bull Trout |

### 3.1.4 Protected Areas

The province has set the goal of protecting 12 percent of the provincial land base by the year 2000. To achieve this goal the Protected Areas Strategy (PAS) was created.<sup>61</sup> The PAS has two major objectives: to protect viable, representative examples of natural diversity in the province; and to preserve unique natural, cultural, and recreational features of the province. Currently, approximately 7.0 percent of the land base of B.C. is protected.

Kalum South is located in the southern portion of the Prince Rupert PAS region. Of the total B.C. protected land base, approximately 77.0 percent lies within the boundaries of the Prince Rupert PAS region.<sup>62</sup> Currently, 12.7 percent of land base in this region is in protected areas.

The Regional Protected Areas Team (RPAT) is responsible for assessing additional large areas of interest (over 3 000 hectares in size). In the southern part of the Kalum Forest District, RPAT is involved in assessing Foch/Miskatla watershed and Copper River. Parts of the Foch/Miskatla watersheds lie inside TFL 41. TFL 41 also contains two other large study areas: Miskatla and the Kitlope.

Several small protected areas are also being considered in the Kalum South. These areas are being reviewed by the Kalum South Land and Resource Management Planning process (LRMP) with assistance from RPAT. The small sites currently being explored as areas of interest for the PAS include: Jesse Lake, the Kasiks River, the Exchamsiks River, Weewanee Hotsprings, the northwest portion of the Dasque management unit, and the Upper Kalum River. Although not part of the PAS, the Kitselas Canyon is being proposed as a federal national historic park.

### 3.2 Recreational Use

The diversity of land forms, topography, and climate gives rise to some extraordinary recreational opportunities in Kalum South. Tourists from around the world visit the Kalum South area. Local recreationalists also enjoy some of the finest salmon fishing rivers in the province. The Kitimat, Nass, and

<sup>60</sup> Information for Kalum Forest District, B.C. Conservation Data Centre, Victoria, B.C. Ministry of Environment, Lands and Parks.

<sup>61</sup> Province of British Columbia (1993), *A Protected Area Strategy for British Columbia*.

<sup>62</sup> A. Wheatley, Ministry of Forests, Regional Protected Areas Team (RPAT) member.

Skeena rivers are renowned for their "king-size" chinook and steelhead. Residents also enjoy a variety of other recreational activities including fresh water fishing, camping, nature study, hiking, swimming, boating, motoring, downhill skiing, cross-country skiing, hunting and canoeing.

Approximately 295 000 recreational user-days (RUDs) are spent in Kalum South annually. This includes 14 000 RUDs for hiking activities and 16 500 RUDs for winter activities on specific recreational trails. A further 32 000 RUDs are spent at several specific sites throughout the area. Dispersed use and non-site-specific usage are estimated at 233 500 RUDs annually.<sup>63</sup>

Residents of this region spend the greatest number of days-per-resident recreating in provincial forests (29.04 days) per resident.<sup>64</sup> Average household expenditures for recreation in the Prince Rupert Forest Region were also the highest in B.C. at \$61.55 (\$1993) per day. Among the more popular recreation sites are Mount Elizabeth, the Lakelse Lake area, Kleanza Creek Provincial Park, the Kalum River area, Sleeping Beauty Mountain, Shames Mountain and Red Sand Lake.

In the Kitimat area, Mount Elizabeth provides hiking opportunities and excellent views of Kitimat and the Douglas Channel. To the north-west of Kitimat and adjacent to Kalum South is the Gitnadoix River Provincial Recreation Area. This river is a Class 1 angling river and is being considered as a protected area and represents the only entire watershed to be considered in the area.

The Lakelse Lake and Lakelse River area includes the Lakelse Provincial Park and the Forest Service recreation site. This area is a major fishing and camping destination and is within 20 km of Terrace. The river is a Class 2 angling river. There are established hiking trails throughout the area including, Onion Lake, Thornhill and Copper mountains. The area is also a popular cross-country skiing and snowmobiling area.

Kleanza Creek Provincial Park, located at the lower end of Kleanza Creek, includes the canyon area. Recreation in the area includes an established trail to Bornite Mountain and fishing in Kleanza Lake. Kleanza Lake is a high-elevation lake with high-quality recreational and aesthetic features. Sleeping Beauty Mountain provides easy access to alpine areas and is a short distance from Terrace. This area is heavily used by Kalum South residents for snowmobiling, cross-country skiing and hiking. On Shames Mountain, residents enjoy downhill skiing in winter and hiking in summer.

The Kalum River area includes the Redsand Lake Demonstration Forest, characterized by a varied mixture of forest types. This area is located between Kitsumkalum Lake and Treston Lake. The area has several trails and provides canoeing, boating, and camping opportunities. The Kalum River is a Class 2 angling river and since this area is easily accessed from Terrace, approximately 300 to 400 people visit the area each weekend during the summer.<sup>65</sup>

The Nass area provides fishing opportunities on the Nass and Tseax rivers and on the many lakes in the area. Along the Nisga'a Highway there are many scenic viewing opportunities, including the lava beds at the Nisga'a Memorial Lava Beds Provincial Park. Table 3-2 summarizes the established parks in the Kalum South area.

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<sup>63</sup> B. Childs, Ministry of Forests, Terrace.

<sup>64</sup> Ministry of Forests (1991), *Outdoor Recreation Survey 1989/90*.

<sup>65</sup> B. Childs, Ministry of Forests, Terrace.

| <b>Table 3-2</b><br><b>B.C. Parks -- Facilities for Kalum South<sup>66</sup></b><br><b>(1993)</b> |                           |                     |                               |                                                       |
|---------------------------------------------------------------------------------------------------|---------------------------|---------------------|-------------------------------|-------------------------------------------------------|
| <b>Park</b>                                                                                       | <b>Class<sup>67</sup></b> | <b>Area</b><br>(ha) | <b>Campgrounds</b><br>(sites) | <b>Campground Attendance<sup>68</sup></b><br>(visits) |
| Exchamsiks River                                                                                  | A                         | 18                  | 20                            | 1 330                                                 |
| Gitnadoix River                                                                                   | RA                        | 58 000              | 0                             | 0                                                     |
| Kitsumkalum                                                                                       | A                         | 40                  | 0                             | 0                                                     |
| Kleanza Creek                                                                                     | A                         | 269                 | 21                            | 1 772                                                 |
| Lakelse Lake                                                                                      | A                         | 362                 | 156                           | 9 572                                                 |
| Nisga'a Memorial                                                                                  | A                         | 11 243              | 0                             | 0                                                     |
| Nisga'a Memorial                                                                                  | RA                        | 6 440               | 6                             | 0                                                     |
| <b>Total</b>                                                                                      |                           | <b>76 372</b>       | <b>203</b>                    | <b>12 674</b>                                         |

<sup>66</sup> Ministry of Environment, Lands and Parks (1994), *Park Data Handbook 1993*.

<sup>67</sup> Designation class of the park. Classes include A, B, C, Recreation Area (RA) and Wilderness Conservancy (WC).

<sup>68</sup> Represents overnight stays in the campgrounds and does not include day visits to these parks.



## 4.0 Current Forestry Operations

This section contains a discussion of the timber harvesting land base, current management practices, history of the allowable annual cut (AAC), current AAC apportionment, and a review of the current harvest in Kalum South.

### 4.1 Timber Harvesting Land Base

Kalum South covers a total land area of 549 762 hectares of which 199 450 hectares are managed by the Forest Service as productive forests. As shown in Table 4-1, current management practices lead to several reductions to the productive land base, and hence the long-term timber harvesting land base. Table 4-1 summarizes the timber harvesting land base for Kalum South.<sup>69</sup>

| Table 4-1<br>Kalum South Timber Harvesting Land Base |                |                           |
|------------------------------------------------------|----------------|---------------------------|
| Classification                                       | Area<br>(ha)   | Proportion of area<br>(%) |
| Total Area                                           | 549 762        | 100                       |
| Productive Forest                                    | 199 450        | 36.3                      |
| Reductions to Crown forests                          | (97 973)       |                           |
| Additions to Crown forests                           | 2 401          |                           |
| <b>Timber Harvesting Land Base</b>                   | <b>103 878</b> | <b>18.5</b>               |
| Future reductions                                    |                |                           |
| <b>Long-Term Timber Harvesting Land Base</b>         | <b>99 136</b>  | <b>18.0</b>               |

### 4.2 Current Management Practices

The timber supply is related to forest management practices, the productivity of the land base, and the size of the timber harvesting land base. The *Kalum South Timber Supply Analysis* describes the timber supply based on a number of current management practices. These management practices include consideration of basic silviculture, incremental silviculture, forest health and unsalvaged losses, stream and old growth protection, cutblock adjacency and green-up guidelines, maintenance of representative forest types, visual quality, watershed and recreation, and minimum harvest ages.<sup>70</sup> There are three main forest management objectives for the Kalum South region:

- General integrated resource management where cutblock adjacency and forest type representation objectives apply;
- Watersheds and special recreation areas; and,
- Visual quality objectives (VQO) management.

The Interim Timber harvesting guidelines for the interior portion of the Prince Rupert Region, as well as stream buffer and representative forest type considerations, were applied in areas designated for general integrated resource management. These guidelines require a harvesting strategy of at least three passes with a 11 to 15 year green-up period between passes.

<sup>69</sup> A more detailed outline is available in the Kalum South Timber Supply Analysis.

<sup>70</sup> Based upon provincial and regional timber harvesting guidelines and the B.C. Fisheries/Forestry Guidelines.

Up to 40 percent of the operable area may be cut during the first pass, and up to 30 percent may be cut during both second and third passes. The guidelines also stipulate that an area cannot be logged until trees in any adjacent logged areas have reached a minimum height of three metres. In terms of representative forest types, the guidelines specify that a least 12 percent of each major forest type is to be maintained in old growth.

Specific forest cover objectives were applied in areas designated for visual quality, watershed and recreation management. In the retention/preservation VQO area, visual evidence of timber harvesting must be minimal. The green-up period for these areas is 22 years and a maximum of eight percent of the area can be younger than the green-up period.

Green-up in the partial retention VQO areas, where timber harvesting may be noticeable but not dominant is 21 years, and a maximum of 12.5 percent of the area can be below this age. Figures for the modification VQO (harvesting may be visually dominant, but must blend with the natural landscape) are 22 years and 24 percent. Cover requirements for community watershed and recreation reserves are 19 years and 23 percent.

#### **4.3 Historical AAC Levels**

In 1981 the Kalum South AAC was set at 450 000 cubic metres per year. The AAC remained at this level until 1987, when it was raised to 480 000 cubic metres per year with the inclusion of 30 000 cubic metres of AAC from lands inside the municipal boundaries of Kitimat.

#### **4.4 Current Apportionment**

The current apportionment of the Kalum South AAC is presented in Table 4-2.

The analysis of harvest scenarios (contained in Sections 5.0, 6.0, and 7.0) assumes that as the harvest changes, each licensee's apportionment is adjusted in proportion. For example, if the total harvest is phased down by 10 percent, it is assumed that each licensee's allocation is phased down by 10 percent.

It is also important to note that licensees are not required to harvest their total AAC allocations in any one year. A licensee's actual harvest may deviate by + or - 50 percent in any one year and, 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 the five-year period each licensee's total harvest must be within + or - 10 percent of its total AAC allocation.

| <b>Table 4-2</b><br><b>Kalum South AAC Apportionment by Licensee</b><br><b>(1994)</b> |                |                          |                            |
|---------------------------------------------------------------------------------------|----------------|--------------------------|----------------------------|
| Licensee                                                                              | License Number | AAC<br>(m <sup>3</sup> ) | Total<br>(m <sup>3</sup> ) |
| <b>1. Forest Licences, Replaceable</b>                                                |                |                          |                            |
| Bell Pole Co. Ltd.                                                                    | FL A16836      | 14 250                   |                            |
| West Fraser Mills Ltd.                                                                | FL A16885      | 28 500                   |                            |
| Skeena Cellulose Ltd.                                                                 | FL A16835      | 346 646                  |                            |
| Sharples Equipment (1969) Ltd.                                                        | FL A16865      | 570                      |                            |
| TV Logging Ltd.                                                                       | FL A16863      | 1 834                    |                            |
|                                                                                       |                |                          | 391 800                    |
| <b>2. Small Business Forest Enterprise Program (SBFEP)</b>                            |                |                          |                            |
| Various                                                                               |                |                          | 58 430                     |
| Bid Proposal                                                                          |                |                          | 20 770                     |
| <b>3. Forest Service Reserve</b>                                                      |                |                          |                            |
|                                                                                       |                |                          | 4 500                      |
| <b>4. Woodlot Licences</b>                                                            |                |                          |                            |
|                                                                                       |                |                          | 4 500                      |
| <b>Total</b>                                                                          |                |                          | <b>480 000</b>             |

#### 4.5 Current Employment

This section focuses on the employment associated with the Kalum South AAC volume of 480 000 cubic metres.<sup>71</sup> The current harvest in Kalum South supports approximately 461 person-years (PYs) of provincial forestry employment, of which 403 PYs accrue to Kalum South residents. Figure 4-1 and Table 4-3 summarize the labour force associated with the current harvest (480 000 cubic metres per year).

| <b>Table 4-3</b><br><b>Estimated Direct Forestry Employment</b><br><b>(Current AAC: 480 000 m<sup>3</sup> per year)</b> |                                                               |                                                                      |                            |                                   |
|-------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------------|----------------------------|-----------------------------------|
| Activity                                                                                                                | TSA<br>Employment<br>Coefficient<br>(PYs/000 m <sup>3</sup> ) | Provincial<br>Employment<br>Coefficient<br>(PYs/000 m <sup>3</sup> ) | TSA<br>Employment<br>(PYs) | Provincial<br>Employment<br>(PYs) |
| Harvesting and Log Hauling                                                                                              | 0.37                                                          | 0.37                                                                 | 178                        | 178                               |
| Road Building                                                                                                           | 0.10                                                          | 0.10                                                                 | 48                         | 48                                |
| Chip Hauling                                                                                                            | 0.02                                                          | 0.02                                                                 | 10                         | 10                                |
| Processing                                                                                                              | 0.29                                                          | 0.38                                                                 | 139                        | 182                               |
| Administration                                                                                                          | 0.02                                                          | 0.03                                                                 | 10                         | 14                                |
| Silviculture                                                                                                            | 0.04                                                          | 0.06                                                                 | 19                         | 29                                |
| <b>Total</b>                                                                                                            | <b>0.84</b>                                                   | <b>0.96</b>                                                          | <b>403</b>                 | <b>461</b>                        |

#### Harvesting and Log Hauling

The current harvest in Kalum South provides 178 PYs of harvesting and transportation employment. Virtually all of this employment accrues to Kalum South residents. There are no camp operations in Kalum South and most harvesters travel to harvest sites each day using logging roads in the area.

<sup>71</sup> Excluded from this section is employment associated with TFL 1 or 41. Also excluded is employment associated with wood grades 3, 4, 5 and 6, timber volumes from private lands, or timber that is transported from other areas for processing in Kalum South.

Timber harvested under major forest licences is harvested and transported by independent contractors, and by small firms that specialize in harvesting and log-hauling activities. The major forest licensees have a small number of company employees in their woodlands divisions to oversee the harvest of their allocated volumes.

### **Road Building and Road Maintenance**

The current harvest requires that additional logging roads be constructed each year. As well, existing logging roads require regular maintenance and upgrading. Road crews in the area typically operate from 7 to 10 months of the year, using a variety of equipment such as excavators, bulldozers, graders, drills and heavy trucks and perform a variety of tasks including; road deactivation, snow removal, bridge building, grading and actual road construction. At the current harvest level, approximately 48 PYs of road building and road maintenance employment are required.

### **Timber Processing**

The current harvest creates approximately 182 PYs of processing employment, with approximately 139 PYs accruing to Kalum South residents. The remaining 43 PYs of processing employment accrues to Prince Rupert residents. The three forest licensees--Skeena Cellulose, West Fraser, and Bell Pole--operate their own processing facilities in Kalum South.

The largest component of the Kalum South harvest (346 646 cubic metres) is processed at Skeena Cellulose's Terrace sawmill. In 1993, Skeena Cellulose's Terrace sawmill processed approximately 700 000 cubic metres, of which the Kalum South timber volume would have represented approximately 50 percent of the required fibre. Wood chips from Skeena Cellulose are transported to Skeena Cellulose's pulp mill near Prince Rupert.

West Fraser's operation is similar to that of Skeena Cellulose, with timber processed at its sawmill in Terrace and chips shipped to its pulp mill in Kitimat. West Fraser's Terrace sawmill requires approximately 735 000 cubic metres of timber annually of which 28 500 cubic metres is supplied from the Kalum South harvest.

The Bell Pole facility requires select high-quality logs suitable for making telephone poles. Therefore, Bell Pole's 14 250 cubic metres AAC is traded for approximately 3 350 cubic metres of suitable pole material for its processing facility.<sup>72</sup> Bell Pole's Terrace mill processes approximately 8 500 cubic metres of timber annually.

Since 1992, Terrace Precut Mill Ltd. has received approximately 45 000 cubic metres of timber from SBFEP Bid Proposal timber sales.<sup>73</sup> This company also purchases timber from Skeena Cellulose and other private suppliers. Terrace Precut Mill Ltd. is considering adding a dry kiln and becoming more involved in the SBFEP. The company Copper Mountain Ltd. utilizes cedar in its processing, and purchases timber from area mills and through private sales.

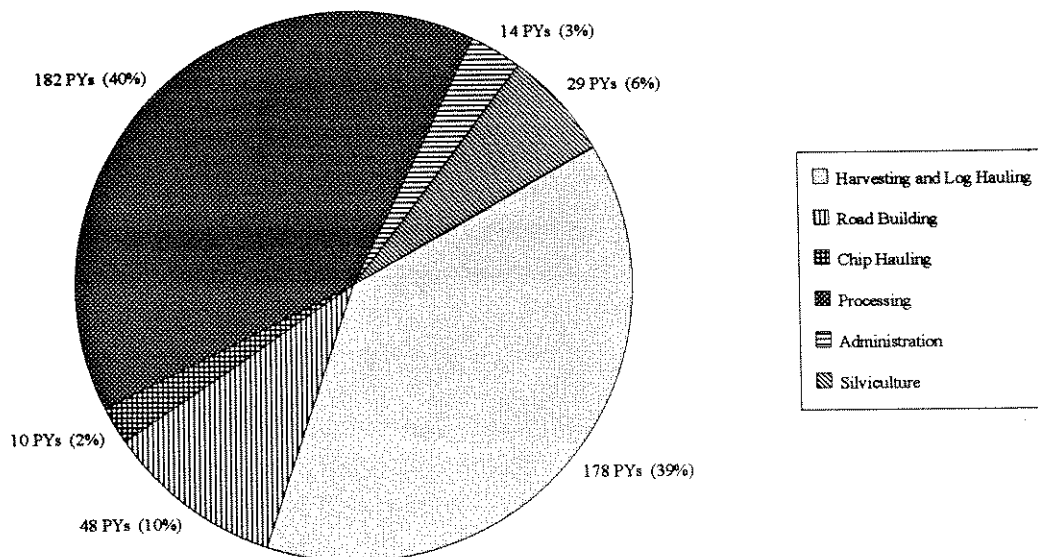
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<sup>72</sup> J. Corstanje, Bell Pole Co. Ltd. Based on the last three years, their AAC (14 250 m<sup>3</sup>) provides on average 3 350 cubic metres annually.

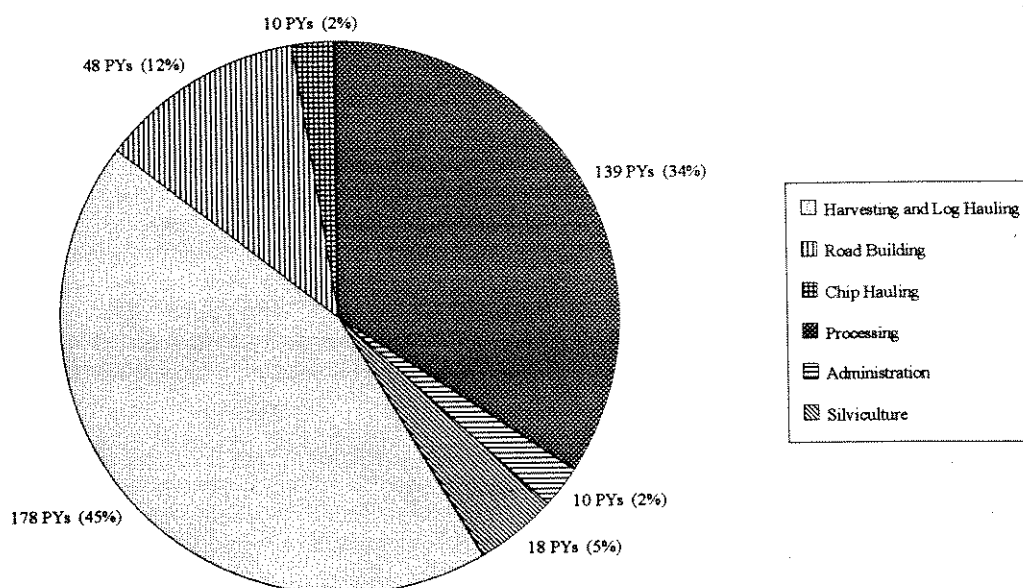
<sup>73</sup> Bid Proposal Sales are under section 16.1 of the Forest Act. These sales are designed to encourage value-added manufacturing of forest products.

**Figure 4-1**  
**Direct Forestry Employment Associated with the Kalum South AAC**  
 (AAC: 480 000 m<sup>3</sup> per year)

**Provincial Direct Forestry Employment (461 PYs)**



**TSA Direct Forestry Employment (403 PYs)**



**Chip and Hogfuel Hauling<sup>74</sup>**

Wood chips and hogfuel from the Terrace sawmills are transported by B-train chip trucks to the two area pulp mills. Approximately 50 truckloads of wood chips and hogfuel are moved each day from Terrace sawmills to the area's two pulp mills. The 480 000 cubic metres from the Kalum South would support approximately 10 PYs of total hauling employment in the Kalum South area.

**Administration**

Licensees maintain supervisory and administrative staff who oversee operations in their processing plants, woodland operations, and local and head offices. A portion of this employment is associated with the Kalum South harvest. At the current harvest level, approximately 14 PYs of administrative employment would be supported. Of this total, 10 PYs would be employed in Kalum South and the remaining 4 PYs would be employed in other B.C. locations.

**Silviculture**

Silviculture activities include surveying, site preparation, planting, brushing, girdling, fertilization, and pruning. The Ministry of Forests is responsible for funding silviculture in areas harvested prior to 1987 and in areas harvested under the SBFEP after 1987. Licensees are responsible for all basic silviculture activities in areas harvested after 1987.

Current harvesting activity generates 29 PYs of silviculture employment, with approximately 18 PYs of this employment accruing to Kalum South residents.<sup>75</sup> Approximately 30 percent of the silviculture activities are performed by workers from the area's First Nations communities.

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<sup>74</sup> The Eurocan Pulp mill also receives wood chips by train from the Morice TSA, but all the transportation associated with the Kalum South harvest is by truck.

<sup>75</sup> Silviculture employment information from: Ministry of Forests, Kalum District; West Fraser and Skeena Cellulose.

## 5.0 Description of Harvest Scenarios

In this section, three harvest scenarios from the *Kalum South Timber Supply Analysis* are described. The impacts of these scenarios, illustrated in Figure 5-1, are examined in sections 6.0 and 7.0. The scenarios do not suggest a preferred AAC or represent the only possible options that could be considered in the final AAC determination.

### 5.1 Scenario 1

As shown in Figure 5-1, under Scenario 1 the current harvest of 480 000 cubic metres per year is reduced by 16 000 cubic metres per year to 464 000 cubic metres per year in decade one. In decade two, a 10 percent decline (46 000 cubic metres) decreases the harvest to 418 000 cubic metres per year and in decade three, the long-term harvest level of 400 000 cubic metres per year is reached. The harvest scenario includes a small shortfall in decade 14. Scenario 1 represents the base case from the timber supply analysis.

In Scenario 1, the immediate phase-down is required to avoid either substantial future harvest reductions or large future timber supply shortages. The long-term harvest level of 400 000 cubic metres per year represents a total reduction of 16.7 percent from the current harvest level of 480 000 cubic metres per year. In decade eight, most of the timber would be harvested from second growth stands.<sup>76</sup>

The long-term harvest level is the harvest rate at which the total growing stock remains at a constant level over time. A constant growing stock is maintained when the annual growth volume is equal to the annual harvest volume. The long-term harvest level of 400 000 cubic metres per year is less than the maximum sustainable harvest level, because of the forest cover requirement for partial retention, retention VQOs and old growth constraints are deducted. Losses from disease and other natural causes must also be deducted from the maximum sustainable harvest level. In Kalum South it is expected that 9 500 cubic metres of timber will be lost annually due to natural causes.

Some uncertainty exists with some of the data and assumptions used in the *Kalum South Timber Supply Analysis*. If there are changes in these assumptions, then there may be changes in the forecast timber supply. Specific areas of concern include: the size of the timber harvesting land base, site productivity for regenerated stands, existing mature volumes, minimum harvest ages, and the forest cover requirements for managing areas with visual quality objectives.

### 5.2 Scenario 2

In Scenario 2, the current harvest of 480 000 cubic metres per year is held constant over the first decade. In the second decade, the harvest level decreases to the long-term harvest level of 400 000 cubic metres per year. As in Scenario 1, there is a small shortfall in decade 14. Under Scenario 2, the long-term harvest level of 400 000 cubic metres per year is attained one decade earlier than in the Scenario 1 (see Figure 5-1).

### 5.3 Scenario 3

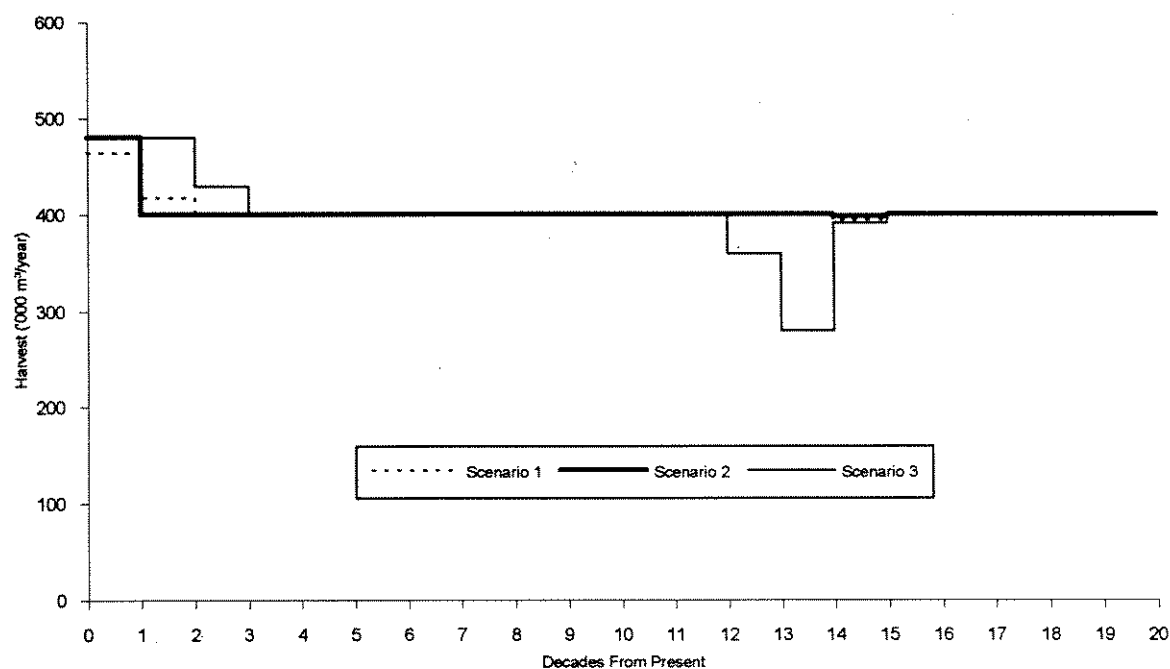
In Scenario 3, the current harvest level of 480 000 cubic metres per year is maintained for the first two decades. Beginning in the third decade, the harvest level declines to 430 000 cubic metres per year. In decade four, the long-term harvest level of 400 000 cubic metres per year is reached. Maintaining the

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<sup>76</sup> Ministry of Forests (1994), *Kalum South Timber Supply Analysis*.

current harvest level for two decades results in a decline below the long-term harvest level in decade 13 and 14. In Scenario 3, the long-term harvest level of 400 000 cubic metres per year is reached one decade later than in the Scenario 1 (see Figure 5-1).

**Figure 5-1**  
**Kalum South Harvest Scenarios**



## 6.0 Economic Impacts

In this section, employment, employment income and government revenue impacts associated with the three harvest scenarios are reviewed. Employment and employment income impacts for residents of Kalum South are analyzed in Section 6.1. In Section 6.2, provincial employment, employment income and government revenue impacts are assessed. All employment income estimates presented are after-tax. All income and revenue estimates are adjusted to reflect \$1993. Appendices B-D provide detailed information on the calculation of the economic impacts presented in this section.

### 6.1 Kalum South Impacts

#### Employment and Employment Income

Forestry activities in Kalum South generate significant direct employment for area residents. Approximately 87 percent of the total direct employment created by the Kalum South harvest accrues to area residents. Estimates of Kalum South employment and employment income associated with Scenario 1 harvest levels are shown in Table 6-1.

In Scenario 1, the annual harvest level would decline immediately from 480 000 to 464 000 cubic metres. The initial 16 000 cubic metre harvest reduction would translate into a direct employment loss of 13 PYs with associated employment income of \$0.4 million. Thus, direct employment would decline from 403 PYs currently to 390 PYs at the decade one harvest level. Direct employment income would decline from \$12.8 to \$12.4 million.

Direct employment in Kalum South supports related indirect and induced employment. Indirect and induced employment at the current harvest level is estimated to be 235 PYs per year. Therefore, total employment (direct and indirect/induced) supported by the current harvest level is 638 PYs, with associated employment income of approximately \$17.9 million. In decade one of Scenario 1, total employment would decline to 617 PYs with associated employment income of \$17.3 million.

In decade two, the harvest would decline to 418 000 cubic metres, resulting in a further decline in direct employment and employment income to 351 PYs and \$11.2 million, respectively. Total employment and employment income at the 418 000 cubic metre harvest level would be 556 PYs and \$15.7 million.

By decade three the long-term harvest level of 400 000 cubic metres is reached. Direct employment stabilizes at 336 PYs with associated direct employment income of \$10.7 million annually. Total employment would be 532 PYs per year with total after-tax income of about \$15.0 million annually. The net impact of decreasing the harvest level from 480 000 cubic metres per year to 400 000 cubic metres per year would be a reduction of 67 PYs of direct employment and 39 PYs of indirect and induced employment, for a total employment decline of 106 PYs.

In Scenario 2, the employment and employment income benefits provided by the current 480 000 cubic metre harvest level would be maintained for one decade. Employment and employment income impacts would not be experienced until the beginning of the second decade when the harvest level is reduced to the long-term level of 400 000 cubic metres per year. This harvest reduction would result in the loss of 67 direct PYs and associated employment income of \$2.1 million. The total employment loss would be 106 PYs with a reduction in employment income of \$2.9 million. As in Scenario 1, direct employment and employment income at the long-term harvest level would be 336 PYs and \$10.7 million. Total employment

and employment income would be 532 PYs and \$15.0 million.

In Scenario 3, current employment and employment income levels would be maintained for the first two decades. At the beginning of decade three, the harvest would decline to 430 000 cubic metres. Direct employment and employment income at this harvest level would be 361 PYs and \$11.5 million, respectively. Total employment and employment income would be 572 PYs and \$16.1 million. In decade four, the long-term harvest of 400 000 cubic metres per year level is reached. At the long-term harvest level, Scenario 3 would support the same employment and employment income levels as indicated for Scenarios 1 and 2.

| Table 6-1                                                                    |                                       |            |                      |       |                                  |                      |       |
|------------------------------------------------------------------------------|---------------------------------------|------------|----------------------|-------|----------------------------------|----------------------|-------|
| <u>Kalum South Employment and Employment Income: Scenario 1<sup>77</sup></u> |                                       |            |                      |       |                                  |                      |       |
| Decade                                                                       | Harvest Level                         | Employment |                      |       | Employment Income                |                      |       |
|                                                                              |                                       | Direct     | Indirect/<br>Induced | Total | Direct                           | Indirect/<br>Induced | Total |
|                                                                              | ( <sup>000 m<sup>3</sup>/year</sup> ) | (PYs/year) |                      |       | (\$1993 after-tax millions/year) |                      |       |
| Current                                                                      | 480                                   | 403        | 235                  | 638   | 12.8                             | 5.1                  | 17.9  |
| 1                                                                            | 464                                   | 390        | 227                  | 617   | 12.4                             | 4.9                  | 17.3  |
| 2                                                                            | 418                                   | 351        | 205                  | 556   | 11.2                             | 4.5                  | 15.7  |
| 3(LTHL <sup>78</sup> )                                                       | 400                                   | 336        | 196                  | 532   | 10.7                             | 4.3                  | 15.0  |
| 4                                                                            | 400                                   | 336        | 196                  | 532   | 10.7                             | 4.3                  | 15.0  |
| 5                                                                            | 400                                   | 336        | 196                  | 532   | 10.7                             | 4.3                  | 15.0  |

## 6.2 Provincial Impacts

### Employment and Employment Income

Additional direct employment accrues to residents who reside outside Kalum South (mostly in Prince Rupert), but who receive employment benefits from the Kalum South harvest. At the current annual harvest level of 480 000 cubic metres, total direct provincial employment (including Kalum South employment) is approximately 461 PYs and the associated direct provincial employment income is \$14.6 million. The direct employment supports 691 PYs of indirect and induced employment throughout the province. Total provincial employment at the current harvest level is 1 152 PYs with associated employment income of \$30.5 million.

In Scenario 1, the initial harvest level of 464 000 cubic metres per year (16 000 cubic metre reduction) would support 445 PYs of direct employment and \$14.1 million in direct employment income. Total provincial employment would be 1 113 PYs with associated employment income of \$29.5 million. The long-term harvest level, which is reached in decade 3, would support 384 PYs of direct employment annually, with associated after-tax employment income of \$12.1 million. With indirect and induced employment included, the long-term harvest level would support a total of 960 PYs of employment and \$25.4 million in employment income annually. Scenario 1 provincial employment and employment income are summarized on a decade-by-decade basis in Table 6-2.

<sup>77</sup> Refer to Appendices B-D for a detailed discussion of methods used to calculate economic impacts.

<sup>78</sup> Long-term harvest level (LTHL)

| Table 6-2<br>Provincial Employment and Employment Income: Scenario 1 <sup>79</sup> |                             |            |                      |       |                                  |                      |       |
|------------------------------------------------------------------------------------|-----------------------------|------------|----------------------|-------|----------------------------------|----------------------|-------|
| Decade                                                                             | Harvest                     | Employment |                      |       | Employment Income                |                      |       |
|                                                                                    |                             | Direct     | Indirect/<br>Induced | Total | Direct                           | Indirect/<br>Induced | Total |
|                                                                                    | ('000 m <sup>3</sup> /year) | (PYs/year) |                      |       | (\$1993 after-tax millions/year) |                      |       |
| Current                                                                            | 480                         | 461        | 692                  | 1 153 | 14.6                             | 15.9                 | 30.5  |
| 1                                                                                  | 464                         | 445        | 668                  | 1 113 | 14.1                             | 15.4                 | 29.5  |
| 2                                                                                  | 418                         | 401        | 602                  | 1 003 | 12.7                             | 13.9                 | 26.6  |
| 3 (LTHL)                                                                           | 400                         | 384        | 576                  | 960   | 12.1                             | 13.3                 | 25.4  |
| 4                                                                                  | 400                         | 384        | 576                  | 960   | 12.1                             | 13.3                 | 25.4  |
| 5                                                                                  | 400                         | 384        | 576                  | 960   | 12.1                             | 13.3                 | 25.4  |

In Scenario 2, provincial direct employment in decade one would be maintained at current levels. In decade two, the long-term harvest level of 400 000 cubic metres per year is reached. This harvest reduction at the beginning of decade two would lead to the loss of 77 direct PYs with associated employment income of \$2.5 million. Total employment losses would be 192 PYs with a reduction in employment income of \$5.1 million. Provincial employment and employment income levels at the long-term harvest level would be the same as those outlined for Scenario 1.

In Scenario 3, direct provincial employment would be maintained at current levels for the first two decades. At the beginning of the third decade, the harvest would decline to 430 000 cubic metres per year. Direct provincial employment and employment income at this harvest level would be 413 PYs and \$13.1 million. This represents a reduction from current levels of 48 PYs and \$1.5 million. Total provincial employment would decline by 120 PYs to 1 032 PYs and total provincial employment income would drop by \$3.1 million to \$27.4 million. At the beginning of decade four the long-term harvest level is reached. Provincial employment and employment income at the long-term harvest level would be the same as Scenarios 1 and 2.

### Government Revenues

Forestry activities generate significant annual revenues for the provincial government. At the current harvest level in Kalum South, approximately \$7.2 million in provincial government revenues are generated.<sup>80</sup> Government revenue estimates associated with Scenario 1 harvest levels are shown in Table 6-3.

Government revenues during the first decade of Scenario 1 would decline from the current level of \$7.2 million to \$6.9 million annually. At the long-term harvest level, government revenues would fall to an estimated \$6.0 million. This represents a reduction from current levels of \$1.2 million.

<sup>79</sup> Refer to Appendices B-D for a detailed discussion of methods used to calculate economic impacts.

<sup>80</sup> This does not include federal government revenues. For example, the figures do not include personal income or corporate tax payments to the federal government.

| <b>Table 6-3</b><br><b>Provincial Government Revenues Account: Scenario 1<sup>81</sup></b><br><b>(\$1993 millions/year)</b> |                                                         |                                 |                                     |                           |               |
|-----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|---------------------------------|-------------------------------------|---------------------------|---------------|
| Decade                                                                                                                      | Harvest Level<br>( <sup>000</sup> m <sup>3</sup> /year) | Stumpage and Rent <sup>82</sup> | Personal Income Taxes <sup>83</sup> | Other Taxes <sup>84</sup> | Total Revenue |
|                                                                                                                             |                                                         | (\$)                            | (\$)                                | (\$)                      | (\$)          |
| Current                                                                                                                     | 480                                                     | 1.1                             | 3.2                                 | 2.9                       | 7.2           |
| 1                                                                                                                           | 464                                                     | 1.1                             | 3.1                                 | 2.8                       | 6.9           |
| 2                                                                                                                           | 418                                                     | 0.9                             | 2.8                                 | 2.5                       | 6.3           |
| 3 (LTHL)                                                                                                                    | 400                                                     | 0.9                             | 2.7                                 | 2.4                       | 6.0           |
| 4                                                                                                                           | 400                                                     | 0.9                             | 2.7                                 | 2.4                       | 6.0           |
| 5                                                                                                                           | 400                                                     | 0.9                             | 2.7                                 | 2.4                       | 6.0           |

In Scenario 2, government revenues in the first decade would remain constant at about \$7.2 million annually. The decade two harvest level is the long-term harvest level and therefore reflects government revenues of \$6.0 million annually.

In Scenario 3, government revenues would remain constant at approximately \$7.2 million for the first two decades. Revenues would decline by \$0.8 million to \$6.4 million in decade three. In decade four, revenues would reach levels consistent with the long-term harvest level of \$6.0 million per year.

<sup>81</sup> Refer to Appendices B-D for a detailed discussion of methods used to calculate economic impacts.

<sup>82</sup> Stumpage and rent averages \$2 265 per 1 000 cubic metres.

<sup>83</sup> Personal income taxes average \$6 685 per 1 000 cubic metres.

<sup>84</sup> Other taxes average \$6 010 per 1 000 cubic metres.

## 7.0 Social and Environmental Implications

This section presents the possible effects of the harvest scenarios on communities, First Nations, and the environment.

### 7.1 Community Implications

The impact on communities in Kalum South as result of changes in the forest industry is difficult to accurately predict. In general, individuals who are subjected to employment loss or employment uncertainty will likely experience psychological or emotional stress. These effects will also have ramifications on their families and would likely result in increased requirements for government services.<sup>85</sup>

Based on previous experience elsewhere in the province, it is likely younger, skilled and more occupationally mobile individuals will leave their community to seek employment elsewhere. People with skilled trades will fare better in attempting to find alternative employment than unskilled workers, while unskilled workers 55 years and older typically have the greatest difficulty re-joining the workforce. In general, unskilled individuals who do rejoin the work force outside of the forest industry likely do so at a lower wage rate (estimated to be 27-33 percent lower).<sup>86</sup>

From the community impact perspective, the important considerations are the magnitude of the unemployment impacts, the pattern and timing of the job losses (i.e., job losses occur in one week or spread out over several years), and the diversity of the economic base of the community (i.e., how dependent the community is on forestry).

The forest industry is very important to the communities in Kalum South. The Kalum South harvest represents approximately 30 percent of the total harvesting activity in the area. (Most other harvesting is done within TFL 1 and 41.) As mentioned earlier, 87 percent of the forestry employment directly benefits Kalum South residents. The Kalum South harvest is particularly important to the community of Terrace which has a large portion of its workforce employed in the forest industry.

The dependence of Terrace on the Kalum South harvest can be traced to the local operations and primary processing of Skeena Cellulose Ltd., West Fraser Mills Ltd. and Bell Pole Ltd. Co. which represent the three major licensees with processing facilities in Kalum South. Kitimat, with the Eurocan pulp mill, supports the next largest forestry workforce in Kalum South. All other communities in Kalum South have a portion of their labour force dependent upon the forestry activities for employment. The largest non-resident employment accrues to nearby Prince Rupert which utilizes Kalum South wood chips at the Skeena Cellulose pulp mill.

In Scenario 1, employment impacts occur immediately in decade one. These employment impacts will eliminate approximately 14 PYs of direct employment and 8 PYs of indirect employment for a total employment impact of 22 PYs. In decade two, the harvest level is reduced again and reaches the long-term harvest level in decade three. Most of this unemployment would likely be absorbed by the community of Terrace. Terrace with its large contribution to direct forestry employment and significant participation in the regions service sector would absorb most of the employment impacts.

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<sup>85</sup> British Columbia Ministry of Employment and Investment (1993), *Resource Based Community Adjustments*, prepared by ARA Consulting Group Inc.

<sup>86</sup> Ernst and Young (1992), *Human Resources in the British Columbia Wood Products Industry*.

Under Scenario 2, employment impacts do not occur until decade two. However, when the harvest is reduced by 80 000 cubic metres, direct employment in the Kalum South communities would be reduced by 68 PYs while an additional 39 PYs of indirect employment would be lost. Scenario 3 extends the current harvest level for the next two decades, thus maintaining the current employment for a longer period.

## 7.2 First Nations Implications

Currently, two of the major concerns of the First Nations communities in the area are economic development and employment opportunities, and preservation of culture and traditional resources.

First Nation communities in the area would like to gain greater access to the employment opportunities afforded by forestry through silviculture and harvesting activities. The current harvest level is 16.7 percent above the forecast long-term harvest level. As the harvest declines to the long-term harvest level opportunities for expanded First Nations involvement in current types of forestry activities could become more limited. However, the long-term harvest level could also be complimentary to First Nations desire for employment in resource based activities associated with special forest products (i.e., mushroom harvesting) and tourism (i.e., guiding and adventure tourism).

With respect to traditional and cultural resources, impacts may or may not continue to occur depending on where the harvesting occurs. In the past, timber harvesting has been concentrated in the wide valley bottoms along the area's rivers. These valleys contain most of the cultural sites in the area. The high concentration of cultural sites combined with the concentrated logging has resulted in impacts on many sites.<sup>87</sup> Protection of these traditional and cultural resources will depend on the adequacy of information on specific sites where future logging occurs, and how information is incorporated into the development plans.

In Scenario 1, a small harvest reduction in decade one may have a negative impact on First Nations employment in the forest industry since much of the First Nation forestry employment is provided by relatively new companies. These new companies could be the first affected if harvests are reduced. However, the immediate reduction in harvest may accommodate First Nation concerns of over harvesting and may afford a greater opportunity to mitigate impacts on some of the other forest resources important to First Nations people (i.e, additional protection to mushroom harvesting areas, fish habitat, trap lines).

Impacts on First Nations in Scenario 2 are difficult to determine. Although the harvest is reduced to the long-term harvest level in decade two, the maintenance of the harvest at current levels through decade one may or may not address current concerns of First Nations communities. All the First Nations expressed an interest in departing from the traditional forest industry activities to some extent. For example, the Nisga'a identified the importance of developing an ecotourism industry based on the sustainability of wilderness values. They envision the establishment of a timber industry based around the production of high quality old growth wood, using partial cutting systems and processing at regional value added wood manufacturing facility to maximize local employment opportunities.<sup>88</sup>

All First Nations communities have expressed an interest in obtaining some form of land tenure regarding forestry. The maintenance of the current harvest for two decades in Scenario 3 may allow the best opportunity for local First Nations communities to realize this goal. At the same time, all First Nations communities are also concerned about managing the forests for non-timber resources at a sustainable level.

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<sup>87</sup> Ministry of Forests (1992), *Heritage Values in the Kalum South Resource Management Area*.

<sup>88</sup> Ministry of Forests (1994), *Kalum-North Area of the Kalum Timber Supply Area--Discussion Paper*, Nisga'a Tribal Council Appendix.

In this regard, the delay in reaching the long-term harvest level until decade four under Scenario 3 may be considered unfavourably.

### 7.3 Environment Implications

Since 1987, numerous provincial guidelines have been implemented to improve management of provincial forest resources. Harvesting practices must now take into account coastal harvesting guidelines, fisheries forestry guidelines, and biodiversity and wildlife tree guidelines. These guidelines ensure that other resource values are identified and that suitable forest practices are used. For example, wildlife tree guidelines are designed to protect snags and coarse woody habitats. These guidelines are important because 40 percent of B.C. wildlife (i.e., birds, small fur-bearers, and amphibians) is dependent upon this component of the forest ecosystem.

Other developments, in terms of environmental considerations, include the Forest Practices Code and the Forest Renewal Plan. The Forest Practices Code created a single enforceable law which requires better forest practices with fines for violations. The Forest Renewal Plan is designed to help restore and protect the health of forest-based ecosystems by requiring the clean-up of environmental damage and to provide research into environmentally sound forest practices. This plan will involve many proactive activities, such as fish restocking and hillside restoration through the repair or removal of unused and unnecessary roads.<sup>89</sup>

#### Environmental Issues

There are several environmental issues and concerns in Kalum South that must be recognized. Among these is the issue of extensive logging activity in the 1970s and 1980s concentrated in the wide valley area between Kitimat and Terrace. This harvesting activity has raised concerns among area residents about logging impacts on fish, wildlife, and the quality of community life.<sup>90</sup> Over much of this area, large quantities of timber were removed very quickly with little regard for other forest resource values.

A recent audit of cut blocks in the Kalum Forest District revealed that 87 percent of the blocks sampled had fisheries concerns.<sup>91</sup> Impacts on the associated streams reflected an overall impact rate of 65 percent, with 42 percent of the Class I and II reaches being impacted. These impacts were caused as the result of road construction and stream related activities. Identified road impacts included surface erosion, inadequate drainage, drainage diversions and encroachment on streams by landings, roads, bridges, or borrow pits. Stream related activities involved inadequate debris cleanup, poor falling and yarding where clean up was possible, stream misclassification, and inappropriate activities around streams. Stream impacts in the Kalum Forest District, where among the higher impact rates estimated for the coastal forest districts that were reviewed.

However, the Kalum Forest District has been involved in several initiatives to address the issue of impacts to fish and wildlife in the Kalum South. District staff are following wildlife tree guidelines to ensure coarse woody debris is available for birds (particularly raptors) and small furbearers. The District is also setting aside forested land near critical habitat areas such as swamps, bogs, and rookeries.<sup>92</sup>

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<sup>89</sup> Province of British Columbia (1994), *British Columbia's Forest Renewal Plan*.

<sup>90</sup> LRMP meeting on *Timber Harvesting Tenure Systems*, March 3, 1994, in Terrace.

<sup>91</sup> Tripp Biological Consultants Ltd. (1994), *The Use and Effectiveness of the Coastal Fisheries Forestry Guidelines in Selected Forest Districts of Coastal British Columbia*.

<sup>92</sup> L. Turney, Ministry of Environment, Lands and Parks, Terrace.

In the biologically rich habitat around Lakelse Lake, buffers of up to 400 metres in width have been established along riparian zones as result of initiatives under the Thunderbird Integrated Resource Management Plan to protect old growth forests and wildlife habitat. District staff are also addressing biodiversity concerns by altering silviculture practices to better maintain grizzly bear habitat by providing more forage and hiding cover. Consideration is also being given to critical ungulate wintering grounds which are particularly important to moose and goat populations.

Another issue in Kalum South is the harvest rates within individual watersheds.<sup>93</sup> Harvesting in a watershed can alter the hydrology and result in different run-off rates than have been observed historically. In the extreme this can potentially result in slide and wash out problems. Concerns have been expressed over the possible impact of logging in some of the smaller upper reach watersheds as these areas come under increasing harvest pressures. These watersheds contain different genetic forest stands and harvesting may result in logging impacts not previously encountered at lower elevation harvest sites.

The removal of a significant portion of the area's remaining old growth over the next fifty years may prove to be detrimental to the biodiversity in the area. Currently, many areas and watersheds have had minimal impact from forestry activities. As more areas are logged, the connectivity between habitats will be reduced and the loss of specific critical habitat types will be expanded. There is a concern that the old growth forest habitat will become patchy, causing many wildlife species to be restricted to small "islands" of habitat which may not be large enough to sustain populations (i.e., grizzly bear habitat). Within the Kalum South Land and Resource Management Planning process the issue of maintaining adequate old growth forest as intact habitat is a concern in many of the planning units.<sup>94</sup>

Another concern related to logging old growth stands is the additional access that may be created. Currently, many areas and watersheds have no or minimal road access; however, in the future road access will increase significantly. This may cause increased sediment production and angling pressure on steelhead stocks in the area which travel to remote and isolated stretches of upper waterways to spawn.<sup>95</sup>

### **Environmental Impacts of Harvest Scenarios**

Currently in Kalum South most of the merchantable forests are 300 years or older. In Scenario 1, over the next 50 years these areas will be significantly reduced. Although Scenario 1 does manage for 12 percent old growth in the major forest types in the Kalum South, it is not clear if this would afford adequate environmental flexibility to accommodate wildlife and wildlife habitat concerns.

However, Scenario 1 may establish a base for other land use planning processes such as the PAS and the LRMP process, which have the objective to establish a representative inventory of wildlife forest habitats. Scenario 1, in combination with other related planning processes, may accomplish the environmental objectives desired by other stakeholders.

Scenario 2 will be subject to the same forestry management guidelines and potential decisions arising from other resource planning initiatives as outlined in Scenario 1. Because of a higher harvest level in decade one, Scenario 2 may not afford the same flexibility for integrating environmental and preservation concerns into harvesting plans as does Scenario 1. However, the difference between the areas harvested in Scenario

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<sup>93</sup> L. Turney, Ministry of Environment, Lands and Parks, Terrace.

<sup>94</sup> The Kalum South Interagency Planning Team (1993), *Kalum South Land and Resource Management Plan: Planning Unit Summaries*.

<sup>95</sup> L. Turney, Ministry of Environment, Lands and Parks, Terrace.

1 and 2 in the first decade would be small.

In Scenario 3, the current harvest level is maintained for two decades, and in the fourth decade the long-term harvest level is reached. Under this scenario, more of the available volumes would be utilized in early decades. This would remove the greatest area of old growth forests in the first four decades.

Scenario 3 affords less flexibility for integrating environmental and preservation concerns into harvesting plans relative to Scenario 1 or 2. For example, Scenario 3 would allow for less time between harvesting in adjacent areas. This could result in difficulty in meeting the Visual Quality Objectives. Visual Quality management areas comprise 31.5 percent of the timber-harvesting land base, therefore the meeting of Visual Quality Objectives may require increased harvest in areas outside the Visual Quality management areas.



## 8.0 Summary and Conclusions

The socio-economic impacts associated with the three harvest scenarios analyzed in this report are summarized in Tables 8-1 and 8-2. As an alternative a decade-by-decade comparison of incremental changes in employment, income, and government revenues for each scenario are provided in Appendix F.

All three harvest scenarios involve a drop in harvest levels from the current level of 480 000 cubic metres per year to a long-term harvest level of 400 000 cubic metres per year. The scenarios differ in the timing and magnitude of the initial harvest reduction. In Scenario 1, the harvest declines immediately to 464 000 cubic metres per year. At the beginning of decade two, Scenario 1 harvest levels decline to 418 000 cubic metres per year and the long-term harvest level of 400 000 cubic metres per year is reached at the beginning of decade three. Scenario 2 maintains the current harvest level of 480 000 cubic metres per year for the first decade and then declines to the long-term harvest level at the beginning of decade two. Scenario 3 extends the current harvest through the first two decades and then declines to 430 000 cubic metres per year in decade three. The long-term harvest level is reached in decade four.

### 8.1 Economic Impacts

As the harvest is phased down, direct employment and employment income impacts occur. The reduction in harvest from 480 000 cubic metres to 400 000 cubic metres would reduce the provincial direct forestry employment by 77 PYs per year with associated after-tax employment income reductions of \$2.5 million. Most of the direct employment losses would occur among forestry employees residing inside Kalum South (68 PYs), particularly in Terrace. The total provincial employment (direct and indirect/induced) impacts could result in a labour force reduction from 1 153 PYs per year to approximately 960 PYs per year.

Government revenues would also decline in proportion to the reduced harvest level. At the 480 000 cubic metre harvest level, associated government revenues are approximately \$7.2 million. At the 400 000 cubic metres harvest level, associated government revenues would be approximately \$6.0 million.

### 8.2 Social and Environmental Implications

Employment impacts could be disproportionately distributed among First Nations communities and the community of Terrace. All scenarios analyzed are subject to the same forest management practices, but the harvest levels would vary in early decades among the three scenarios. Old growth forests would be harvested in earlier decades under Scenario 3 relative to Scenario 1 and 2. As discussed earlier, Scenario 3 may provide less flexibility in meeting environmental objectives.

### 8.3 Concluding Remarks

This study assesses the economic, social and environmental impacts of changing harvest levels in the Kalum South area. Each of the three harvest scenarios examined could lead to losses in jobs, incomes, and provincial government revenues. The timing of the losses would differ between scenarios. As most forestry jobs are relatively high paying, considerable growth in other areas of the economy would be required to offset the withdrawal of forest sector income from the economy. The Forest Renewal Plan, announced in April, 1994, was not considered in this analysis, but may offset some of the impacts. This study documents impacts attributed to a change in harvest levels and assumes that factors such as land base, management, harvesting and processing technology, and timber prices remain constant. Changes in these variables would require a re-examination of impacts.

**Table 8-1**  
**Summary of Kalum South and Provincial Economic Impacts**

| Impact Account<br>(By Decade)                     | Scenario 1  |            | Scenario 2  |            | Scenario 3  |            |
|---------------------------------------------------|-------------|------------|-------------|------------|-------------|------------|
|                                                   | Kalun South | Provincial | Kalun South | Provincial | Kalun South | Provincial |
| <b>Employment and Employment Income: Decade 1</b> |             |            |             |            |             |            |
| Harvest Level (m <sup>2</sup> /year)              | 464 000     |            | 480 000     |            | 480 000     |            |
| Direct Employment (PYs/year)                      | 390         | 445        | 403         | 461        | 403         | 461        |
| Total Employment (PYs/year)                       | 617         | 1 113      | 638         | 1 152      | 638         | 1 152      |
| Direct After-Tax Income (\$1993 M/year)           | 12.4        | 14.1       | 12.8        | 14.6       | 12.8        | 14.6       |
| Total After-Tax Income (\$1993 M/year)            | 17.3        | 29.5       | 17.9        | 30.5       | 17.9        | 30.5       |
| <b>Employment and Employment Income: Decade 2</b> |             |            |             |            |             |            |
| Harvest Level (m <sup>2</sup> /year)              | 418 000     |            | 400 000     |            | 480 000     |            |
| Direct Employment (PYs/year)                      | 351         | 401        | 336         | 384        | 403         | 461        |
| Total Employment (PYs/year)                       | 556         | 1 003      | 532         | 960        | 638         | 1 152      |
| Direct After-Tax Income (\$1993 M/year)           | 11.2        | 12.7       | 10.7        | 12.1       | 12.8        | 14.6       |
| Total After-Tax Income (\$1993 M/year)            | 15.7        | 26.6       | 15.0        | 25.4       | 17.9        | 30.5       |
| <b>Employment and Employment Income: Decade 4</b> |             |            |             |            |             |            |
| Harvest Level (m <sup>2</sup> /year)              | 400 000     |            | 400 000     |            | 400 000     |            |
| Direct Employment (PYs/year)                      | 336         | 384        | 336         | 384        | 336         | 384        |
| Total Employment (PYs/year)                       | 532         | 960        | 532         | 960        | 532         | 960        |
| Direct After-Tax Income (\$1993 M/year)           | 10.7        | 12.1       | 10.7        | 12.1       | 10.7        | 12.1       |
| Total After-Tax Income (\$1993 M/year)            | 15.0        | 25.4       | 15.0        | 25.4       | 15.0        | 25.4       |
| <b>Government Revenues: Decade 1</b>              |             |            |             |            |             |            |
| Total Revenues (\$1993 M/year)                    | 6.9         |            | 7.2         |            | 7.2         |            |
| <b>Government Revenues: Decade 2</b>              |             |            |             |            |             |            |
| Total Revenues (\$1993 M/year)                    | 6.3         |            | 6.0         |            | 7.2         |            |
| <b>Government Revenues: Decade 4</b>              |             |            |             |            |             |            |
| Total Revenues (\$1993 M/year)                    | 6.0         |            | 6.0         |            | 6.0         |            |

**Table 8-2**  
**Summary of Social and Environmental Implications**

| Summary of Social and Environmental Implications                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Scenario 1                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Scenario 2                                                                                                                                                                                                                                                                                                                                 | Scenario 3                                                                                                                                                                                                                                                      |
| <b>Community</b> <ul style="list-style-type: none"> <li>Community impacts occur immediately. Approximately 13 PYs of direct and 8 PYs of indirect employment will be lost immediately in Kalam South. Most of these employment impacts will occur in the community of Terrace.</li> </ul>                                                                                                                                                                            | <ul style="list-style-type: none"> <li>All employment impacts are deferred until decade two. However, beginning in decade two area communities would expect to see a reduction in direct employment by 67 PYs and indirect employment by 24 PYs.</li> </ul>                                                                                | <ul style="list-style-type: none"> <li>Employment impacts are deferred until decade three. In decade three and four employment will decline with the harvest reductions.</li> </ul>                                                                             |
| <b>First Nations</b> <ul style="list-style-type: none"> <li>The immediate harvest reduction could have a negative impact on First Nations forestry employment. Much of this employment is provided by relatively new companies which may be the first affected under a harvest decline. However, the harvest reduction could assist in addressing First Nation concerns related to timber harvesting and impacts on traditional uses of forest resources.</li> </ul> | <ul style="list-style-type: none"> <li>Maintaining the current harvest level may allow more flexibility in addressing First Nations' desire to obtain forest tenures. However, maintaining harvest levels would conflict with expressed interests among First Nations to conduct timber harvesting at a more sustainable level.</li> </ul> | <ul style="list-style-type: none"> <li>Implications would be similar to Scenario 2.</li> </ul>                                                                                                                                                                  |
| <b>Environment</b> <ul style="list-style-type: none"> <li>May provide more flexibility to incorporate decisions from land use planning processes such as PAS and the LRMP.</li> </ul>                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Because the current harvest level is maintained in decade one, Scenario 2 may not afford the same flexibility for addressing environmental and preservation concerns as does Scenario 1.</li> </ul>                                                                                                 | <ul style="list-style-type: none"> <li>Scenario 3 affords less flexibility for integrating environmental and preservation concerns into harvesting plans relative to Scenario 1 or 2. Old growth forests are utilized more rapidly under Scenario 3.</li> </ul> |



## Appendix A

## Glossary of Terms

|                                              |                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Allowable Annual Cut (AAC)</b>            | The volume of timber which may be cut each year from a forest management unit (e.g., a TSA), set by the chief forester in accordance with Section 7.0 of the Forest Act.                                                                                                                                  |
| <b>Biodiversity</b>                          | Biological diversity: 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.                                                                                            |
| <b>Biogeoclimatic Zones</b>                  | Areas which are defined by similar biological, physical and atmospheric characteristics.                                                                                                                                                                                                                  |
| <b>Class I Waters</b>                        | Anadromous salmonids is moderate to high levels of resident sports fish are present. Stream gradient is usually less than 8 percent.                                                                                                                                                                      |
| <b>Class II Waters</b>                       | Low levels of resident sport fish are present. Stream gradient is usually 8-12 percent.                                                                                                                                                                                                                   |
| <b>Class III Waters</b>                      | Resident non-sport fish are present. Stream gradient is usually 8-20 percent.                                                                                                                                                                                                                             |
| <b>Class 1 Waters</b>                        | Recreational Class 1 waters are remote, pristine, wilderness water bodies with significant fisheries values that are largely accessible only by boat or aircraft. For Class 1 waters all guided and non-guided angling is managed.                                                                        |
| <b>Class 2 Waters</b>                        | Recreational Class 2 waters are more accessible, but still represent a quality fishing experience. Class 2 waters typically have more local use than Class 1 waters. On these waters angling guides are limited to the guided angler-days specified in the water-specific management plan.                |
| <b>Cut-block Adjacency</b>                   | Integrated management guidelines restrict harvesting in areas adjacent to a cut block until that cut block has satisfied certain regeneration requirements (i.e., green-up requirements).                                                                                                                 |
| <b>Direct Income and Employment Impacts</b>  | Income and employment impacts in the forestry sector (i.e., harvesting, transportation, silviculture, processing, and government) arising from changes in the timber harvest level.                                                                                                                       |
| <b>Ecosystem</b>                             | Any complex of living organisms together with all the other biotic and abiotic (non-living) factors which affect them.                                                                                                                                                                                    |
| <b>Environmentally Sensitive Area</b>        | Area with notable non-timber values, fragile soils or unstable soils; or an area that has problems in establishing a new stand; or an area where timber harvesting may result in land slides.                                                                                                             |
| <b>Ecoprovince</b>                           | 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 (animal and plant life).                                                                                                  |
| <b>Green-up Period</b>                       | The time needed for a stand of trees to reach a desired condition (e.g., height) to ensure maintenance of water or visual quality, wildlife habitat, soil stability or aesthetics. Green-up requirements refer to the desired conditions.                                                                 |
| <b>Indirect Income or Employment Impacts</b> | Spin-off effects on related sectors or industries which supply materials or equipment to the forestry sector (e.g., provisions for logging camps), arising from changes in the timber harvest. These impacts also include impacts from the spending of forestry-related employment and employment income. |
| <b>Integrated Resource Guidelines</b>        | Guidelines requiring that forest management activities (such as harvesting, road building and silviculture treatments) be conducted in a special way to protect or enhance timber and non-timber forest resource values.                                                                                  |

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Land and Resource Management Planning (LRMP)</b> | A sub-regional integrated resource planning process for B.C. LRMP considers all resource values and depends upon public participation and consensus based land and resource management decisions.                                                                                                                                                                                                     |
| <b>Long-term Harvest</b>                            | The timber harvesting level which allows the volume of timber harvested in any given period to be replaced by a similar volume of regenerated stands within the same period.                                                                                                                                                                                                                          |
| <b>Multiplier</b>                                   | A number used to estimate total income or employment (direct and indirect) relative to the direct value. Multipliers are generally greater than 1.0, since 1.0 represents the direct income or employment component.                                                                                                                                                                                  |
| <b>Person-year (PY)</b>                             | A standard measure of employment that takes into account part-time or seasonal full-time work. For example, if an employee works full-time for six months (i.e., for half a year), he or she accounts for 0.50 PYs of employment. Using person-years allows different types of employment to be compared on a similar basis. In this report, 1 800 hours of work per year represents one person-year. |
| <b>Primitive Recreation Opportunity Area</b>        | A recreation area 8 km or more from primitive roads. The area must also be larger than or equal to 5 000 hectares. The setting must be essentially an unmodified environment.                                                                                                                                                                                                                         |
| <b>Protected Area</b>                               | An area designated under the B.C. Protected Areas Strategy for protection in its current state, based on special physical and environmental qualities it may possess.                                                                                                                                                                                                                                 |
| <b>Recreational User Day (RUD)</b>                  | Recreational User Day is all or part of a calendar day spent participating in any form of recreation.                                                                                                                                                                                                                                                                                                 |
| <b>Riparian Zone</b>                                | The stream bank and flood plain adjacent to streams or water bodies, with particular reference to the vegetation.                                                                                                                                                                                                                                                                                     |
| <b>Seral Species</b>                                | Seral species refers to organisms which are part of a biotic community which is in a development or transitory stage in an ecological succession.                                                                                                                                                                                                                                                     |
| <b>Timber Supply Area (TSA)</b>                     | An integrated resource management unit established in accordance with Section 6 of the Forest Act.                                                                                                                                                                                                                                                                                                    |
| <b>Watershed</b>                                    | An area drained by a particular stream or river. A large watershed may contain several smaller watersheds.                                                                                                                                                                                                                                                                                            |
| <b>Wind Throw</b>                                   | After harvest in an area, trees not previously exposed to direct wind paths become exposed. Often these trees do not have root systems required to withstand the direct winds and as a result are blown over, becoming "wind throw."                                                                                                                                                                  |

## Appendix B

## Employment and Employment Income Estimates

Estimates of direct forestry employment and employment income generated by Kalum South's AAC rely on information collected directly from the licensees, forest contractors, forest district, and Statistics Canada. Employment for Kalum South is summarized in Table B-1 while average employment income is summarized in Table B-2. Employment figures are in person-years (PYs) equivalents (1 800 hours per year) and employment income estimates through-out the report refer to after-tax employment income in \$1993. Personal income tax paid by forestry employees is reported separately (See Appendix C).

This analysis assumes that: all licensees, SBFEP, and woodlot operators continue to operate in a manner similar to 1993; the proportion of Kalum South residents to non-Kalum South residents remains constant; and that employment requirements remain constant. Therefore, changes in the harvest are estimated to require proportional changes in harvesting employment.

| <b>Table B-1</b><br><b>Direct Forestry Employment</b><br>(AAC: 480 000 m <sup>3</sup> ) |                                                                                    |                                                                                   |                            |                                   |
|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------------------|-----------------------------------|
| Activity                                                                                | Kalum South<br>Employment<br>Coefficient <sup>a</sup><br>(PYs/000 m <sup>3</sup> ) | Provincial<br>Employment<br>Coefficient <sup>b</sup><br>(PYs/000 m <sup>3</sup> ) | TSA<br>Employment<br>(PYs) | Provincial<br>Employment<br>(PYs) |
| Harvesting and Log Hauling                                                              | 0.37                                                                               | 0.37                                                                              | 178                        | 178                               |
| Road Building                                                                           | 0.10                                                                               | 0.10                                                                              | 48                         | 48                                |
| Chip Hauling                                                                            | 0.02                                                                               | 0.02                                                                              | 10                         | 10                                |
| Processing                                                                              | 0.29                                                                               | 0.38                                                                              | 139                        | 182                               |
| Administration                                                                          | 0.02                                                                               | 0.03                                                                              | 10                         | 14                                |
| Silviculture                                                                            | 0.04                                                                               | 0.06                                                                              | 18                         | 29                                |
| <b>Total</b>                                                                            | <b>0.84</b>                                                                        | <b>0.96</b>                                                                       | <b>403</b>                 | <b>461</b>                        |

| <b>Table B-2</b><br><b>Average Forestry Employment Income (\$1993)</b><br>(AAC: 480 000 m <sup>3</sup> ) |                                                 |                                           |                                |
|----------------------------------------------------------------------------------------------------------|-------------------------------------------------|-------------------------------------------|--------------------------------|
|                                                                                                          | Gross Employment Income<br>(Including Benefits) | Employment Income<br>(Excluding Benefits) | After-Tax<br>Employment Income |
| Harvesting and Log Hauling                                                                               | 54 500                                          | 45 380                                    | 32 675                         |
| Road Building                                                                                            | 54 200                                          | 45 025                                    | 32 420                         |
| Chip Hauling                                                                                             | 54 000                                          | 39 950                                    | 29 960                         |
| Processing                                                                                               | 55 600                                          | 42 400                                    | 30 950                         |
| Administration                                                                                           | 56 100                                          | 44 850                                    | 32 300                         |
| Silviculture                                                                                             | 42 780                                          | 38 500                                    | 28 875                         |
| <b>Average</b>                                                                                           | <b>54 200</b>                                   | <b>43 600</b>                             | <b>31 600</b>                  |

<sup>a</sup> Used to determine employment accruing to Kalum South residents from Kalum South AAC.

<sup>b</sup> Used to determine total provincial employment, including employment accruing to Kalum South residents, from the Kalum South AAC.

## Harvesting and Log Hauling

Information on timber volumes harvested, required crews, and residences of crews has been obtained directly from West Fraser Mills Ltd., Skeena Cellulose Inc., and individual contractors.<sup>c</sup> Skeena Cellulose, has an agreement to oversee the Bell Pole Co. Ltd. harvest, also provides information on Bell Pole's harvest. (Individual company employment coefficients are confidential.)

For the SBFEP harvest and woodlot activity, coefficients have been developed from information from the Real Market Loggers Association and the North West Woodlot Association. The Real Market Loggers Association has members involved in A-frame logging, hand logging, and conventional logging. The North West Woodlot Association members are mostly involved in alternative harvest methods. The activities of these two associations approximate the harvest within the SBFEP and woodlot AAC. The combined harvesting and log hauling coefficient for the Kalum South is 0.37 PYs per 1 000 cubic metres.

Harvesting employment income estimates are based on information from the major licensees, industry contractors and Statistics Canada.<sup>d</sup> The gross employment income average, which includes benefits, is \$54 500 per PY, without benefits employment income is \$45 380 per PY. The after-tax employment income associated with harvesting and log hauling is \$32 675 per PY. These estimates are felt to reflect the "typical" income in this sector, although there is a variety of pay levels (e.g., bush foremen, fallers, buckermen, equipment operators, and logging truck drivers). As well, the rate of pay may be pegged to some portion of the operation (e.g., some of a logging-truck driver's income is based on a portion of earnings for the truck he drives).

## Road Building

Information on road building activities, crew size, and residences of crews has been obtained from West Fraser Mills Ltd., Skeena Cellulose Inc. and the contractors working for West Fraser Mills Ltd. The average road building employment derived for the major licensees has been applied to volumes associated with the SBFEP and Woodlot harvests. The road building coefficient for Kalum South is 0.10 PYs per 1 000 cubic metre. Gross employment income, including benefits is estimated to be \$54 200 per PY, while without benefits employment income is \$45 025 per PY. After-tax employment income associated with road building is \$32 420.

## Chip Transportation

Employment and employment incomes in the wood chip transportation sector have been derived from information provided by the licensees and the two principal chip transportation companies in the Terrace area: Excel Transportation Ltd. and Lomak Transportation Corp. Previous research done by G.E. Bridges and Associates has also been used in generating the employment coefficients.<sup>e</sup> The wood chip transportation employment coefficient is 0.02 PYs per 1 000 cubic metre. The gross chip transportation employment income, which includes benefits, is estimated to be \$54 000 per PY or \$39 950 per PY without benefits. The average after-tax employment income associated with this income is \$29 960 per PY.

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<sup>c</sup> Contractors contacted include; The Almwood Group, Freill Lake Logging, Kildala Road Construction, and Tristar Logging Ltd.

<sup>d</sup> Census category 751 -- Forestry and Logging Occupations.

<sup>e</sup> Regional District of Bulkley-Nechako (1993), *Wood Residue Power Projects in British Columbia, Proposed Bulkley-Nechako Power Project Opportunities for Strategic Initiatives*, prepared by G.E. Bridges & Associates Inc.

## Processing

Processing sector employment and employment income estimates are derived in a similar manner as those for harvesting. Information has been obtained directly from West Fraser Mills Ltd., Skeena Cellulose, and Bell Pole.

The licensees provided information on: total volumes processed at specific company mills in 1993; wages paid, total labour force at each mill (including hourly and salaried staff); and the Kalum South volumes processed at each mill in 1993. Processing coefficients derived from this information are then applied similarly to the harvesting coefficients to derive employment at different timber harvest levels. Although the licensees do not process all the Kalum South's harvest at their processing facilities (wood may be sold or traded), it is assumed that the harvest from Kalum South benefits the processing facilities of the licensees involved.

The SBFEP and woodlot operators do not operate sufficient processing capacity to process their entire allocation; therefore it is assumed that the volumes would be sold to other B.C. processors. For this study it is assumed these operators sell their wood to: Skeena Cellulose, West Fraser Mills, Bell Pole, Terrace Precut Mill Ltd, and Copper Mountain Cedar Products Ltd. The employment coefficient for processing is estimated to be 0.38 PYs per 1 000 cubic metres. The associated gross employment income, which includes benefits, is \$55 600 per PY. Employment income without benefits is \$42 400 per PY while after-tax employment income is \$30 950 per PY.

## Administration

Administration sector employment includes management and support staff located at regional and head offices. This information has been obtained from West Fraser Mills, Skeena Cellulose, and Bell Pole. Administration labour force is pro-rated over the companies' entire harvest level to derive administrative employment coefficient. The administration employment coefficient is 0.03 PYs per 1 000 cubic metres. The average gross employment income (including wages and benefits) is \$56 100 with employment income (no benefits) at \$44 850 per PY. The after-tax employment income is \$32 300 per PY.

## Silviculture

Information on silviculture spending has been obtained from the Kalum Forest District and the licensees. Currently, the Ministry of Forests 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, and the employment estimates (in person-years) have been derived by adding up the number of months worked.

Kalum South receives the greatest portion of the Kalum Forest District silviculture budget. This additional spending in the Kalum South is attributed to historical harvest levels and the current requirement for pruning and thinning activities in the area. In Kalum South, the silviculture coefficient is 0.06 PYs per 1 000 cubic metres. Gross silviculture employment income (including wages and benefits) is \$42 780 per PY while employment income (no benefits) is \$38 500 per PY. After-tax employment income is \$28 875 per PY.<sup>f</sup>

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<sup>f</sup> Census category 7511 -- Forestry Conservation Occupations.

### **Ministry of Forests**

For Kalum South, provincial government employment at the Kalum Forest District staff is 53 PYs. The Prince Rupert Forest Region provides 126 PYs of employment. These two offices are responsible for the administration of the Kalum South. No employment coefficient is derived since the number of Ministry of Forests positions is assumed to be unaffected by direct changes in the harvest. Government employment is likely to be less dependent on the size of the harvest than it is on budgetary issues and on the immediate priorities and responsibilities of the Ministry.

## Appendix C

### Government Revenue Estimates

Estimates of government forestry revenues are based on information from the Ministry of Forests and Statistics Canada, and are expressed in \$1993 per 1 000 cubic metres. These estimates are summarized in Table C-1.

| Table C-1<br>Government Forestry Revenues            |                                                |                                             |
|------------------------------------------------------|------------------------------------------------|---------------------------------------------|
| Revenue Type                                         | Revenues<br>(\$1993 per 1 000 m <sup>3</sup> ) | Total<br>(\$1993 per 1 000 m <sup>3</sup> ) |
| Stumpage and Rent                                    | \$2 265                                        |                                             |
| Personal Income Tax                                  | 6 685                                          |                                             |
| Scaling Fees, Residue and Waste charges              | 55                                             |                                             |
| Other Provincial Taxes (Logging, Sales, Electricity) | 5 955                                          |                                             |
| <b>Total</b>                                         |                                                | <b>\$14 960</b>                             |

#### Stumpage and Rent

Stumpage information for Kalum South has been provided by the Prince Rupert Forest Region Valuation Branch. Estimated stumpage payments are based on 1992 and 1993 Kalum South billed volumes and average \$1 987 per 1 000 cubic metres. Rent estimates are based on information from the Economics and Trade Branch of the Ministry of Forests,<sup>8</sup> based upon a five year average (1987/88 to 1991/92 inclusive). Rent averages \$278 per 1 000 cubic metres, so that resource revenues total \$2 265 per 1 000 cubic metres as shown above.

Policy changes announced in April, 1994 as part of the Forest Renewal Plan will result in significantly higher stumpage revenues if the increase in lumber prices that occurred in 1993 represents a structural shift in the market. The revenue estimates above are based on historical inflation adjusted prices. Based on an average lumber selling price of \$350 U.S. per thousand board feet, initial estimates indicate that stumpage revenues may be 60 to 80 percent higher than in the past. Stumpage revenues will vary with changes in lumber prices and it is not possible to precisely project the impact of these new policy changes at the TSA level until the new policy has been implemented for a period of time.

#### Personal Income Tax

Estimates of employment income (Appendix B) and average provincial income tax payments by income class<sup>h</sup> are used to estimate provincial personal income tax. Personal income taxes are \$3 743 per 1 000 cubic metres associated with direct forestry employment and additional \$2 942 per 1 000 cubic metres associated with indirect/induced personal income taxes for a total personal income tax contribution of \$6 685 per 1 000 cubic metres. Government revenue estimates in this report do not include taxes paid to the federal government. This represents approximately two-thirds of the total income tax payments and is estimated to be \$13 371 per 1 000 cubic metres for the Kalum South harvest.

<sup>8</sup> Ministry of Forests (1992), *Economic Impacts of Timber Harvesting*, Economics and Trade Branch.

<sup>h</sup> Population Statistics, Ministry of Finance and Corporate Relations (1993), *Average Tax Payments by Income Class for British Columbia, 1990*.

### Scaling Fees, Residue and Waste Charges

The revenue derived from scaling, residue and waste charges are from the Prince Rupert Forest Region, Valuation Branch. The revenue derived from this source is \$55 per 1 000 cubic metres. This is based on the actual revenues derived from the Kalum South in 1991 and 1992 and is averaged over the billed volumes in those years to obtain the average rate.<sup>i</sup> Scaling fees and waste charges are reported under other taxes in the tables and text of this report.

### Other Taxes

Other taxes include corporate, logging, sales, property and electricity taxes. These are estimated to be \$5 955 per 1 000 cubic metre using a five year average (1988-1992).<sup>j</sup> Government revenues estimated in this report do not include corporate taxes paid to the federal government. Using a five year average (1988-1992), corporate taxes paid to the federal government average \$1 250 per 1 000 cubic metres.

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<sup>i</sup> T. Buckley, Prince Rupert Forest Region, Ministry of Forests.

<sup>j</sup> Ministry of Forests, Economics and Trade Branch (1993), *Economic Impacts of Timber Harvesting in British Columbia*.

## Appendix D

### Multipliers

The sectors of the British Columbia and local economies are interrelated. Changes in demand or supply in one sector cause ripple effects throughout other sectors of the economy. In this report, multipliers are used to estimate income and employment effects resulting from changes in the harvest level at both the TSA and provincial levels.

When the timber harvest declines, there are *direct* income and employment impacts as jobs are lost. *Indirect* impacts refer to spin-off effects on other interrelated sectors that supply material or equipment to the forestry sector, for example, provisions for logging camps. *Induced* impacts are another form of spin-off effects that result from the re-spending of employment, business, and government income that arise from direct and indirect impacts. In this report we use the term indirect to include both indirect and induced impacts. Multipliers are used in this report to estimate the indirect (i.e., indirect and induced) employment and income impacts of various timber harvest levels at both the region and the provincial level.

Indirect impacts derived using multipliers are not considered to be as accurate as direct impacts for several reasons. The complexity of economic dynamics requires that multipliers utilize a number of simplifying assumptions. Also, multiplier impacts occur over time, and are therefore disguised as affected workers become re-employed or retire.

#### Regional Multiplier

The multiplier used to estimate indirect employment and income in the TSA comes from Horne and Robson (1993), *British Columbia Community Economic Dependencies*, prepared for the B.C. Round Table on the Environment and the Economy. Horne and Robson use the economic base method to derive community-specific income multipliers, for both the long-term and short-term.

The short-run negative change multiplier for the Kalum South area is 1.31. Using the revised methodology to generate induced impacts the multiplier is multiplied by 0.92 to yield 1.21.<sup>k</sup> This multiplier is composed of 1.0, which refers to the direct component, and 0.21 which refers to the induced component. Indirect employment income impacts are assessed using the indirect income factors of 0.21 for Logging, 0.17 for Pulp and Paper, and 0.11 for other wood manufacturing. The generated indirect income values are divided by specific after-tax indirect income levels (i.e., \$24 700 for indirect logging, \$23 400 for indirect pulp and paper income, and indirect income from other wood manufacturing is \$22 300).

#### Provincial Multiplier

The forestry employment multiplier of 2.5 is used to estimate indirect employment and income at the provincial level. This value was provided by the Economics and Trade Branch of the Ministry of Forests and is based on studies of the forest industry conducted by the Planning and Statistics Division of the Ministry of Finance and Corporate Relations. Unlike the community multiplier, this provincial multiplier is specific to the forest industry.

The multiplier of 2.5 applies only to employment. The derivation of indirect provincial employment is analogous to the derivation of indirect region income. First, direct provincial after-tax employment

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<sup>k</sup> G. Horne (1994), *Recommended Procedure for Estimating Regional Economic Impacts Resulting from Direct Changes in the Forest Sector--An Interim Procedure*.

associated with a specific harvest level is multiplied by 1.5 (i.e., the indirect component) to approximate indirect employment. Indirect employment is then multiplied by the service sector average after-tax employment income (per PY) in B.C. of \$23 280 to estimate indirect after-tax employment income.

## Appendix E

### List of Contacts

| <b>Ministry of Forests</b>                      |                                                           |
|-------------------------------------------------|-----------------------------------------------------------|
| L. Bolster                                      | Resource Planner, Prince Rupert Forest Region             |
| T. Buckley                                      | Valuation Officer, Prince Rupert Forest Region            |
| T. Calhoun                                      | Planning Forester, Prince Rupert Forest Region            |
| B. Childs                                       | Recreation Resource Officer, Kalum Forest District        |
| D. Coffey                                       | Economist, Economics and Trade Branch                     |
| A. Coyne                                        | Economist, Economics and Trade Branch                     |
| I. Delisle                                      | Regional Staff Manager, Prince Rupert Forest Region       |
| B. Lenardt                                      | Small Business Resource Officer, Kalum Forest District    |
| D. Nicholson                                    | Inventory Resource Officer, Kalum Forest District         |
| N. Parry                                        | Aboriginal Affairs Manager, Kalum Forest District         |
| J. Perras                                       | Timber Resource Officer, Kalum Forest District            |
| R. Prokop                                       | Manager, Negotiations, Aboriginal Affairs Section         |
| A. Taylor                                       | Valuation Officer Supervisor, Prince Rupert Forest Region |
| G. Townsend                                     | Resource Economics, Economics and Trade Branch            |
| A. Wheatley                                     | Planning Forester, Prince Rupert Forest Region            |
| B. Wilson                                       | Silviculture Resource Officer, Kalum Forest District      |
| <b>Forest Companies and Contractors</b>         |                                                           |
| R. Wood                                         | Alm-Wood Contracting Ltd.                                 |
| J. Corstranje                                   | Bell Pole Co. Ltd.                                        |
| M. Mckee                                        | Excel Transportation Ltd.                                 |
| J. McLaughlin                                   | Friell Lake Logging Ltd.                                  |
| B. Rosenburg                                    | International Forest Products Ltd.                        |
| A. Spanevello                                   | Kildala Road Construction Ltd.                            |
| K. Illingworth                                  | Kitimat Booming Ltd.                                      |
| K. Derow                                        | Skeena Cellulose Ltd.                                     |
| F. Fominoff                                     | Skeena Cellulose Ltd.                                     |
| A. MacDonald                                    | Skeena Cellulose Ltd.                                     |
| K. Reed                                         | Skeena Cellulose Ltd.                                     |
| M. Thorton                                      | Tristar Logging Ltd.                                      |
| D. Keating                                      | West Fraser Ltd.                                          |
| S. Marleau                                      | West Fraser Ltd.                                          |
| L. Reese-Hansen                                 | Woodlot Loggers Association                               |
| <b>Ministry of Environment, Lands and Parks</b> |                                                           |
| S. Hartwell                                     | Conservation Data Centre, MELP, Victoria                  |
| B. Hooton                                       | Head Fisheries, MELP, Smithers                            |
| A. Thogersen                                    | Data Acquisition Clerk, Biometrics Section                |
| L. Turney                                       | Forest Ecosystem Specialist, MELP, Terrace                |
| <b>Department of Fisheries and Oceans</b>       |                                                           |
| M. Hobbes                                       | DFO, Vancouver                                            |
| P. Lemieux                                      | DFO, Prince Rupert                                        |
| D. McNeil                                       | DFO, Kitimat River Hatchery                               |
| D. Peacock                                      | DFO, Prince Rupert                                        |
| D. Radford                                      | DFO, Prince Rupert                                        |
| G. Serbic                                       | DFO, Nanaimo                                              |

| <b>Aboriginal Community</b>  |                                                                 |
|------------------------------|-----------------------------------------------------------------|
| J. Wier                      | Kitamaat Village Council                                        |
| Collier Azak                 | Nisga'a Tribal Council                                          |
| Bert Azak                    | Nisga'a Tribal Council                                          |
| B. Mercer                    | Economic Development Officer, Nisga'a Tribal Council            |
| H. Moore                     | Nisga'a Tribal Council                                          |
| M. Bevan                     | Chief Councillor, Kitselas Band Council                         |
| A. Bolton                    | Band Councillor, Kitsumkalum Band Council                       |
| J. Bryand                    | Chief Councillor, Lax kw' Alaams Band Council                   |
| <b>Local Representatives</b> |                                                                 |
| B. Hallsor                   | Administrator, City of Terrace                                  |
| C. Kofoed                    | Canadian Women in Timber, Terrace Branch                        |
| A. Webber                    | Economic Development Officer, Regional District Kitimat-Stikine |
| <b>Government Services</b>   |                                                                 |
| H. Bray                      | B.C. Statistics, Victoria                                       |
| P. Bluemel                   | B.C. Statistics, Victoria                                       |
| K. Kirby                     | B.C. Statistics, Victoria                                       |
| E. Panzenboeck               | B.C. Statistics, Victoria                                       |
| D. Schrier                   | B.C. Statistics, Victoria                                       |
| G. Weir                      | B.C. Statistics, Victoria                                       |

## Appendix F

## Decade by Decade Incremental Changes

This appendix provides decade by decade incremental changes for each of the harvest scenarios. Changes in each decade represent the change in each impact account resulting from reductions in the harvest level from the previous decade. For example, decade two increment change is based on the harvest level reduction between decade two and decade one.

| <b>Table F-1</b>                            |               |          |          |          |          |
|---------------------------------------------|---------------|----------|----------|----------|----------|
| <b>Decade by Decade Changes: Scenario 1</b> |               |          |          |          |          |
| <b>Account</b>                              | <b>Decade</b> |          |          |          |          |
|                                             | <b>1</b>      | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> |
| Harvest Level (cubic metres per year)       | -16           | -46      | -18      | 0        | 0        |
| <b>Kalum South Accounts</b>                 |               |          |          |          |          |
| Economic Development                        |               |          |          |          |          |
| Direct Employment (PYs/yr)                  | -13           | -39      | -15      | 0        | 0        |
| Total Employment                            | -21           | -61      | -24      | 0        | 0        |
| Direct After-Tax Income (\$millions/yr)     | -0.4          | -1.2     | -0.5     | 0        | 0        |
| Total After-Tax Income                      | -0.6          | -1.6     | -0.7     | 0        | 0        |
| <b>Provincial Accounts</b>                  |               |          |          |          |          |
| Economic Development                        |               |          |          |          |          |
| Direct Employment (PYs/yr)                  | -16           | -44      | -17      | 0        | 0        |
| Total Employment                            | -39           | -110     | -43      | 0        | 0        |
| Direct After-Tax Income (\$millions/yr)     | -0.5          | -1.4     | -0.6     | 0        | 0        |
| Total After-Tax Income                      | -1.0          | -2.9     | -1.2     | 0        | 0        |
| Government Revenues (\$millions/yr)         | -0.3          | -0.6     | -0.3     | 0        | 0        |

| <b>Table F-2</b>                            |               |          |          |          |          |
|---------------------------------------------|---------------|----------|----------|----------|----------|
| <b>Decade by Decade Changes: Scenario 2</b> |               |          |          |          |          |
| <b>Account</b>                              | <b>Decade</b> |          |          |          |          |
|                                             | <b>1</b>      | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> |
| Harvest Level (cubic metres per year)       | 0             | 0        | -80      | 0        | 0        |
| <b>Kalum South Accounts</b>                 |               |          |          |          |          |
| Economic Development                        |               |          |          |          |          |
| Direct Employment (PYs/yr)                  | 0             | 0        | -67      | 0        | 0        |
| Total Employment                            | 0             | 0        | -106     | 0        | 0        |
| Direct After-Tax Income (\$millions/yr)     | 0             | 0        | -2.1     | 0        | 0        |
| Total After-Tax Income                      | 0             | 0        | -2.9     | 0        | 0        |
| <b>Provincial Accounts</b>                  |               |          |          |          |          |
| Economic Development                        |               |          |          |          |          |
| Direct Employment (PYs/yr)                  | 0             | 0        | -77      | 0        | 0        |
| Total Employment                            | 0             | 0        | -192     | 0        | 0        |
| Direct After-Tax Income (\$millions/yr)     | 0             | 0        | -2.5     | 0        | 0        |
| Total After-Tax Income                      | 0             | 0        | -5.1     | 0        | 0        |
| Government Revenues (\$millions/yr)         | 0             | 0        | -1.2     | 0        | 0        |

| Table F-3<br>Decade by Decade Changes: Scenario 3 |        |   |      |      |   |
|---------------------------------------------------|--------|---|------|------|---|
| Account                                           | Decade |   |      |      |   |
|                                                   | 1      | 2 | 3    | 4    | 5 |
| Harvest Level (cubic metres per year)             | 0      | 0 | -50  | -30  | 0 |
| <b>Kalum South Accounts</b>                       |        |   |      |      |   |
| Economic Development                              |        |   |      |      |   |
| Direct Employment (PYs/yr)                        | 0      | 0 | -42  | -25  | 0 |
| Total Employment                                  | 0      | 0 | -66  | -40  | 0 |
| Direct After-Tax Income (\$millions/yr)           | 0      | 0 | -1.3 | -0.8 | 0 |
| Total After-Tax Income                            | 0      | 0 | -1.8 | -1.1 | 0 |
| <b>Provincial Accounts</b>                        |        |   |      |      |   |
| Economic Development                              |        |   |      |      |   |
| Direct Employment (PYs/yr)                        | 0      | 0 | -48  | -29  | 0 |
| Total Employment                                  | 0      | 0 | -120 | -72  | 0 |
| Direct After-Tax Income (\$millions/yr)           | 0      | 0 | -1.5 | -1.0 | 0 |
| Total After-Tax Income                            | 0      | 0 | -3.1 | -2.0 | 0 |
| Government Revenues (\$millions/yr)               | 0      | 0 | -0.8 | -0.4 | 0 |