Kamloops Timber Supply Area
Socio-Economic Analysis

May, 1995

Economics And Trade Branch
British Columbia Ministry of Forests

Prepared by:

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Executive Summary

Introduction

- This report is part of the province-wide Timber Supply Review being carried out by the Ministry of Forests (MOF). The impact assessment presented in this report does not promote or recommend any particular harvest level for the Kamloops TSA. The Chief Forester will determine the AAC after considering many factors in addition to the results contained within this report.

- This report focuses on the base case harvest forecast developed by the *Kamloops TSA Timber Supply Analysis* report. A glossary and a discussion of the derivation of the estimates used in this report are included in detailed appendices at the end of the report.

Approach

- The base case from the *Kamloops TSA Timber Supply Analysis* report is referred to as the base timber harvest forecast in this report. The socio-economic implications associated with this forecast are identified.

- The base timber harvest forecast is assessed within a "multiple-account" framework. Impacts are reviewed within the framework of five accounts, two of which are quantitative in nature (employment and government revenues), while the other three accounts (community, First Nations, and environment) are qualitative.

Socio-Economic Profile

- The Kamloops TSA has a population of approximately 90 450 (in 1991), the majority of which, 82 500, live in the southern portion of the TSA (the Kamloops area).

- Within the boundaries of the Kamloops TSA are ten First Nations Bands. Seven of these Bands are affiliated with the Secwepemc (Shuswap) Nation Tribal Council, two Bands are affiliated with the Nlaka'pamux Nation Tribal Council, and there is one independent Band (the Little Shuswap Band).

- An additional eight Bands are located outside the Kamloops TSA but maintain traditional interests inside the TSA.

Environmental Setting

- The biophysical components of the TSA includes several ecosystems, important aquatic systems, and several rare plants and wildlife.

- The TSA contains eight biogeoclimatic zones. There is an estimated 1 800 lakes in the TSA and at least 40 salmon producing streams.

Forestry Sector Overview

- The Kamloops TSA represents a total land area of 2 117 718 hectares, of which 1 441 117 hectares are classified as Crown forest lands.

- The current allowable annual cut (AAC) in the Kamloops TSA is 2 393 180 cubic metres per year.

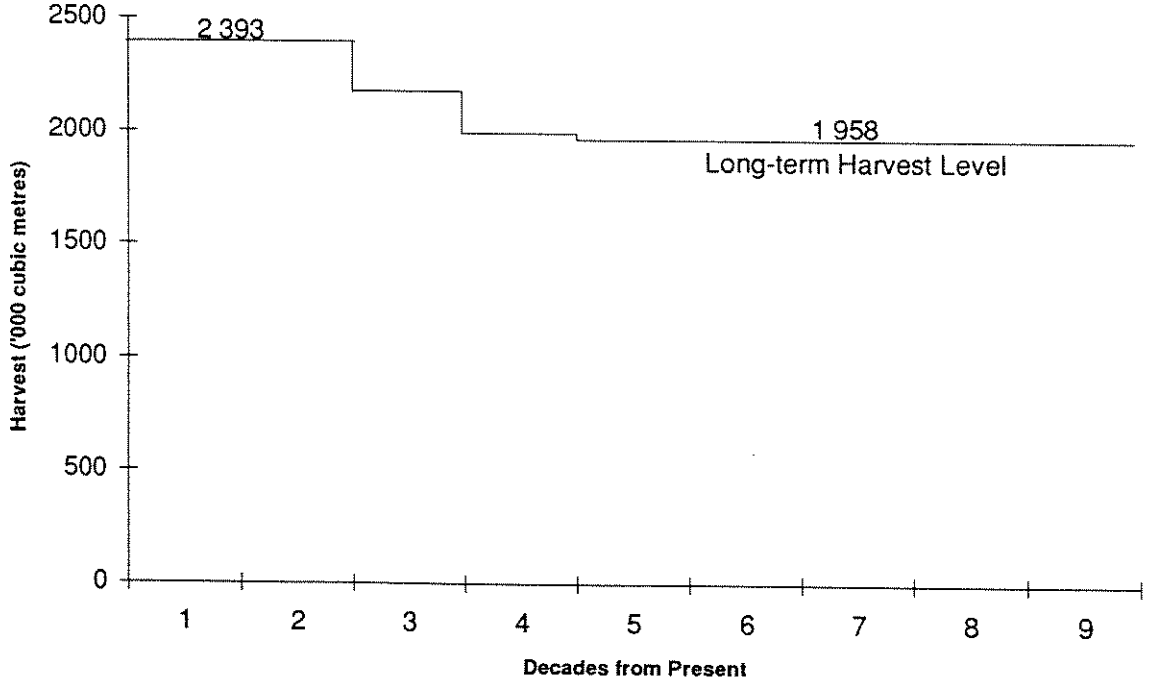
- The AAC apportionment does not provide a complete picture of the fibre supply in the Kamloops TSA for the major licensees. Additional timber volumes are obtained from a variety of other sources including: Tree Farm Licences, Timber Licences, private land inside the TSA, Crown lands outside the TSA, and private lands outside the TSA.

- Eight major licensees, Ainsworth Lumber Co. Ltd., Bell Pole Co. Ltd., Gilbert Smith Forest Products Ltd., International Forest Products Ltd., Riverside Forest Products Ltd., Slocan Forest Products Ltd., Tolko Industries Ltd., and Weyerhaeuser Canada Ltd. operate in the Kamloops TSA. The TSA also has several smaller processors as well.

Base Timber Harvest Forecast

- Figure ES-1 illustrates the harvest forecast for the base timber harvest forecast. The harvest forecast maintains the current harvest level for the first two decades before declining at a rate of nine percent over decades three and four, reaching the long-term harvest level of 1 958 000 cubic metres in decade five.

Figure ES-1
Scenario 1 Harvest Forecast



Economic Implications

- The current harvest of 2 393 180 cubic metres creates approximately 1 675 person-years (PYs) of direct forestry employment annually inside the TSA. Additional direct forestry employment created outside the TSA brings the total direct forestry employment associated with the current harvest to approximately 2 180 PYs annually.

- The direct forestry employment associated with the current harvest creates additional indirect and induced employment. Inside the TSA, an additional 1 075 PYs of employment would be supported by the current harvesting activity bringing the total (direct and indirect) employment to 2 750 PYs.

- At the provincial level (including TSA and non-TSA), indirect and induced employment created by the current harvest is approximately 3 270 PYs annually. This brings the total employment associated with the Kamloops TSA to approximately 5 450 PYs.

- In addition, the TSA harvest generates significant provincial and federal government revenues. At current harvest levels, forestry operations generate approximately $82.5 million in provincial government revenues, and a further $38.2 in federal government revenues.

- Under the base timber harvest forecast the current harvest would be maintained for the first two decades. In decades three through five the harvest would decline by 435 180 cubic metres. It is during this period that employment, employment income and government revenue impacts would occur. Table ES-1 summarizes the employment, employment income, and government revenue impacts associated with the base timber harvest forecast.

Social and Environmental Implications

- The first community impacts would not occur until twenty years from the present. Between decade three and decade five the timber harvest would decline by 435 180 cubic metres. It would be during this period that community adjustment would occur.

- First Nations communities in the Kamloops TSA have many diverse concerns and issues associated with forestry activity in their traditional lands.

- The policy of the Secwepemc Nation Council is that British Columbia should avoid alienation or potential degradation of natural resources in Secwepemc Nation territory.

- The independent Little Shushap Band is concerned about preservation of traditional lands and cultural sites, as well as distribution and access to timber for First Nations.

- The main environmental implication of the base timber harvest forecast is the narrowing of the forest age class distribution. Over the next 250 years the distribution of stand ages is forecast to become more even, resulting in approximately equal areas at ages up to about 120 years. Populations of species that depend on mature forests may decline.

- In addition, several other environmental issues have been identified including road impacts, water quality and habitat alterations.

Table ES-1
Summary of Employment, Income and Government Revenue Impacts: Base Timber Harvest Forecast

ECONOMIC IMPLICATIONS	Decade One and Two		Decade Three		Decade Four		Decade Five	
	TSA	**Provincial**	**TSA**	**Provincial**	**TSA**	**Provincial**	**TSA**	**Provincial**
Employment and Employment Income								
Harvest Level (m^3)		2 393 180		2 177 794		1 981 792		1 958 000
Direct Employment (PYs/year)	1 675	2 180	1 525	1 980	1 390	1 805	1 370	1 780
Total Employment (PYs/year)	2 750	5 450	2 500	4 960	2 275	4 510	2 245	4 455
Direct After-Tax Income ($1994 million/year)	51.2	66.8	46.4	60.8	42.4	55.4	41.8	54.7
Total After-Tax Income ($1994 million/year)	70.9	136.6	64.5	124.5	58.7	113.3	57.9	111.8
Government Revenues ($1994 million/year)								
Total Provincial Revenues	82.5		75.1		68.3		67.5	
Total Federal Revenues	38.2		34.8		31.6		31.3	

SOCIAL AND ENVIRONMENTAL IMPLICATIONS

- Community impacts do not occur until twenty years into the future. Currently, the major processing facilities in the area are highly dependent on TSA fibre, and will likely remain so. Future harvest level reductions will likely have the greatest impact in those communities where these processing facilities are located.
- First Nations communities in the Kamloops TSA have many diverse concerns and issues associated with forestry activity. The policy of the Secwepemc Nation Tribal Council is that British Columbia should avoid alienation or potential degradation of natural resources in Secwepemc Nation territory. Secwepemc people do not feel comfortable with the level of forest harvesting in the TSA and the detrimental impacts to the environment which have occurred in the past. The independent Little Shuswap Band is concerned about preservation of traditional lands and cultural sites, as well as distribution and access to timber for First Nations.
- The main environmental implication of the base timber harvest forecast is the narrowing the forest age class distribution. Over time the next 250 years the distribution of stand ages is forecast to become gradually more even, resulting in approximately equal areas at ages up to about 120 years. Populations of species that depend on mature forests may decline. In addition, several other environmental issues have been identified, including road impacts, water quality and habitat alterations.

1.0 Introduction

This report is part of the province-wide Timber Supply Review being carried out by the Ministry of Forests (MOF). The Timber Supply Review examines the availability of timber now and in the future for timber supply areas (TSAs) throughout British Columbia, under current forest management practices.

The Socio-Economic Analysis (SEA) report is the second of four documents to be released as part of the Timber Supply Review in the Kamloops TSA. The first document is the Timber Supply Analysis Report, which provides technical information on how current forest management practices affect the available wood supply over the next 250 years. In the SEA report, the economic, environmental, and social implications of current forest management practices are evaluated. The third report summarizes the first two documents to provide a focus for public discussion. The final report will provide a description of the Chief Forester's Allowable Annual Cut decision, and supporting documentation.

The impact assessment presented in this report does not promote or recommend any particular harvest level for the Kamloops TSA. The Chief Forester will determine the AAC after considering many factors in addition to the results contained within this report.

1.1 Approach

This report focuses on the base timber harvest forecast developed by the *Kamloops TSA Timber Supply Analysis* report.[1] The harvest flow reviewed in this report will not be the only level considered in the final AAC determination and it is not the intention of this report to identify a preferred AAC level.

The timber supply forecast follows a "multiple-account" approach. The report organizes the effects of changing timber harvest levels into five accounts - two quantitative accounts (i.e., economic), and three qualitative accounts. The report also provides an overview of the Kamloops Timber Supply Area (TSA), describes the environmental and socio-economic setting, and highlights some of the environmental, community and First Nations concerns with respect to current forest management practices. Table 1-1 presents a summary of the accounts used in this report.

[1] A timber harvesting forecast represents a flow of potential timber harvests over time. It represents the maximum timber supply that can be realized for a specified land base and set management assumptions.

Table 1-1
Summary of Accounts[2]

ECONOMIC IMPACTS	
Employment	• identifies direct and indirect/induced effects on Kamloops TSA employment and employment income over the short and long-term; • identifies direct effects on employment and employment income outside of Kamloops TSA; • identifies total direct and indirect/induced effects on employment and employment income for British Columbia.
Government Revenues	• identifies impacts on government revenues derived from the Kamloops TSA timber resource.
SOCIAL AND ENVIRONMENTAL IMPLICATIONS	
Community	• discusses possible effects on local residents and families with respect to their jobs; • discusses local communities' ability to adapt to forestry impacts, and opportunities for mitigation.
First Nations	• discusses possible effects on local aboriginal communities, and identifies potential areas of concern of aboriginal communities.
Environmental	• discusses possible effects on forest ecosystems.

In this analysis, only those impacts that can be identified as being directly attributable to changes in the Kamloops TSA AAC have been examined. In effect, this study assumes that all other variables (e.g., the land base, technology, harvesting costs, timber values, etc.) remains 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 changes will be incorporated into the analysis. The base case from the *Kamloops TSA Timber Supply Analysis* report is based on current forest practices. Future initiatives (i.e., Forest Practices Code, Forest Renewal Plan, and the Kamloops Land Resource Management Plan) are not accounted for in the base case.

Although it is assumed that the employment coefficients (i.e., person-years (PYs) of employment per 1 000 cubic metres of harvest) will remain constant over time, many factors may affect employment in the future. To some extent, forest sector employment may decline further due to the adoption of labour-saving technologies.[3] It is also possible that as the harvest is reduced, "threshold levels" could be reached, resulting in the shutdown of entire operations or layoffs of

2 Adapted from Marvin Shaffer and Associates (1992), *Interim Social and Economic Impact Assessment of Forest Land Management Options.*

3 For example, direct forestry employment per unit harvest on the Coast has declined by about 2.0% annually since the late 1970s.

entire shifts. This could result in the redeployment of labour or changes in processing activity that may decrease employment in the area. If this were to occur, employment losses could be more than those estimated in this report.

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, harvest smaller cut blocks and additional requirements in sensitive watershed areas. Licensees may begin utilizing alternative coniferous wood sources such as log grades 3, 4, 5, and 6.[4] A wider range of deciduous timber may be harvested and utilized. Another possibility is a change in the labour requirements within the individual components of forestry activity. For example, a possible decline in harvesting employment may be offset by greater employment through value-added processing. The various trends affecting future labour requirements and their net impacts on total employment are difficult to determine.

1.2 Report Outline

The report is organized as follows:

- Section 2.0 presents a socio-economic profile of the Kamloops TSA, including a description of the communities, social setting and First Nations activities and concerns. This section also describes the structure of the labour force by industry and the major resource sectors in the TSA;
- Section 3.0 describes the TSA's environmental setting;
- Section 4.0 provides an overview of current forestry operations within the TSA. Discussion focuses on the timber harvesting land base, current management practices, AAC apportionment, forest industry, and the employment coefficients associated with current harvest levels;
- Section 5.0 describes the base timber harvest forecast and discusses its economic implications;
- Section 6.0 discusses the social and environmental implications of the base timber harvesting forecast;
- Finally, Section 7.0 summarizes the report's findings. This is followed by detailed appendices.

4 See Appendix A for description of log grades 3, 4, 5, and 6.

2.0 Socio-Economic Profile

This section provides a description of the communities, and First Nation's activities and concerns in Kamloops TSA. The profile also includes a description of the TSA labour force and other economic activities directly associated with the TSA land base.

2.1 General Area Profile

The Kamloops Timber Supply Area (TSA) is one of four TSAs comprising the Kamloops Forest Region. Located in the southern interior of B.C., the TSA is made up of the Kamloops and Clearwater Forest Districts, excluding Tree Farm Licenses 35 and 18. The TSA is centred on the community of Kamloops and is bordered by Wells Gray Park in the north and extends south to the area around Logan Lake. The Kamloops TSA covers approximately 2.1 million hectares. (See Figure 2-1.)

2.2 Community and Social Setting

The economy of the Kamloops TSA was historically based upon agriculture. During the 1950s and 1960s the area underwent rapid growth. It was during this period that forestry became a significant component of the local economy.

In 1991, the population of the Kamloops TSA was estimated at 90 450. This represents an increase of 3.5% from 1981. Between 1991 and 2000 the population in the TSA is projected to increase a further 20.0%.[5] This projected growth is expected to vary within the TSA, with the southern portion of the TSA (Local Health Area 24) expected to experience growth of approximately 22.0%, while the northern portion of the TSA (Local Health Area 26) is expected to experience growth closer to 7.0%.

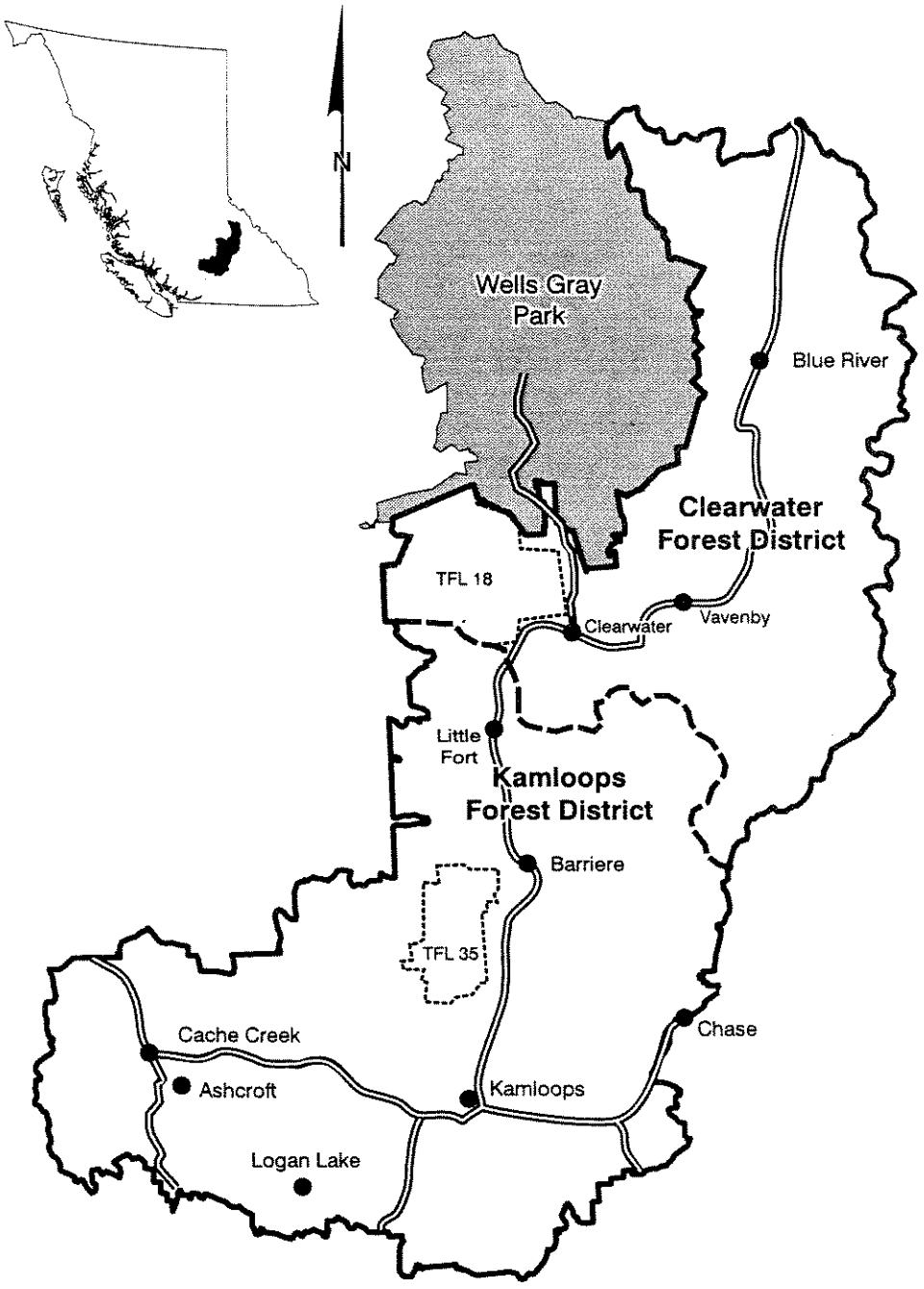
These two health areas also represent two relatively distinct economic areas in the TSA: (1) Kamloops area, and (2) North Thompson area.

2.2.1 Kamloops Area

In 1991, the Kamloops area contained 82 500 of the TSA's 90 450 inhabitants. The largest community in the Kamloops area is the City of Kamloops, with Logan Lake, Ashcroft, and Cache Creek representing the other incorporated communities in the southern portion of the TSA. The area also has several small unincorporated communities including; Pritchard, Savona, Paul Lake, McLure, Cherry Creek, Knutsford, Adams Lake, Monte Creek, Brennan Creek, and Vinsulla.

5 Source: B.C. Statistics, Ministry of Government Services. Based on average projected growth for the Kamloops (24) and North Thompson (26) Local Health Areas between 1991 and 2000.

Figure 2-1
Kamloops Timber Supply Area: Kamloops Forest Region



City of Kamloops

Kamloops originally developed as a fur trading and ranching centre. Today it represents the transportation and trading hub of the south central interior. Both of Canada's transcontinental railways and several major highways pass through the City, including the Trans-Canada Highway. Kamloops is a three and half hour drive to Vancouver over the Coquihalla Highway.

The population for the City of Kamloops in 1991 was approximately 69 000. The City of Kamloops has a diversified economy with an economic base that includes manufacturing, tourism, technologies, forestry, mining, agriculture, and the service sector. Among the larger employers of local residents are Weyerhaeuser Canada, Highland Valley Copper, Royal Inland Hospital, School District 24, and the University College of the Cariboo. Kamloops is also home to several regional and district provincial government offices, agencies, and crown corporations.

Logan Lake

Logan Lake is located in the southern portion of the TSA about 60 kilometres southwest of Kamloops. Logan Lake began as one of B.C.'s "instant towns" with development of the Lornex copper properties in the Highland Valley in 1970s.

The 1991 population of Logan Lake was approximately 2 445. Mining is the major economic activity with approximately half of Highland Valley Copper's 1 215 employees residing in Logan Lake. The service industry provides additional employment to local residents.

Ashcroft

In 1991 the population of Ashcroft was 1 763. Ashcroft is located approximately 45 kilometres north of Spences Bridge and in close proximity to Cache Creek. The Ashcroft and Cache Creek area have close ties and together provide a range of commercial services. The Ashcroft economy is based on the forest industry, mining, ranching, and the provision of highway and railway transportation services.

Cache Creek

In 1991 the population of Cache Creek was 1 035. Cache Creek is located 85 kilometres west of Kamloops. The community grew rapidly in the 1960's as housing was built for the Bethlehem Copper Mine. Traditionally, Cache Creek has been a highway service centre providing for the needs of Trans-Canada (Highway #1) and Highway #97 travellers. With the completion of the Coquihalla Highway in 1986, the number of travellers passing through Cache Creek has declined significantly. Despite this, tourism remains important to local economic activity. The area also derives employment from industrial activity at Highland Valley Copper Mine, a waste disposal operation and Cache Creek Woodchips.

2.2.2 North Thompson Area

The 1991 population of the North Thompson area is approximately 8 000 with the largest two centres being the unincorported communities of Barriere and Clearwater. The North Thompson area has several other small unincorporated communities including Louis Creek, Little Fort, Black Pool, Birch Island, Vavenby, Avola, and Blue River.

Barriere

In 1991, the population of Barriere was estimated at 1 653. Barriere is located approximately 70 kilometres north of the City of Kamloops on Highway #5.

The largest employment sector in the Barriere area is the forest industry. Three local processing facilities operated by Gilbert Smith Forest Products Ltd., Tolko Industries Ltd., and Darfield Building Products Ltd. provide approximately 275 PYs of processing employment. School District 24 and logging contractors are also significant local employers. Barriere is also the gateway to many fine fishing lakes which support several fishing resorts.

Clearwater

Clearwater is located 120 kilometres north of the City of Kamloops on the North Thompson River. The 1991 population of Clearwater was approximately 1 690.

The largest economic sector in Clearwater is the forest industry. Sawmills operated by Slocan Forest Products Ltd., Weyerhaeuser Canada Ltd. and Wadlegger Logging and Construction Ltd. provide approximately 295 PYs of processing employment in the Clearwater area. Government services (i.e., School District #26, B.C. Forest Service, etc.) and logging contractors[6] also support a significant component of the Clearwater labour force. Finally, Clearwater's close proximity to Wells Gray Park and other tourist destinations has helped develop a local tourism sector, with many "drive through" tourists stopping in Clearwater for meals and accommodation.

6 Member companies of the Clearwater Loggers Association directly employ approximately 185 people in the Clearwater area.

2.3 First Nations

Ten First Nations Bands are located in the Kamloops TSA, with a total registered population of 4 078. Seven Bands are affiliated with the Secwepemc (Shuswap) Nation Tribal Council, two Bands are affiliated with the Nlaka'pamux Nation Tribal Council, and there is one independent Band (the Little Shuswap Band). Table 2-1 identifies the First Nation communities in the Kamloops TSA as well as the resident reserve population and the total registered populations.

Table 2-1

First Nations Populations for the Kamloops TSA in 1995 [7]

	Population (Own Band)	Population (Other Band)	Registered (Off Reserve)	Total Population
Secwepemc Nation				
Adams Lake	366	15	200	581
Bonaparte	203	19	417	639
Kamloops	495	69	280	844
North Thompson	218	16	280	514
Neskonlith	228	32	246	506
Skeetchestn	136	16	237	389
Whispering Pines	61	0	37	98
Nlaka'pamux Nation				
Oregon Jack Creek	11	5	38	54
Ashcroft	46	5	147	198
Independent Bands				
Little Shuswap	156	23	76	255
Total	**1 920**	**200**	**1 958**	**4 078**

An additional eight Bands are located outside of the Kamloops TSA but maintain traditional interests inside the TSA. These Bands include: the High Bar Band, Spallumcheen Band, Lower Nichola Band, Upper Nichola Band, Fountain Band, Pavillion Band, Cook Ferry Band, and Canim Lake Band.

2.3.1 Secwepemc Nation Forestry Concerns

Secwepemc people have never surrendered their Aboriginal rights or title throughout their traditional territory. Until the aboriginal land title question is settled through a negotiated treaty, the policy of the Secwepemc Nation Tribal Council (SNTC) is that British Columbia should avoid alienation or potential degradation of natural resources in Shuswap Nation territory.

Secwepemc people do not feel comfortable with the level of forest harvesting in the TSA and the detrimental impacts to the environment which have subsequently occurred. Traditional land ethics

7 Source: Government of Canada, Indian and Northern Affairs Canada.

respect natural ecological processes. Indiscriminate removal of natural resources from the landscape for corporate wealth does not fit with traditional Secwepemc beliefs and values.

Several representatives from the areas Secwepemc communities expressed similar concerns on many issues regarding forestry activity in the Kamloops TSA including: preservation of cultural sites, forestry opportunities, impacts of forestry activities, and access to grazing areas.[8]

The Secwepemc Nation has many cultural and traditional land uses that require identification before forest harvesting occurs in an area. In the past many cultural and traditional land uses have not always been identified and concerns exist that this problem may persist. Preservation of important cultural and heritage sites requires that they are mapped and reviewed in the course of forestry planning and should be administrated through First Nations. It is also important that archaeological impact assessments be undertaken where appropriate.

The Secwepemc communities have identified several forestry opportunities for creating forestry employment to strengthen the labour force of local communities. The Native Resource Management Program (NRMP) has been in place for four years and has provided training to over 100 people from eight different Secwepemc Bands in the Kamloops TSA. This program has developed employment opportunities in silviculture, fire suppression and traversing. Additional employment opportunities associated with developing and expanding small sawmill and log cabin building operations along with other Secwepemc forestry ventures have been identified as a means to provide local communities with greater participation in the forest industry.

Currently the Kamloops Band and the Neskonlith Band are working towards establishing small processing facilities. The North Thompson Band has begun operating a small sawmill similar in size to what the other two Bands would like to operate. The development and viability of these operations would be enhanced with the allocation of an annual timber apportionment. The SNTC has made a request to acquire a volume of 75 000 cubic metres annually from the Kamloops TSA. A volume of 25 000 cubic metres would be utilized by the Neskonlith, Kamloops, and North Thompson communities.

Greater integration of other land uses and values is required when practising forestry on lands in the Kamloops TSA. It is important to consider not only timber extraction but to recognize the important values of other forest products such as botanical forest products, cultural values, and fish and wildlife habitats. First Nations representatives are concerned that the larger landscape level impacts of logging are not being adequately considered. There is also concern about the impact of logging on traditional First Nation resources. In particular, there is concern that logging may disrupt the migration routes for local caribou, moose, deer, and elk, damage ungulate wintering habitat, and adversely impact botanical forest products.

8 Based on an April 7, 1995 meeting at the Chief Louis Centre in Kamloops, Secwepemc representatives included: P. Mackasey, Forest Lands Management Director, Shuswap Nation Tribal Council; A. Casimir, Range Manager, Kamloops Band; J. Thomas, Councillor, Kamloops Band; R. Matthew, North Thompson Band, Councillor; M. Peters, Councillor, Skeetchestn Band; and D. Morgan, Councillor, Bonaparte Band.

Harvesting in the TSA should strive to improve the wood volumes utilized from individual harvest sites. Currently, there is a lot of wood waste and better efforts are needed utilze these volumes. Forestry in the Kamloops TSA also needs to ensure that long-term site productivity is maintained for future generations. Forests need to be managed from a watershed perspective and ensure ecological integrity. Generally, forestry activity needs to be approached from the context of landscape level planning to ensure that all values are considered and protected.

2.3.2 Specific Concerns from Secwepemc Bands

Traditionally, and until very recently, members of the Kamloops Band maintained two homes -- winter residences and summer residences. As result, there was a fair amount of movement around the area. This makes issues regarding natural resource management surrounding the larger area of great concern to members of the Kamloops Band.

The Kamloops Band is developing a log house building operation. They are currently training 6 to 8 people to build log homes. These log houses will utilize a post and beam design which maximizes the use of local wood materials. The initial objective is to produce housing for the needs of the local Band and in the future expand operations to other markets. The Whispering Pines Band is also considering developing a log house manufacturing facility similar to that being developed by the Kamloops Band.

The Kamloops Band would require approximately 600 cubic metres annually of the proper timber types to operate this facility. The Kamloops Band has identified approximately 50 000 cubic metres annually within their traditional territories which could be harvested in a co-operative manner with the areas licensees to increase forestry opportunities for Kamloops Band members.

The North Thompson Band is currently upgrading their small sawmill near Chu Chua. In 1994, this mill operated all year producing mostly 4x4 post material. The sawmill is currently not operating as they upgrade their facility and search for proper timber types for their facility. Maintaining a steady wood supply has always been a problem. The North Thompson Band also operates a small value-added operation which utilizes trim-ends from Tolko's Louis Creek sawmill and produces wood dimensions which can be utilized by Tolko's Compwood Products Plant. The North Thompson Band's value-added operation employs between four or five people.

Collectively, the North Thompson Indian Band milling and harvesting activities employ approximately 25 people when in full operation. The sawmill would be able to operate continually with access to 25 000 cubic metres of timber annually. It would also be beneficial if major licensees could help local First Nations communities become more involved in small business ventures. This could lead to creation of additional local employment from the areas timber harvest.

Several Bands have expressed an interest in utilizing local timber for traditional and community uses. The Kamloops Band is developing a cultural village and would like to use local materials. The North Thompson Band would like to re-establish cabins at traditional hunting camps and utilize surrounding timber to build these cabins. The Skeetchestn Band is planning to build some

traditional kekulis (pithouses) and also is interested in utilizing surrounding wood resources as well.

The Bonaparte Band has been attempting to obtain grazing permits from the Ministry of Forests for Crown lands.[9] Currently no grazing permits are held by members of the Bonaparte Band. The Band has been trying for several years to gain access to tenures near their community. The Bonaparte Band feels that the tenures are currently being under utilized and there could be allowances made for their participation on grazing lands in the area. The Bonaparte Band has been offered permits in the Canim Lake area but this is over 100 kilometres from their community and falls within traditional territory of other First Nations people.

2.3.3 Nlaka'pamux Nation Tribal Council Concerns[10]

Several specific concerns and issues have been identified by the Nlaka' pamux Nation regarding forestry in traditional Nlaka' pamux territory, of which the Kamloops TSA makes up a portion. Specifically, these points address concerns associated with employment opportunities, communication process, adequate funding for participation, environmental and traditional use issues.

The Nlaka'pamux Nation has outlined several initiatives that would increase the opportunities for the Nlaka'pamux labour force in the forest industry. Through participation with the Ministry of Forests the Nlaka'pamux Nation would like to identify special Timber Sale opportunities that would encourage good forest management and additional contracting opportunities. A permanent commercial position in the forest industry for the Nlaka'pamux communities could be achieved through the creation of special Forest Licences. Further employment opportunities could be realized if Ministry of Forests and licensees where to identify work for additional Native Resource Crews. Licensees could also assure contracting opportunities to qualified Nlaka'pamux loggers in order to allow them to make the commitment to purchase modern logging equipment.

The Nlaka'pamux Nation has identified the need to improve communication and information flow between the Nlaka'pamux communities and the Forest Service offices. In order to aid communication the Ministry of Forests should appoint one senior person to be responsible for co-ordinating all correspondence and information flow from the four District offices active in the Nlaka'pamux territory. Forestry data pertaining to the Nlaka'pamux should be presented in a manner that allows compilation on the basis of the boundaries of the Nlaka'pamux territory. A formal process should also be established to address all issues regarding issues associated with management of forested lands on traditional territory until a interim agreement is developed.

The Nlaka'pamux Nation is developing a resource team to support the efforts of the nine Nlaka'pamux communities. The Provincial Government should provide a budget to support an effective forestry capability under the control of the Nlaka'pamux communities. Additional

9 T. Porter, Chief, Bonaparte Band Council.

10 Information from the Nlaka'pamux Nation Tribal *Council Task Force Reports on Forestry Issues within the Territory of the Nlaka'pamux*, prepared June, 1994 and March, 1995.

funding support from the Ministry of Forests is required to increase field surveillance of forestry within the territory. Finally, there should be a comprehensive plan developed for the use of Forest Renewal funding to meet the priority needs within the Nlaka'pamux territory.

A joint review by the Ministry of Forests and the Nlaka'pamux Nation Tribal Council is required to assess sustainability of the forest industry within the traditional territory and ensure that logging activities within each major watershed are also being conducted on a sustainable level. It is also important that traditional use studies be conducted before harvesting is approved for unlogged watersheds. These must be properly organized so that all Nlaka'pamux who have rights to, and utilize these areas have the opportunity to provide their input.

2.3.4 Little Shuswap Indian Band Forestry Concerns[11]

The Little Shuswap Indian Band has identified the inventorying of traditional land use and cultural sites as a priority. In particular it is important that individuals carrying out these surveys be properly trained as to ensure gathered data will be of value.

Distribution and access of timber for First Nations is also important to the Little Shuswap Band. Currently timber harvesting on reserve land and from their woodlot license creates employment for three individuals for four or five months of the year. Ideally, individual Bands that have proven the ability to harvest the resource should be eligible for a timber quota. These quotas should be spread among the various Bands in the area so that some Band's could become primary suppliers while other Bands would be manufacturers. The Bands that obtain quotas should also be encouraged to sell this timber at fair market prices.

2.4 Labour Force

The experienced labour force in the Kamloops TSA, categorized by industry, is summarized in Table 2-2. Labour force data for the City of Kamloops is reported separately for comparative purposes. Among the largest components of the labour force in the TSA are the wholesale/retail, accommodation and business services, and manufacturing sectors. Much of the employment accounted for in the manufacturing sector is derived through employment in area sawmills, and at Weyerhaeuser's pulp mill in Kamloops.

11 S. Adamson, Forestry Advisor, Little Shuswap Band.

Table 2-2

Experienced Labour Force By Industry for the Kamloops TSA[12]

(Individuals in Labour Force)[13]

Industry	City of Kamloops	Remainder of TSA	Total Labour Force
Mining	1 070	820	1 890
Agriculture	375	1 080	1 455
Manufacturing (Includes forestry processing)	2 875	1 170	4 045
Transportation	2 310	650	2 960
Logging and Forestry	715	895	1 610
Wholesale and Retail trade	7 295	1 580	8 875
Construction	2 550	685	3 235
Accom. and Business Services	3 350	1 140	4 490
Communication	1 185	265	1 450
Real Estate/Financial/Commercial Services	2 770	595	3 365
Education	2 340	805	3 145
Health and social service	3 520	585	4 105
Government	2 125	795	2 920
Other	2 730	735	3 465
Total Labour Force	**35 210**	**11 800**	**47 010**

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.[14] The Kamloops area has a diversity index of 75 while the North Thompson area has a diversity index of 66. A higher index reflects a more diversified economic base while a lower ratio represents relative dependence on one or two main sectors. The diversity index for the Kamloops area is among the higher ratios in the province, while the index in the North Thompson is among the lower ratios in the province. Areas comparable in population to the Kamloops area includes Kelowna with a diversity index of 73, and Prince George with a diversity index of 68.

Table 2-3 illustrates the distribution of income dependencies among the basic sectors. The income dependency is the percentage of basic sector after-tax income that is attributed to each sector for the local area. The Kamloops TSA comprises two areas - Kamloops and the North Thompson.

12 Source: Statistics Canada, 1991 Census. Experienced labour force information was derived from the enumeration areas that represent the Kamloops TSA.

13 Table 2-2 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 the Kamloops TSA; 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.

14 G. Horne and C. Powell, Ministry of Finance and Corporate Relations (1995), *British Columbia Local Area Economic Dependencies and Impact Ratios.*

Table 2-3

Basic Sector Income Dependencies [15]

(Percentage of After-tax Income, 1991)

Area	Forestry	Mining	Agriculture	Tourism	Public	Other	Non-Employment
Local Areas							
Kamloops	10%	7%	2%	2%	21%	23%	35%
N. Thompson	37%	2%	4%	5%	16%	8%	29%

Average employment income for TSA residents is lower than the provincial average. In 1992, the average reported before-tax employment income in the TSA was $27 070 ($1994), while the provincial average was $28 620 ($1994).[16] Within the TSA, Logan Lake reported the highest average before-tax income at $28 350 ($1994) while the North Thompson area reported the lowest before-tax income average in the TSA at $23 400 ($1994). The average before-tax employment income for the City of Kamloops was $27 525 ($1994) in 1992.

Unemployment insurance claim levels in the TSA are slightly above the provincial average. In September 1994 the percentage of the workforce (i.e., working age 19-64 years) claiming unemployment insurance was 5.3%, while the provincial average was 4.1%. In December 1993, the workforce claiming unemployment insurance was 8.4%, while the provincial average was 6.3%..

While the total workforce claiming unemployment insurance in the past two years has remained under ten percent, two subgroups in the TSA, young adults (i.e., 19-24 years) and older workers (i.e., 55-64 years), have consistently remained above ten percent. Over this period, the unemployment insurance rates for young adults has ranged from 15.9% to 17.9%, while for older workers it has ranged from 9.7% to 11.4%.

There is also a greater percentage of recipients on income assistance in the TSA than is generally found in the province as a whole. In September 1994, 13.3% of the region's population received income assistance as opposed to 10.2% of the provincial population.[17] In September 1992 the rate was 11.9% in the TSA and 9.0% in the province.

15 Ibid. Forestry includes logging, pulp and paper, sawmills, other wood manufacturing, related transportation and construction; Tourism includes accommodation and a portion of food services, retail trade, etc., Public includes education, health services and government, Other includes part of manufacturing, transportation, construction, etc.; Non-employment income includes unemployment insurance, pension, investment income, transfer payments, social assistance payments.

16 These income values include average earnings for both part-time and full-time earners and are reported as before-tax employment income. Employment income identified elsewhere in this report refers to after-tax employment income.

17 Individuals collecting old age security benefits are not included in the income assistance figures.

2.5 Mining

The Kamloops TSA has two major mining operations, three quarries and fourteen sand and gravel operations. Highland Valley Copper, which is currently the largest operating mine in B.C., directly creates approximately 1 215 PYs of employment. The other mining operation in the TSA is the Afton/Ajax operation. This facility had been closed for the past three years but recently re-opened creating approximately 145 PYs of employment.

The three quarries in the TSA, Harper Ranch, Pavillion Lake, and Red Lake, collectively create 90 PYs of employment. The fourteen sand and gravel operations broaden the mining sector in the TSA and create an additional 110 PYs of employment for a total direct mining labour force of 1 560 PYs.

The Kamloops TSA also generates an average exploration expenditure of about $12.0 million annually. The value of exploration tends to vary widely from year to year. Between 1988 and 1993 exploration expenditures ranged from between $2.0 million and $20.0 million dollars. In general, exploration activity fluctuates in response to international mineral prices, government policy, and tax structure.

2.6 Agriculture

Agriculture has a long history in the TSA and has played an important role in the development of the Thompson Nicola region.[18] Agriculture continues to be important to the area's economy, particularly in the southern half of the TSA. Agricultural has traditionally involved forage and livestock operations, including beef, sheep, dairy, and horses. Recent developments have resulted in the introduction of crops such as ginseng, seed crops, expanding potato acreages and game farming (i.e., fallow deer and bison).

The total area in farmland in the TSA is estimated to be 280 823 hectares. Approximately 107 000 hectares of this area is rented from the government while the remainder is privately owned. The vast majority of this land is used for rangeland by the cattle industry with only 28 872 hectares devoted to cultivated crops. In 1991, there were approximately 875 farms in the TSA of which 546 were classified as cattle and calf operations. In 1991, gross farm revenues for all farms in the TSA were estimated to be $44.0 million ($1994).[19]

2.6.1 Cattle Industry

The reliance on crown rangeland is an important feature of cattle ranching. The Ministry of Forests is responsible for the management of Crown rangelands. In 1991 there were 192 grazing tenures which allowed area ranchers to graze over 28 000 cattle and 2 700 sheep.[20] A total of 123 849 AUMs (Animal Unit Months) were authorized in the TSA (representing approximately 8.0% of the total AUMs authorized in B.C.) of which 117 027 AUMs were utilized. In the TSA

18 The Kamloops TSA lies completely within the Thompson-Nicola Region.
19 Census of Agriculture (1991) - special run of enumeration areas which form the Kamloops TSA.
20 Ministry of Forests, Range Branch, Victoria.

Crown rangelands are being used at a level that is close to capacity. Generally Crown rangelands are used in the spring, summer and fall.

2.6.2 Cultivated Crops

In 1991, approximately 4 026 hectares of alfalfa and 3 894 hectares of tame hay were planted. A small amount of vegetable, berries, tree fruits, barley and oats are also grown in the area. The TSA is one of the province's major ginseng growing areas. At present ginseng is being grown by over 50 area farmers. A single hectare of ginseng can generate over $0.4 million ($1994). The revenues generated by this crop are expected to grow as its cultivation increases.[21]

2.7 Botanical Forest Products

It is estimated that more than 190 botanical forest products are harvested from the forests of British Columbia.[22] Several of these products are harvested in the Kamloops TSA. They are of particular importance to First Nations people of the area. The Shuswap Nation, for instance, has identified several products that they utilize, including: berries such as saskatoon, blueberries, huckleberries, and cranberries; nuts such as hazelnuts and pine; bark from birch, pine, and alder trees; roots, corms and bulbs; needles from pine trees; and several types of mushrooms. In addition, there are other plants with medicinal qualities and uses known to Elders.[23]

2.8 Recreation and Tourism

The Kamloops TSA provides an abundance of opportunities for recreational and tourism related activities.

2.8.1 Recreation

It is estimated that approximately 2.3 million recreational user-days (RUDs) are spent in the TSA annually. This includes approximately 400 000 RUDs spent in provincial parks and recreation areas, and a further 1.9 million RUDs in recreation sites on other Crown lands. Park use has increased steadily in the TSA with visitor numbers increasing by over 90% during the last ten years.[24]

The parks and recreational sites in the Kamloops TSA include, Adams Lake Recreation Area, Clearwater River Recreation Area, Juniper Beach Park, Lac Le Jeune Park, North Thompson River Park, Neskonlith Lake Park, Paul Lake Park, Roderick Haig-Brown Park, Stake-McConnel Lakes Recreation Area, and Trophy Mountains Recreation Area.

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21 Government of Canada (1993), *Labour Market Review - Kamloops Region Quarterly Report October to December 1993*, Prepared by Canada Employment Centre, Kamloops, p. 5.

22 Ministry of Forests (1993), *Agroforestry Industry in British Columbia: Identification of Issues, Responsibilities and Opportunities for the Ministry of Forests.*

23 Kamloops Land and Resource Management Planning Team (1995), *Kamloops Land and Resource Management Plan.* Vol.1: Recommendation.

24 Parks Branch data shows that total visits have increased from 998 058 in 1985 to 1 906 774 in 1994 for the Thompson-Nicola Regional District.

Crown land sites that are not parks or recreation areas but that have been identified as important for recreational activities include Blue Earth Lake, Tod Mountain, Adams River, Dunn Peak, Deadman Creek, Clearwater Valley, Roche Lake, Deadman Valley, Hat Creek Valley, Raft Mountain, Moira Lake, Fog Horn Mountain, Porcupine Ridge, Watching Creek, Saul Lake, Shelly Lake, Bachelor Hill, and Lac Du Bois.

The TSA's parks, recreation areas, and other Crown lands provide the setting for a host of activities, including camping, hiking, skiing, wildlife and scenic viewing, photography, fishing, hunting, backpacking, picnicking, hang-gliding, kayaking, river rafting, canoeing, downhill skiing, cross-country skiing, mountain biking, four wheel driving, motor biking, ATVing, power boating, and snowmobiling.

Approximately 56% of all recreational activity can be attributed to TSA residents. Residents of the Lower Mainland also make extensive use of recreational opportunities in the Kamloops TSA, with the greatest proportion of recreational activity taking place in the vicinity of Kamloops. Much of the recreational activity in the Kamloops TSA is oriented towards lake and river-based recreation, or is closely associated with lake and river use.

2.8.2 Tourism

The Kamloops TSA supports a diverse tourism industry with operators catering to a wide range of tourism activities. A significant portion of this activity is associated with "drive through" travel.[25] The TSA is well situated on travel corridors to other regions of the province. As well, the TSA is in close proximity to world renown tourism destinations, such as Jasper National Park, Banff National Park, Wells Gray Park, and Shuswap Lake. Table 2-4 estimates the approximate experienced labour force associated with tourism in the TSA.

While much of the experienced labour force in the TSA is associated with the "drive through" tourism component, a significant portion of the TSA tourism sector is closely linked with activity on the TSA land base. These tourism operators specialize in destination type tourism activities, such as sports fishing, hunting and guide-outfitting, adventure travel, heli-skiing, dude ranches, and destination resorts. Approximately 90 such businesses currently operate in the TSA.

25 Ministry of Small Business, Tourism and Culture (1990), *Visitor '89 Survey.*

Table 2-4

Experienced Tourism Labour Force in the Kamloops TSA[26]

(Individuals in the Labour Force)

	Total TSA Labour Force	Tourism Component of Labour Force[27]	Tourism Labour Force
Accommodation and Food Services	4 490	51.1%	2 295
Transportation and Storage	2 960	26.8%	793
Retail Trade	6 920	8.3%	574
Communications	1 450	2.2%	32
Finance, Insurance and Real Estate	1 790	1.1%	20
Other Services	3 465	10.2%	353
Total	**21 075**	**19.3%**	**4 067**

26 The experienced labour force includes individuals over the age of 16 who are either employed or unemployed. Census of Canada, *Labour Force by Industry*. Aggregated by the Kamloops TSA.

27 Ministry of Tourism and Ministry Responsible for Culture (1993), *Tourism Gross Domestic Product: Measuring British Columbia's Tourism Industry, 1981-1991*.

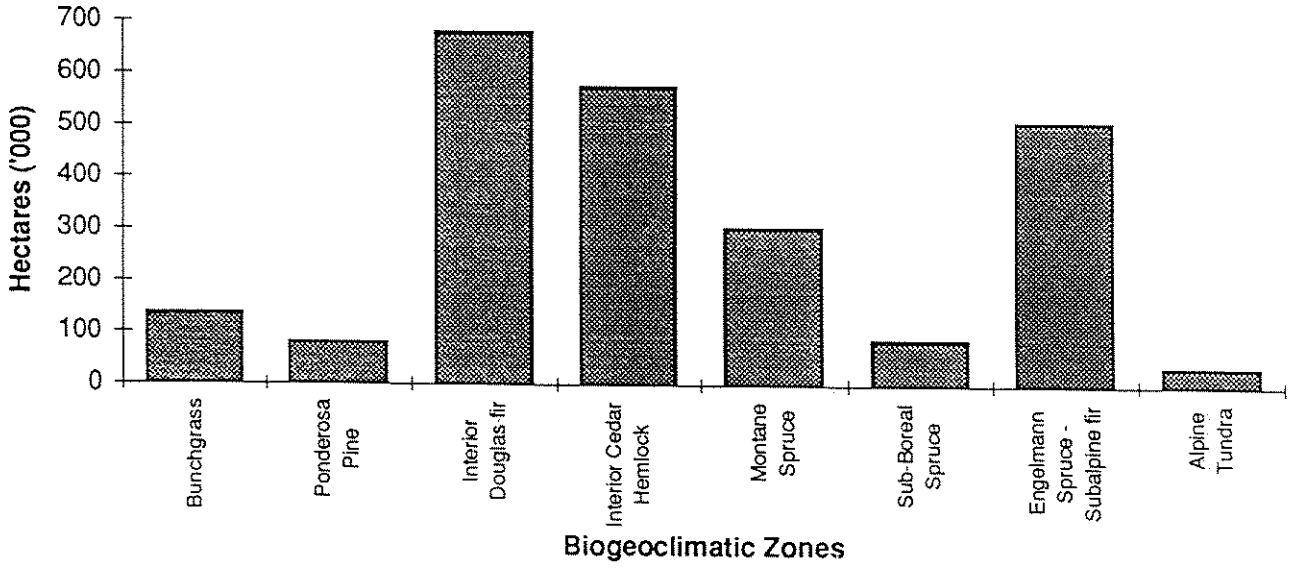
3.0 Environmental Setting

This section consists of a brief overview of the TSA's biophysical assets and associated outdoor recreation values. The biophysical components of the area include ecosystems, important aquatic systems, and a variety of plants and wildlife.

3.1 Ecosystems[28]

The biogeoclimatic ecosystem classification is a hierarchical classification system combining climatic, vegetative, and site factors. Each of the zones represent a distinct composition of vegetation, animal and physical environments, based on climate and physical geography. There are eight biogeoclimatic zones in the Kamloops TSA: Bunchgrass, Ponderosa Pine, Interior Douglas-fir, Interior Cedar-Hemlock, Montane Spruce, Sub-boreal Spruce, Engelmann Spruce-Subalpine Fir, and Alpine Tundra zones. Figure 3-1 illustrates the approximate area for each of the biogeoclimatic zones.

Figure 3-1
TSA by Biogeoclimatic Zone



28 Ministry of Forests (1991), *Ecosystems of British Columbia.*

Bunchgrass Zone -- In the Bunchgrass Zone the grasslands common in the lowest elevations of the Thompson River Valley (i.e., from Spences Bridge to Kamloops) are the dominant feature. This Zone is characterized by hot summers and cold, windy winters with very little precipitation. Typical climax conditions are characterized by bunchgrass, shrubs, and cryptograms (i.e., cactus).[29] Alluvial black cottonwood stands occur to a limited extent on the Thompson River floodplain. Wetlands are common throughout this Zone and include shrub-dominated riparian habitats. Several alkali lakes, representing some of the world's rarest aquatic ecosystems are also found in this Zone.

The Bunchgrass Zone supports a tremendous diversity and density of wildlife. A number of these wildlife species are of provincial significance because of their rarity or uniqueness. The grassland ecosystem provides habitat for California bighorn sheep, elk, and a wide range of small mammals, birds, and reptiles. Small pockets of trees support a variety of animals ranging from mule deer to hummingbirds. Lakes and streams provide important staging areas for migrating waterfowl in the spring, and habitat for muskrat, beaver and trout. Compared to other biogeoclimatic zones in the province, the bunchgrass Zone occupies a very small area.

Ponderosa Pine Zone -- The Ponderosa Pine Zone occurs at low elevations in the Thompson, and southern portion of the North Thompson river valleys. Summers are very warm and winters are cold with light snow cover. Often, the forest stands are open and park-like, with a ponderosa pine canopy and an understory dominated by bluebunch wheatgrass. Douglas-fir is common on moist sites characterized by gullies and streams, while black cottonwood stands occur on alluvial floodplains.

The short, relatively snow-free winters attract many animals. Mule deer, bighorn sheep, and elk winter in this Zone, as well as flocks of birds (e.g., thrush, crow, starling). The ponderosa pine parklands provide habitat for species that forage on large conifer seeds (e.g., nuthatch, ground squirrel) and on bark insects (e.g., woodpecker, flying insects). Wetland meadows and moist, shaded areas draw amphibians and reptiles such as the common garter snake, the rattlesnake, and a variety of frogs. Lakes and potholes are breeding sites for the Canada goose and various dabbling and diving ducks.

Interior Douglas-fir Zone -- The Interior Douglas-fir Zone dominates the low to mid-elevations above the Ponderosa Pine Zone. The climate is characterized by warm dry summers, a fairly long growing season, and cool winters. Douglas-fir stands may form open or closed canopies and cover substantial portions of the Zone. A combination of soil conditions, topographic conditions, and fire history has led to the development of large grassland communities, dominated by bluebunch wheatgrass.

Because of its diverse topography and vegetation, this Zone has a wide variety of habitat niches for wildlife. South facing areas at lower elevations attract animals during winter (e.g., mule deer, elk, crow). A diverse complement of birds feed on conifer seeds, bark insects, and small mammals. The flammulated owl typically nests in old ponderosa pine and Douglas-fir. Understory grasses

29 Plants without flowers or seeds, e.g., ferns, mosses, fungi, etc.

support California and Rocky Mountain bighorn sheep, mule deer, hawk, and numerous other species. Lakes and marshes are important staging and breeding areas for various waterbirds. Many of the lakes support valuable stocks of rainbow trout.

Interior Cedar-Hemlock Zone -- The Interior Cedar-Hemlock Zone is located at lower to middle elevations in the northern and central parts of the Kamloops TSA. It is characterized by cold wet winters and warm dry summers, and has the highest diversity of tree species of any zone in the province. Western red cedar and western hemlock dominate the mature climax forests. Grizzly and black bears inhabit areas throughout this Zone. Large ungulates such as mule deer and elk are also found during the summer and fall, although they migrate to the adjacent Interior Douglas-fir Zone in the winter. Moose are found throughout the Cedar-Hemlock Zone in the winter. Caribou also appear in the late summer and fall. Mature forests with mixed deciduous and coniferous species offer a variety of seeds and insects for breeding bird populations.

Montane Spruce Zone -- The Montane Spruce Zone is located in middle elevations above the Interior Douglas-fir Zone in the southern half of the study area. It is characterized by cold winters and moderately short, warm summers. It is a transition Zone with climax stands of fir and subalpine fir. One of its most distinctive features is the extensive stands of young and maturing lodgepole pine that have formed in areas affected by wildfires. Wetlands and grasslands are uncommon, but grasslands can occur on south-facing upper slopes and ridges.

The stands of lodgepole pine provide ranges for moose and mule deer in the summer and fall. Riparian areas and waterbodies are very important summer habitats for a variety of mammals, birds, and amphibians. Moose and mule deer often select this Zone to rear their calves and fawns.

Engelmann Spruce-Subalpine Fir Zone -- The Engelmann Spruce-Subalpine Fir Zone has a climate similar to the Montane Spruce Zone. It occurs in the higher elevations of the TSA in the Columbia Mountains, and lies below the Alpine Tundra Zone. The Engelman Spruce-Subalpine Fir Zone is characterized by short, cool growing seasons and long, cold winters.

This Zone includes continuous forest at lower and middle elevations, and subalpine regions at upper elevations. Englemann spruce and subalpine fir are the dominant climax tree species. The Zone is an important wintering habitat for caribou, which are well adapted to the conditions and which feed upon the lichens found in mature conifer forests. Avalanche tracks are important spring and summer habitats for bear and ungulates. The conifer forests are important habitats for fur bearers such as wolverine, marten, and fisher, as well as for a variety of seed-eating birds.

Alpine Tundra Zone -- The Alpine Tundra Zone occurs on high mountains within the area. It is characterized by low growing-season temperatures and a short frost-free period. The Alpine Zone is predominantly treeless, although stunted trees are common at lower elevations. The most common species include subalpine fir and Engelmann spruce. Vegetation is dominated by shrubs, herbs, bryophytes (i.e., mosses), and lichens. Alpine grass vegetation is also widespread. Wildlife diversity and abundance are generally low in this Zone.

3.2 Aquatic Systems

There are estimated to be over 1 800 lakes and 40 salmon producing streams, as well as many additional fish supporting streams in the Kamloops TSA.[30] These waterbodies support some of the finest inland fisheries in B.C., containing valuable stocks of anadromous and resident fish. Species of high recreational or economic value include rainbow trout, steelhead, kokanee, brook trout, white fish, and Dolly Varden. However, at present very little lake and stream inventory data exists regarding resident fisheries.[31] The Thompson, North Thompson, South Thompson and Adams rivers and their tributaries support a significant population of anadromous fish - sockeye, coho, chinook and pink salmon, and steelhead. The Adams River, world-famous for its sockeye stocks, is perhaps the most well-known of the aquatic habitats in the Kamloops TSA.

The North Thompson River contains all remaining wild stocks of rainbow trout within the TSA and the Southern Interior Region of B.C.[32] The North Thompson and Albreda Rivers are important migratory routes for Dolly Varden char and whitefish, as well as rainbow trout. The Barierre River supports important spawning runs of Dolly Varden char and trophy sized rainbow trout. The Barierre River and it's tributaries are also significant due to the quantities of unused resident spawning habitat they contain.[33]

Salmon habitat is located throughout the TSA. However, the Adams River, where most sockeye production occurs, is estimated to account for 50% of the escapements recorded in the TSA.[34] Sockeye comprises close to 100% of the escapements attributed to the Adams River. The Adams River is important to chinook and coho runs as well. In the North Thompson Basin, sockeye producing waterways include the Raft River and Fennel Creeks. Pink salmon are spawn primarily in the Thompson River system. The most significant chinook producing rivers include the North Thompson, Clearwater and South Thompson Rivers. In addition to these rivers, Finn Creek and Deadman River are also considered important chinook producing waterways. Coho rely on many smaller streams and tributaries and their habitat is distributed throughout the TSA. Among some of the major coho producing streams are Louis Creek, Dunn Creek, Lion Creek, Albreda River and the Upper Adams River.

3.3 Rare Habitat and Species at Risk

From a provincial perspective, the Kamloops TSA contains a number of ecosystems that are in limited supply. Most notable are the Bunchgrass and Ponderosa Pine ecosystems which are being encroached upon by urban and agricultural development.[35] Other Zones, such as the Sub-Boreal Spruce and Interior Cedar-Hemlock Zones are significant due to their relative rarity in the

30 Ministry of Environment, Lands and Parks (1994), *Resource Analysis, Prepared by Wildstone Resources.* Department of Fisheries and Oceans (1994), *Kamloops LRMP Resource Analysis for Anadromous Fisheries.*

31 Department of Fisheries and Oceans (1994), *Strategic Review of Fisheries Resources -- North Thompson Habitat Management Area*, p. 36.

32 The "Southern Interior Region" refers to the Ministry of Environment, Lands and Parks administrative region which encompasses the Kamloops LRMP area as well as the Okanagan area.

33 Interagency Planning Team (1993), *Resource Unit Profiles*, p. 39.

34 Department of Fisheries and Oceans (April 28, 1994), *Kamloops LRMP Resource Analysis for Anadromous Fisheries*, Table 2.

35 Ministry of Environment, Lands and Parks (1991), *Managing Wildlife to 2001: A Discussion Paper.*

province. Livestock grazing and timber harvesting have also had significant impacts on these ecosystems. Biogeoclimatic subzones recognized as priorities for protection include the Very Dry Hot subzone of the Bunchgrass Zone (BGxh), Dry Cool subzone of the Interior Douglas-fir Zone (IDFdk2), the Moist Mild subzone of the Sub-Boreal Spruce Zone (SBSmm), and the Moist Cool subzone of the Interior Cedar-Hemlock Zone (ICHmk).

The Very Dry Hot subzone of the Bunchgrass Zone is an ecosystem of regional and provincial significance. This subzone is located primarily along the Thompson and South Thompson River Valleys, stretching from the valley bottoms to an altitude of about 700 metres. These grasslands are characterized by a hot dry climate and are one of the more fragile ecosystems in the province. They are located only in the Southern Interior and along some portions of the Fraser River Valley. The subzone contains a great variety of wildlife species with a significant number of species of provincial or national importance because of their rarity or uniqueness (i.e., the Great Basin Pocket Mouse, Pallid Bat, Spotted Bat, Canyon Wren, White-Throated Swift, Burrowing Owl, Great Basin Spadefoot Toad, and Tiger Salamander). The introduction of noxious weeds and the conversion of grasslands to agricultural and commercial developments has been a concern. Historically, this subzone had been overgrazed, however, recent history (i.e., last 50 years) indicates that range conditions are improving.[36]

Wetland areas providing critical staging and nesting habitat for waterfowl and other waterbirds (e.g., Canada goose and tundra swan) are also becoming increasingly rare. It is estimated that in the southern portion of the Kamloops TSA wetlands comprise 0.5% of the land area, whereas in the Northern portion of the TSA they comprise about 5.0%.[37] Provincially, wetlands cover just 6.0% of the provincial land base. Most of this area is concentrated on the coast and in the north-east portion of B.C.[38] In the Kamloops TSA, there are 116 wetland sites considered to be rare habitat. The proportion of wetland area within the Kamloops TSA is relatively small in comparison to other areas of the province.

Additional ecosystems identified as significant in the TSA include:

- Niskonlith flower meadows (represents a relatively uncommon ecosystem);
- Relatively undisturbed watershed within the Arrowstone proposed protected area;
- Adams River Floodplain (one of the last relatively natural floodplains in the region);
- Low to mid elevation cedar-hemlock forests;
- Old growth ponderosa pine – (proposed for protection in the Blustery Area of Interest);
- Complex system of plateau lakes, sedge meadows and wetlands in the Bonaparte Area of Interest;
- Old Growth in the Englemann-Spruce Subalpine fir (ESSF) Biogeoclimatic Zone;
- North Thompson River Floodplains;
- Sub-boreal spruce (SBSmm) forest in the Emar Area of Interest;

36 G. Strachan, Senior Agrologist, Ministry of Agriculture, Fisheries and Food.

37 Agriculture Canada (1992), *Agricultural Use and Extent of British Columbia Wetlands*, Prepared by A.L. Van Ryswick, K. Broersma and J.W. Hall.

38 Ministry of Environment, Lands and Parks and Environment Canada (1993), *State of the Environment Report for British Columbia.*

- Watershed of Two Spring creek which is relatively undisturbed.[39]

Although the Kamloops TSA contains an abundance of terrestrial and aquatic wildlife and plants, a number of these plants and animals require special consideration due to their rarity or restricted ranges. In the TSA these species can be identified using the Ministry of Environment, Lands and Parks Conservation Data Centre's S1, S2 and S3 ranking systems.[40]

There are at least 34 rare plant species in the Kamloops TSA area in danger of extinction or extirpation (i.e., plants with an S1 or S2 rating). An additional 22 plant species are considered uncommon (S3) and are in danger of large scale disturbance. All of the rare species (i.e., S1 or S2) and most of the uncommon species (S3) are found within the southern portion of the TSA. These species are associated with the grassland ecosystems and ponderosa pine ecosystems in the TSA which are threatened or have been reduced through development activities (e.g., grazing, forestry, and urban encroachment). Approximately 24 animal species are considered vulnerable to extinction or extirpation in the Kamloops TSA. They are identified in Table 3-1. These species may warrant special management considerations. Current threats to particular species represent a potential or actual loss of biodiversity.

39 Regional Protected Areas Team (May 5, 1994), *Resource Analysis Report on the LRMP Protected Area Scenarios -- Review of Individual Units.*

40 S1, S2, S3 lists for the Kamloops TSA were provided by the Conservation Data Centre, Ministry of Environment, Lands and Parks. Using this ranking system, species may be considered "critically imperilled because of extreme rarity" (S1 ranked), "imperilled because of rarity" (S2 ranked), or "rare or uncommon" (S3 ranked). Species with a ranking of S3 are in danger of large-scale disturbances, whereas species with a ranking of S1 or S2 are considered to be vulnerable to extinction or extirpation. (An extirpated species refers to a species that no longer occurs within part of its historical range.)

Table 3-1[41]

Species Vulnerable to Extirpation or Extinction in the Kamloops TSA

(Species With an "S1" or "S2" Rating)

Birds	Mammals	Reptiles and Amphibians	Fi sh
Western Grebe	Fringed Myotis	Sharptail Snake	Umatilla Dace
Ferruginous Hawk	Western Small-Footed Myotis	Night Snake	
American Peregrine Falcon	Southern Red Bat	Tiger Salamander	
Prairie Falcon	Pallid Bat	Great Basin Spadefoot Toad	
Sharp-Tailed Grouse (Columbianus Subspecies)	White-Tailed Jackrabbit	Northern Leopard Frog	
Uphill Sandpiper			
Burrowing Owl			
Short-Eared Owl			
White-Headed Woodpecker			
Sage Thrasher			
Yellow-Breasted Chat			
Sagebrush Brewers Sparrow			
Grasshopper Sparrow			

41 Ministry of Environment, Lands and Parks, Conservation Data Centre.

4.0 Forest Sector Overview

This section describes the timber harvesting land base, current management practices, current AAC apportionment, provides an overview of the forest industry operating in the TSA, and identifies the employment associated with timber harvesting and related activities.

4.1 Timber Harvesting Land Base

The Kamloops TSA covers a total land area of 2 117 718 hectares of which 1 441 117 hectares are classified as Crown forest lands. Current forest management activities determine how much of the productive land base is available for timber harvesting. The following areas are excluded from the timber harvesting land base:

- Non-Crown land -- areas not administered by the British Columbia Forest Service as part of the timber harvesting land base;
- Non-forest land -- areas not occupied by productive forest cover;
- Inoperable areas -- e.g., areas classified as unavailable for harvest for terrain-related reasons;
- Non-commercial cover areas -- areas occupied by non-commercial tree or bush species;
- Environmentally sensitive areas -- portions of the areas considered to be sensitive;
- Deciduous forest types;
- Non-merchantable forests types -- forest types with poor timber quality or low timber volume that cannot be harvested economically;
- Woodlot licences -- the allowable annual cut for woodlot licences is not administered as part of the TSA;
- Specified no-harvest areas -- these include the Hudson's Bay Trail and lakeshore areas around Class A lakes. Harvesting in these areas is not currently allowed in order to protect recreational and environmental values;
- Riparian areas -- for the Kamloops TSA, a 1.2% reduction was applied in accordance with the *Kamloops TSA Riparian Management Area Guidelines*;
- Forest roads, skid trails, and landings -- to account for the loss of productive forest land that has occurred during past timber harvesting and development, 12.8 % of all areas currently younger than 21 years and 1.0% of all areas greater than 20 years are removed.

Table 4-1 summarizes the determination of the timber harvesting land base for the Kamloops TSA.[42]

42 A more detailed outline is available in the *Kamloops TSA Timber Supply Analysis* report.

Table 4.1
Kamloops TSA Timber Harvesting Land Base

Classification	Area	Proportion of area
	(ha)	(%)
Total Area	2 117 718	100.0
Productive Forest	1 441 117	68.1
Current Reductions to Crown forests	(573 987)	27.1
Additions to Crown forests	83 702	4.0
Current Timber Harvesting Land Base	**950 832**	44.9
Future Reductions for roads	(60 536)	2.9
Long-Term Timber Harvesting Land Base	**890 296**	**42.0**

4.2 Current Management Practices[43]

Forest management in the Kamloops TSA is subject to a wide range of guidelines. Those guidelines which are particularly important to the *Kamloop TSA Timber Supply Analysis* are outlined below.

- Basic silviculture levels -- defines reforestation activities required to establish free-growing stands, as well as maintain harvesting systems used in the TSA;
- Selection management -- about 17.0% of the timber harvesting land base is ecologically suited to management by selection harvesting. Stands managed in this fashion will contain trees of various ages;
- Forest health and unsalvaged losses -- expected timber losses due to fire, pest (insect, disease, and animals), and wind damage. In the Kamloops TSA unsalvaged losses are estimated to be 43 400 cubic metres per year (these losses have been subtracted from all of the harvest forecasts);
- Utilization levels -- tree and log size limits that are to be removed from the site;
- Minimum harvestable ages -- the time it takes for stands to grow to harvestable size. The minimum harvestable age defines the youngest age at which a stand may be harvested. Actual harvest age depends on many factors, including the age of other stands, limits on overall harvest levels, and forest cover requirements;
- Cutblock adjacency and green-up -- guidelines that specify the spatial distributi on of cutblocks and the condition that previously harvested sites must reach, expressed as an average tree height or age, before adjacent mature timber may be harvested. Green-up guidelines

43 For more detailed information refer to the *Kamloops TSA Timber Supply Analysis* report.

specify that no more than a specified percentage of the forest may not meet green-up conditions;

- Forest cover objectives -- specify the desired composition of forest areas by stand age. These objectives are used to specify general adjacency and green-up guidelines as well as desired conditions for wildlife habitat and aesthetics.

4.3 Current Apportionment

The current AAC for the Kamloops TSA is 2 393 180 cubic metres. The apportionment of the AAC is presented in Table 4-2.

It is 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 for the entire five years.

Table 4-2

Kamloops TSA Apportionment of AAC (1994)

Licensee	AAC (m^3)	Total (m^3)
1. Forest Licences, Replaceable		
Ainsworth Lumber Co. Ltd.	209 124	
Bell Pole Co. Ltd.	13 272	
Gilbert Smith Forest Products Ltd.	61 940	
International Forest Products Ltd.	249 594	
Riverside Forest Products Ltd.	34 133	
Slocan Forest Products Ltd.	269 638	
Tolko Industries Ltd.	641 088	
Weyerhaeuser Canada Ltd.	456 276	
Other	17 414	**1 952 479**
2. Small Business Forest Enterprise Program (SBFEP)		
Category 1 (sec. 16)	229 587	
Category 2 (sec. 16)	75 200	
Bid Proposal	108 757	
TSL (major) less than 10 000 m^3	1 861	**415 405**
3. Forest Service Reserve	25 296	
Total[44]		**2 393 180**

[44] The Kamloops AAC apportionment also includes 23 500 cubic metres associated with the Woodlot Licences, however, this AAC is not considered in the Timber Supply Review.

4.4 Major Licensees Fibre Supply

The AAC apportionment does not provide a complete picture of the fibre supply in the Kamloops TSA for the major licensees. They also obtain timber volumes from other sources including, Tree Farm Licenses, Timber Licenses, private lands inside the TSA, and Crown and private lands outside the TSA.

In 1993, TSA timber from Forest Licences, and from the Small Business Forests Enterprise Program (SBFEP) represented approximately 71% of the total fibre input for the TSA's major sawmill facilities. During the same year, the TSA's sole resident pulp mill (Weyerhaeuser) obtained approximately 50% of its fibre requirement in the form of wood chips from TSAs resident sawmills.

In 1993, the TSA's major sawmills collectively identified approximately 217 000 cubic metres more timber harvested or purchased than they processed. This additional timber was sent to other processing facilities in the interior or the Lower Mainland. Typically this timber was destined for other processing facilities owned by the same company. However, a significant volume was also made available to Cache Creek Woodchips.

Total sawmill processing within the Kamloops TSA in 1993 was 3 051 000 cubic metres.[45] Most of this volume, approximately 2 711 000 cubic metres, was processed by the TSA's major licensees at seven large facilities.[46] The remaining volume was processed at numerous small sawmills located within the TSA. In addition to the sawmill processing, the Weyerhaeuser pulp mill in Kamloops processed approximately 1 386 000 cubic metres of fibre in 1993. This mill typically processes close to 1 700 000 cubic metres annually. The shortfall in 1993 was the result of soft market conditions for pulp and plant maintenance.

Three of the Kamloops TSA's major licensees maintain processing facilities outside the TSA. These companies, Ainsworth, Bell Pole, and Riverside, send their fibre to eight different processing facilities. Collectively, these sawmills processed approximately 1 992 000 cubic metres of timber in 1993. The timber volumes from the Kamloops TSA accounted for approximately 13.5% of the total annual fibre required by these facilities. The fibre supply for the major licensees associated with the Kamloops TSA is summarized in Table 4-3.

45 Ministry of Forests, Economics and Trade Branch, *Primary Processing Database.*

46 Note, Ainsworth Lumber Co. Ltd. also operates a a speciality plywood plant at Savona. While this plant is located within the Kamloops TSA and utilizes TSA wood fibre, the TSA fibre it receives actually comes via Ainsworth operations outside of the TSA. As a result, the Savona mill and its associated employment is included alongside Ainsworth's other processing facilities which are located outside of the Kamloops TSA

Table 4-3
Fibre Supply For Major Licensees Associated with the Kamloops TSA AAC - 1993

Company	Mill Location	Employment	Processing Volume		TSA Timber Volume		Other Local Volume		Non-TSA Volume	
		Processing Employment (PY's)	Timber Input (m3)	Processing Attributed to TSA	Forest Licence (m3)	SBFEP (m3)	Tree Farm Licence (m3)	Private Land & Other (m3)	Private and other Crown lands (m3)	
Processing in Kamloops TSA										
TSA Resident Sawmills										
Gilbert Smith	Barriere	55	81 000	81.5%	66 000			15 000		
Interfor	Adams Lake	195	496 000	63.8%	316 500	24 500		108 000	66 000	
Slocan	Vavenby	160	575 000	59.1%	270 000	70 000	187 000	50 000	80 000	
Tolko	Heffley Louis Creek (Compwood)	475	798 000	84.0%	564 000	106 000		159 000	47 000	
Weyerhaeuser	Vavenby									
	Kamloops	245	761 000	67.4%	431 500	78 000	170 000	60 500	59 000	
Total for Major Sawmills		1 130	2 711 000	71.0%	1 648 000	278 500	357 000	392 500	252 000	
TSA Processing by Smaller Operators			340 000							
Total Primary Processing in the TSA			3 051 000							
TSA Resident Pulp Mills										
Weyerhaeuser Canada		615	1 386 000	• In 1993, approximately 50.0 % of the fibre required by Weyerhaeuser's pulp mill was supplied by area mills. In 1993, the pulp mill did not operate at capacity.						
Processing Outside the TSA										
Ainsworth	Five facilities	705	1 350 000		233 000	5 000				• Ainsworth's five facilities include: 100 Mile House, Chasm, Savona, Lillooet, and Abbotsford
Bell Pole	Two facilities	20	70 000		2 000					• Bell Pole's facilities are in Revelstoke and Lumby.
Riverside	Armstrong	390	572 000		23 000	5 500				
Total Non-TSA Processing		1 115	1 992 000	13.5%	258 000	10 500				

4.5 Company Profiles

Eight major licensees operate in the Kamloops TSA: Ainsworth Lumber Co. Ltd., Bell Pole Co. Ltd., Gilbert Smith Forest Products Ltd., International Forest Products Ltd., Riverside Forest Products Ltd., Slocan Forest Products Ltd., Tolko Industries Ltd., and Weyerhaeuser Canada Ltd.

Ainsworth Lumber Co. Ltd.

Ainsworth Lumber Co. Ltd. (Ainsworth) is a Canadian owned company founded in the South Cariboo in 1952. Today, Ainsworth consists of several processing facilities both inside and outside the Kamloops TSA. The company produces stud lumber products at its sawmills in 100 Mile House, Clinton, and Lillooet, and at its finger-joining facility at Abbotsford. In addition, the company operates a veneer plant in Lillooet, a speciality plywood plant in Savona, and an Oriented Strand Board (OSB) plant in 100 Mile House.

The timber volume from the Kamloops TSA goes mostly to support production in sawmills at 100 Mile House, Clinton, and partly supports stud finger-joining production in Abbotsford. Timber volume in the form of larger logs from 100 Mile House TSA and Lillooet TSA support production at the veneer plant in Lillooet. Approximately 73 million square feet (134 000 cubic metres) of 3/8" basis veneer from Lillooet is shipped to Savona to support production at the Company's speciality plywood plant. The OSB plant in 100 Mile House is supported by timber volumes from the Kamloops, Lillooet, 100 Mile House and Williams Lake TSAs.

The 100 Mile House sawmill operation creates approximately 185 full-time processing jobs while the Clinton operation creates a further 145 full-time processing jobs. Recovered material from these mills is shipped to the Company's finger-joining operation which creates 80 full-time processing jobs. Part of the wood chips generated from these two mills goes to supply the Weyerhaeuser pulp mill in Kamloops.

The Lillooet veneer facility employs approximately 165 full-time processing jobs while the Savona speciality plywood plant creates an additional 130 full-time processing jobs. The OSB plant in 100 Mile House, which began operations in 1994, created an additional 95 full-time processing jobs. The integration of processing operations has allowed Ainsworth to maximize utilization and achieve higher market values for their wood profile.

Bell Pole Co. Ltd.

Bell Pole has operated in British Columbia since the 1920's and is a major producer of treated poles for the North American electric utility market. Bell Pole sells its harvest volume to other licensees willing to sell their pole material in return. For the past few years the largest share of its Kamloops TSA harvest has been sold to International Forest Products at Chase, with a minor volume sold to Cache Creek Woodchips and local log house manufacturers.

These "trade" arrangements allow Bell Pole to obtain an average of 900 cubic metres a year of pole quality material from their Kamloops TSA AAC. The pole material that Bell Pole receives is processed at either their processing yard in Lumby or Revelstoke. The Lumby yard creates fourteen full-time processing jobs, while the Revelstoke yard creates ten full-time processing jobs.

Gibert Smith Forest Products Ltd.

Gilbert Smith Forest Products Ltd. has operated in the Barriere area since 1955. For the past 26 years the company has operated a mill specializing in cutting dimensional cedar lumber in Barriere. This processing facility creates approximately 45 full-time, and 10 part-time processing jobs. The total volume required for this facility comes from the Kamloops TSA. The mill also supplies some cedar volume to Meeker Shake and Shingle near Kamloops. Gilbert Smith Forest Products operations generate approximately 8 000 bonne dry units (BDU) a year which are supplied to Weyerhaeuser Canada Ltd.

International Forest Products Ltd.

International Forest Products Ltd. (Interfor) began its operations in the 1930s with a sawmill in Whonnock, about 48 kilometres east of Vancouver. In 1971, the company expanded from the coast to the central interior by acquiring Holding Lumber Company Limited which owned and operated a sawmill at Adams Lake. Today Interfor has logging operations in the North Coast/Lower Mainland, Bella Coola, Port Hardy, Campbell River, West Coast, Sechelt, and Adams Lake areas. The company operates ten processing facilities in the Lower Mainland, as well as the Adams Lake sawmill.

The sawmill at Adams Lake primarily manufactures dimension lumber for the United States, Canadian and offshore construction markets. This operation creates approximately 195 full-time processing jobs. The wood chips generated from this mill are sent to Kamloops or Vancouver. In 1990, the Interfor began upgrading the Adams Lake mill in an effort to reduce log consumption and manufacturing costs. This upgrade will be completed in 1995, and is expected to increase fibre utilization from the log profile while maintaining current employment levels.

Riverside Forest Products Ltd.

Riverside has operated in British Columbia since 1947. It has four wood products divisions, three of which are located in the Okanagan TSA, with the fourth operation located in the Williams Lake TSA. The company operates sawmill-plywood mills at Kelowna and Armstrong, and a sawmill-veneer mill at Lumby, as well as a sawmill at Williams Lake. The sawmill in Williams Lake was recently purchased from Jacobsen Brothers Forest Products Ltd.

The timber volumes harvested in the Kamloops TSA are all assumed to go to the Armstrong processing facility. This facility creates approximately 390 full-time processing jobs. The Armstrong processing facility also produces an additional 84 000 BDUs of wood chips each year which are supplied to Fletcher Challenge Canada Limited's Port Mann facility.

Slocan Forest Products Ltd.

Slocan Forest Products Ltd. was formed in 1978 to purchase the timber, logging and sawmilling assets of Triangle Pacific Forest Products Ltd. located at Slocan in the West Kootenay area. Today Slocan is one of the largest integrated forest products organizations in British Columbia, with timber resources and production facilities in northern, central and southern regions of the Province. Slocan presently owns and operates eight sawmills and one plywood facility in British Columbia and has a 50% interest in the plywood facility owned by Cantree Plywood Corporation near Vancouver.

Slocan's Vavenby sawmill facility was purchased from Clearwater Timber Products in 1987. The Vavenby sawmill has three lines - one processes large log diameters, while the other two are high speed lines which process the majority of the mill's throughput. The mill produces random length lumber up to 24 feet, and has the flexibility to produce lumber for different market specifications for North America, Europe, and Japan. The facility also produces wood chips that are shipped to Weyerhaeuser's Kamloops pulp mill and to Fibreco in North Vancouver. The Vavenby sawmill creates approximately 160 full-time processing jobs in the Clearwater and Vavenby areas.

Tolko Industries Ltd.

Tolko Industries Ltd. is a privately owned B.C. corporation. Its primary business is the marketing and manufacturing of solid wood products. The company has six manufacturing divisions and three marketing divisions. The company was founded in 1961 with operations at its Lavington division near Vernon. In 1981, the operations of Ernst Sawmills in Quesnel were acquired to form the Quest Wood division. In 1987, Tolko acquired Balco Industries Ltd. which operated manufacturing facilities at Merritt, Louis Creek, and Heffley Creek. Tolko also has a 50% interest in Heffley Reforestation Centre Ltd. and Gilbert Smith Forest Products Ltd. In 1988, Nova Lumber Ltd. was acquired forming Inlet Cedar division. Currently, Tolko is developing Oriented Strand Board (OSB) plants in Alberta and Ontario.

In the Kamloops TSA, Tolko operates a sawmill, planer, and lumber reload operation at it's Louis Creek plant. This operation produces dimensional lumber and creates approximately 250 full-time processing jobs. At Heffley Creek, Tolko operates a round log merchandizing/chipping, veneer and plywood plant which produces plywood and veneer products and creates approximately 200 full-time processing jobs. Adjacent to the Veneer and Plywood Plant is Compwood Products. This Tolko Industries Ltd. affiliate engages in "value-added" operations, such as fingerjointing for German and North American window stock, edge-gluing, and producing base components for Japanese squares. The Compwood facility employs an additional 25 full-time processing employees.

Weyerhaeuser Canada Ltd.

Weyerhaeuser Canada Ltd. began operations in 1965 and today has manufacturing operations in British Columbia, Alberta, and Saskatchewan. Weyerhaeuser Canada's head office is in

Kamloops, with corporate offices in Vancouver. The company is a wholly-owned subsidiary of Weyerhaeuser Company of Tacoma, Washington, one of the largest forest products companies in North America.

In the Kamloops TSA, the company operates a Bleached Kraft pulp mill in Kamloops, as well as sawmills at Kamloops and Vavenby. In the Kamloops area, the Weyerhaeuser facilities create approximately 745 full-time jobs - 615 jobs in the pulp mill, and 130 jobs in the sawmill. In the Clearwater area the Vavenby sawmill supports 115 full-time processing jobs. All wood chips produced by the two sawmills are processed at the pulp mill in Kamloops.

Weyerhaeuser Canada also has sawmills in Lumby, Merritt, Princeton, and Okanagan Falls. These sawmills supply wood chips to the Kamloops pulp mill as well. Besides the processing facilities in the province Weyerhaeuser Canada Ltd. operates a seedling nursery and seed orchard in Armstrong.

4.6 Industry Structure

This section presents and discusses the employment coefficients (i.e., person-years per 1 000 cubic metres of timber harvest) estimated for the AAC in the Kamloops TSA. Table 4-4 summarizes the employment coefficients derived for each category of the TSA harvest.

4.6.1 Harvesting

Harvesting employment consists of site employment (i.e., employment at the harvest site), log hauling, and road building employment. At the current AAC of 2 393 180 cubic metres, this component of the forest industry creates 0.24 PYs of direct provincial employment per 1 000 cubic metres harvested, or approximately 575 PYs.

Site Employment

All timber volumes in the Kamloops TSA are harvested by independent contractors either under contract directly to the major licensees, or contracts awarded under the SBFEP. Employment associated with harvesting varies depending on the method of logging (i.e., horse logging, fallerbuncher, cable system), size of the harvest site, volume of timber on site, and experience of crew. Biophysical constraints such as soil type, time of year, and weather conditions also influence the amount of employment at a particular harvest site. Logging within the TSA creates 0.17 PY's of direct employment within the province.

Log Hauling

Log hauling is similar to harvesting in that it is performed by independent contractors. Many contractors operating in the TSA are engaged in both logging and log hauling activities. Employment in log hauling varies depending on the distance that timber is transported. Some TSA harvest sites are only a few kilometres from a mill, while in other cases, timber may be transported

from the harvest site to areas outside the TSA. The provincial coefficient for log hauling is estimated at 0.05 PYs per 1 000 cubic metres.

Road Building and Maintenance

Harvesting activities require the construction of new logging roads each year and existing logging roads require regular maintenance and upgrading. Forestry road crews perform a variety of tasks, including sub-grade construction, reconstruction, grading, culvert installation, gravelling, bridge construction, sanding and salting, snow removal, blasting, snag falling, dust control, brush control, landing construction, land rehabilitation, grass seeding, rehabilitation, hazard abatement, and installation of erosion bars. In the Kamloops TSA the provincial road building coefficient is approximately 0.02 PYs per 1 000 cubic metres.

4.6.2 Processing

Processing comprises sawmill (including veneer and plywood manufacturing) and pulp mill activities. At the current AAC of 2 393 180 cubic metres this component of the forest industry creates 0.55 PYs of employment per 1 000 cubic metres harvested, or approximately 1 315 PY's.

Sawmill

The Kamloops TSA harvest provides fibre to several processing facilities inside and outside the TSA. Inside the TSA the major licensees operations include: Ainsworth Lumber Co. Ltd.'s Savona plywood mill; International Forest Products Ltd.'s Adams Lake sawmill; Tolko Industries Ltd.'s Louis Creek sawmill and Heffley Creek Veneer and plywood operations; Gilbert Smith Forest Products Ltd.'s Barriere cedar mill; Slocan Forest Products Ltd.'s Vavenby sawmill; and Weyerhaeuser Canada Ltd.'s Vavenby and Kamloops sawmills.

Outside the TSA the major licensees operate processing facilities which receive some amount of fibre from the Kamloops TSA. The non-TSA facilities that benefit from the TSA harvest include: Ainsworth Lumber Co. Ltd.'s Chasm sawmill near Clinton, Exeter sawmill in 100 Mile House, Veneer plant in Lillooet, and Troika Fingerjoint plant in Abbotsford; Bell Pole Co. Ltd. (pole processing facilities) in Lumby and Revelstoke; and Riverside Forest Products Ltd's sawmill complex near Armstrong.

In addition to the above mentioned mills, there are also several other processing facilities in the Kamloops TSA which obtain fibre from the Kamloops TSA AAC. However, this sector is very competitive, with timber volumes often coming from a variety of different sources each year. This sector includes operations such as: A & A Post and Rail Ltd.; Cache Creek Woodchips Ltd.; Compwood Products Ltd.; Darfield Building Products Inc.; Davis Lake Cedar Ltd.; Interior Log Construction Association; Meeker Cedar Ltd.; M.V.P Veneer Inc.; Multi Wood Products Ltd.; Paragon Ventures Ltd.; Creek Slicing Ltd.; Piva Sawmill Ltd.; Thompson River Hardwoods Ltd.; and Wadlegger Logging and Construction Ltd.

The provincial sawmill employment coefficient for the Kamloops TSA is 0.43 PYs per 1 000 cubic metres.

Pulp mill

Most of the wood chips generated by the Kamloops TSA harvest are processed at the Weyerhaeuser pulp mill in Kamloops. Wood chips not processed by Weyerhaeuser in Kamloops are transported to the Lower Mainland where they are either shipped out of the province or processed at Lower Mainland facilities.

The provincial pulp mill employment coefficient for the Kamloops TSA is 0.12 PYs per 1 000 cubic metres.

4.6.3 Other Direct Forestry Activities

Silviculture

Silviculture activities include site preparation, planting, brushing, herbiciding (aerial and ground application), girdling, fertilization, and spacing. The Ministry of Forests is responsible for funding silviculture in areas harvested prior to 1987, as well as in areas harvested under the SBFEP after 1987. Licensees are responsible for all basic silviculture activities in areas harvested after 1987. Silviculture work within the SBFEP and from licensees recently harvested sites is used in deriving the silviculture employment coefficient for the Kamloops TSA. The provincial silviculture employment coefficient is 0.06 PYs per 1 000 cubic metres.

Administration

Licensees maintain supervisory and administrative staff who oversee operations in their processing plants, woodland operations, and local and head offices. The provincial employment coefficient for this category is estimated at 0.06 PYs per 1 000 cubic metres.

Ministry of Forests

The Kamloops Forest Region creates 120 PYs, while the Kamloops and Clearwater Forest Districts create 81 and 57 PYs, respectively. These government offices are responsible for the administration of the Kamloops TSA. No employment coefficient is derived for Ministry of Forest employment. Staffing levels at the Ministry of Forests are assumed to be less affected by direct changes in harvest levels, than by budgetary issues and immediate priorities and responsibilities of the Ministry.

4.6.4 Total Direct Employment

Total direct provincial forestry employment (TSA and other provincial residents) associated with the current harvest level of 2 393 180 cubic metres is approximately 2 180 PYs. Approximately 77% of this total, or 1 675 PYs, are residents of the TSA.

Table 4-4

Estimated Direct Forestry Employment

(Current AAC: 2 393 180 cubic metres)

Activity	TSA Employment Coefficient	Provincial Employment Coefficient	TSA Employment	Provincial Employment
	(PY/1 000 m^3)	(PY/1 000 m^3)	(PYs)	(PYs)
Harvesting				
Site Employment	0.14	0.17		
Log Hauling	0.04	0.05		
Road Building	0.02	0.02		
Total Harvesting	**0.20**	**0.24**	**480**	**575**
Processing				
Sawmill	0.33	0.43		
Pulp mill	0.10	0.12		
Total Processing	**0.43**	**0.55**	**1 030**	**1 315**
Other Forestry				
Silviculture	0.05	0.06		
Administration	0.02	0.06		
Total Other Forestry	**0.07**	**0.12**	**165**	**290**
Total	**0.70**	**0.91**	**1 675**	**2 180**

5.0 Economic Implications

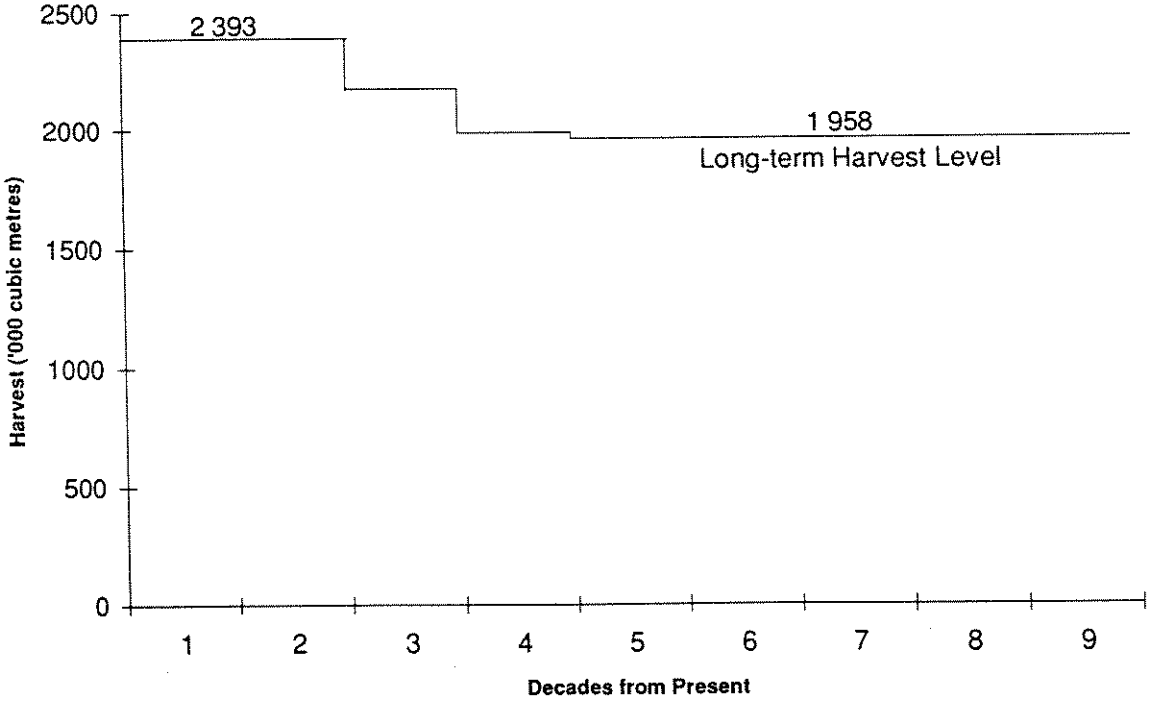
This section outlines the base timber harvest forecast, and presents the associated employment, employment income and government revenue impacts.

5.1 Harvest Forecast

Figure 5-1 illustrates the harvest forecast for the base timber harvest forecast, termed the base case in the *Kamloops TSA Timber Supply Analysis*. The base timber harvest forecast maintains the current harvest level in the TSA for the first two decades. It then declines at a rate of nine percent over decades three and four and reaches the long-term harvest level of 1 958 000 cubic metres in decade five.

Note, neither the AAC nor the base timber harvest forecast includes harvesting activity of log grade 4. This log grade, which refers to trees which are alive but unsuitable for milling into timber, represents timber which could be removed from operable harvest sites beyond volumes harvested as part of the AAC. In the Kamloops TSA log grade 4 timber volumes are estimated at 70 000 cubic metres annually.

Figure 5-1
Base Timber Harvest Forecast



5.2 Kamloops TSA Impacts

5.2.1 Employment and Employment Income

Forestry activities in the Kamloops TSA provide significant direct employment benefits for area residents. Approximately 77.0% of the total direct employment created by the Kamloops TSA harvest accrues to TSA residents. Estimates of TSA employment and employment income impacts associated with the base timber harvest forecast are shown in Table 5-1.

Table 5-1

Kamloops TSA Employment and Employment Income: Base Timber Harvest Forecast

Decade	Harvest (m3)	Employment (PY's/year)			Emp. Income ($1994 millions/yr)		
		Direct[47]	Indirect/ Induced[48]	Total	Direct[49]	Indirect/ Induced[48]	Total
Current Harvest	2 393 180	1 675	1 075	2 750	51.2	19.7	70.9
1	2 393 180	1 675	1 075	2 750	51.2	19.7	70.9
2	2 393 180	1 675	1 075	2 750	51.2	19.7	70.9
3	2 177 794	1 525	975	2 500	46.4	18.1	64.5
4	1 981 792	1 390	885	2 275	42.4	16.3	58.7
5	1 958 000	1 370	875	2 245	41.8	16.1	57.9

Under the base timber harvest forecast, the harvest level would remain constant at 2 393 180 cubic metres for the first two decades. This level of harvest would support approximately 1 675 PYs of direct forestry employment within the TSA and create $51.2 million ($1994) in after-tax direct employment income. This direct forestry activity would also support indirect and induced employment and employment income within the TSA. Indirect/induced employment is estimated to be 1 075 PYs. This employment generates a further $19.7 million ($1994) in after-tax employment income. Total employment is estimated at 2 750 PYs; total employment income at $70.9 million ($1994).

The base timber harvest forecast projects a decline in the harvest between decade three and decade five to a long-term harvest level of 1 958 000 cubic metres. Over this thirty year period, direct TSA forest sector employment and employment income would decline by approximately 305 PY's

47 Includes harvesting, log hauling, road building, processing, silviculture, and administrative employment. Based on information obtained from individual licensees and area contractors. See Appendix B.

48 Based on regional employment multipliers and an average after-tax wage rate provided by G. Horne and C. Powell, Ministry of Finance and Corporate Relations, *The Forest District Tables*, March 1995. See Appendix D.

49 Direct income is based on payroll information from the licensees, contractors and from Statistics Canada's 1991 Census. See Appendix B.

and $9.4 million ($1994), to 1 370 PY's and $41.8 million ($1994). Total employment (direct, and indirect/induced) associated with the long term harvest level would be 2 245 PY's; a decrease of 505 PY's from the current level. Employment income at this harvest level would $57.9 million ($1994); a decrease of $13.0 million.

5.3 Provincial Impacts

5.3.1 Employment and Employment Income

At the provincial level, direct employment associated with the Kamloops TSA includes local residents as well as workers who reside outside the region. Most non-TSA employment occurs at processing facilities located in the 100 Mile House and Okanagan TSAs. Some processing employment also accrues to employees located on the Lower Mainland. In addition, the Kamloops TSA supports harvesting employment among workers who reside outside the TSA, again mostly from the surrounding 100 Mile House and Okanagan TSAs. The remaining non-TSA employment occurs as part of silviculture and administration activities. Table 5-2 illustrates the provincial employment and employment income associated with the base timber harvest forecast.

Table 5-2

Provincial Employment and Employment Income: Base Timber Harvest Forecast

Decade	Harvest (m3)	Employment (PY's/year)			Emp. Income ($1994 millions/yr)		
		Direct[50]	Indirect/ Induced[51]	Total	Direct[52]	Indirect/ Induced[51]	Total
Current Harvest	2 393 180	2 180	3 270	5 450	66.8	69.8	136.6
1	2 393 180	2 180	3 270	5 450	66.8	69.8	136.6
2	2 393 180	2 180	3 270	5 450	66.8	69.8	136.6
3	2 177 794	1 980	2 980	4 960	60.8	63.7	124.5
4	1 981 792	1 805	2 705	4 510	55.4	57.9	113.3
5	1 958 000	1 780	2 675	4 455	54.7	57.1	111.8

Total direct provincial employment (including TSA residents) associated with the current harvest level is approximately 2 180 PYs. The after-tax employment income associated with this labour force is approximately $66.8 million ($1994) annually. This direct forestry employment supports

50 Includes harvesting, log hauling, road building, processing, silviculture, and administrative employment. Based on information obtained from individual licensees and area contractors. See Appendix B.

51 Based on a provincial forest industry employment multiplier of 2.5. Source: Economics and Trade Branch, Ministry of Forests. See Appendix D.

52 Direct income is based on payroll information from the licensees, contractors and from Statistics Canada's 1991 Census. See Appendix B.

additional indirect and induced employment of approximately 3 270 PYs throughout the province. Total provincial employment (direct and indirect/induced) is 5 450 PYs; associated after-tax employment income is $136.6 million ($1994) annually.

5.3.2 Government Revenues

Government revenues stemming from forestry operations associated with the Kamloops TSA are comprised of provincial stumpage and rent, provincial personal income tax and other taxes (i.e. property, corporate, logging and electricity) and fees (i.e. scaling and residue), and federal personal income tax and other taxes (i.e. corporate, sales and excise).

Provincial and federal government revenues associated with the current harvest and the base timber harvest forecast are summarized in Table 5-3. The revenue estimates are based on historical rates adjusted for inflation (see Appendix C). However, due to the significant increase in stumpage rates in 1994 over previous years as a result of high lumber prices and the introduction of the Forest Renewal Plan, provincial stumpage estimates are based only on the 1994 Kamloops TSA billed volumes.

Provincial Forestry Revenue Impacts

Forestry operations associated with the current harvest level of 2 393 180 cubic metres generates, in total, approximately $82.5 million ($1994) in provincial revenues. Stumpage revenues account for $49.6 million, provincial income tax $18.4 million, and other taxes and fees account for a further $14.5 million.

Provincial forestry revenues generated by the Kamloops TSA would decline commensurately with reductions to the harvest. In decade 3, total provincial revenues would fall $7.4 million to $75.1 million ($1994). Between decades 4 and 5, they would fall an additional $7.6 million to $67.5 million ($1994).

Federal Forestry Revenue Impacts

Federal government revenues generated by the current harvest level amount to $38.2 million ($1994). Federal personal income taxes account for $36.0 million of this total, while other taxes account for the remaining $2.2 million ($1994).

Similar to the provincial forestry revenues, federal revenues begin declining in decade 3 and level off in decade 5 once the long term harvest level is attained. Over the thirty year period, decade 3 to decade 5, total federal revenues would have declined $6.9 million, to $31.3 million ($1994).

Table 5-3

Provincial and Federal Government Revenues: Base Timber Harvest Forecast

(millions $1994/year)

Decade	Harvest Level (cubic metres)	Provincial Government Revenues				Federal Government Revenues		
		Stumpage and Rent	Personal Income Tax	Other Taxes	Total	Personal Income Tax	Other Taxes	Total
Current	2 393 180	49.6	18.4	14.5	82.5	36.0	2.2	38.2
1	2 393 180	49.6	18.4	14.5	82.5	36.0	2.2	38.2
2	2 393 180	49.6	18.4	14.5	82.5	36.0	2.2	38.2
3	2 177 794	45.2	16.7	13.2	75.1	32.8	2.0	34.8
4	1 981 792	41.1	15.2	12.0	68.3	29.8	1.8	31.6
5	1 958 000	40.6	15.0	11.9	67.5	29.5	1.8	31.3

6.0 Social and Environmental Implications

This section presents the possible effects of the base timber harvest forecast on the communities, First Nations, and environment in the Kamloops TSA.

6.1 Community Implications

This socio-economic analysis assumes that impacts are related to the rate of harvest. The base timber harvest forecast maintains harvest levels for the first twenty years. As such, associated forestry employment and related indirect/induced employment would not change over this period, i.e. employment levels would remain at their current levels.

Between decades three and five the timber harvest declines by 435 180 cubic metres. It is during this period that employment levels would be affected and community adjustments would occur. Initially, reductions to TSA timber supplies may be replaced, at least in part, by supplies of timber from outside of the TSA. However, the longer term prognosis is for increasing pressure on all timber supplies from provincial forests and an overall reduction in milling.

While impact estimates should generally hold at the broad TSA level, the distribution of these impacts among licensees and communities with the Kamloops region could vary considerably. In particular, it is difficult to determine what the impact may be on a particular processing facility. Issues pertaining to "threshold" timber volumes required to maintain a mill's viability have not been explored. The overall harvest reduction could result in shift reductions or a mill closing completely.

It should also be noted that Kamloops TSA fibre dependency among the major processing facilities varies considerably. In 1993, the larger processing facilities in the North Thompson area depended on the Kamloops TSA for approximately 77% of their required processing fibre.[53] In the Kamloops area, International Forest Products sawmill, Weyerhaeuser Canada sawmill, and Tolko Forest Products Veneer and Plywood Plant depended on the TSA for approximately 62% of their fibre requirements.[54] The Weyerhaeuser pulp mill also received a significant portion (approximately 50% in 1993) of its fibre in the form of wood chips from the Kamloops TSA processing facilities.

The following communities appear to be more vulnerable than the average to any forestry downturn: Kamloops area (Savona); North Thompson area communities, (i.e. Louis Creek, Barriere, Clearwater, Vavenby and Avola). While it is difficult to predict the economic base of these communities twenty years into the future, it is important to note that the forest industry has played an important part in the growth and prosperity of these communities and changes in the future would lead to reductions in the forestry labour force. Moreover, these communities are all

53 The major processing facilities in the North Thompson include sawmills at; Slocan Forest Product's Vavenby operation, Weyerhaeuser Canada's Vavenby Division, Gilbert Smith Forest Product's Barriere facilitiy, and Tolko Forest Product's Louis Creek operation.

54 The fibre from the Tree Farm Licence 18 and 35 are not part of the Kamloops TSA but does contribute to the timber harvest from Crown lands in the Clearwater and Kamloops Forest Districts.

relatively small, and have few alternative development options than larger population centres such as Kamloops.

6.2 First Nations Implications

First Nations communities in the Kamloops TSA have many diverse concerns and issues associated with forestry activity.

The policy of the Secwepemc Nation Tribal Council is that British Columbia should avoid alienation or potential degradation of natural resources in Secwepemc Nation territory. Secwepemc people do not feel comfortable with the level of forest harvesting in the TSA and the detrimental impacts to the environment which have occurred in the past. The independent Little Shuswap Band is concerned about preservation of traditional lands and cultural sites, as well as distribution and access to timber for First Nations.

6.3 Environmental Implications

A number of factors make it difficult to discuss the effects of the base timber harvest forecast on the TSA's evironmental values. In particular, the Timber Supply Review focus is on aggregate changes in harvesting levels as opposed to watershed specific changes. In addition, there is a general lack of information about current wildlife populations, and ecosystem processes and relationships.

The potential cumulative effect of current forest management practices on forest and aquatic ecosystems is an issue of particular concern to scientists and resource managers. Unfortunately, neither the time frames over which environmental effects may occur, nor the threshold levels at which profound ecosystem changes take place are at present well understood.

There are a number of on-going processes outside of the Timber Supply Review attempting to address long-term habitat requirements for some wildlife and fish species (LRMPs), and improve timber harvesting practices (Forest Practices Code).

Crown land in the Kamloops TSA is part of the recently completed Kamloops Land and Resource Management Plan (LRMP). This plan has designated 30% of the land base for resource management zones where special management practices are required including: 14% for wildlife habitat areas, 6% for community watersheds, 5% for recreation and tourism areas, 4% for protected areas, and 1% for settlement lands. In total, over 98 000 hectares of land, or an additional 4.0% of the land base in the TSA will be protected.[55]

Although not considered within the *Kamloops TSA Timber Supply Analysis*, all future harvesting in the Kamloops TSA will follow the Forest Practices Code of British Columbia. The Code contains mandatory and enforceable standards for forest practices based on basic principles of

55 Kamloops Land and Resource Management Planning Team (1995), *Kamloops Land and Resource Management Plan: Volume One.*

ecosystem protection. These standards will limit cutblock size, and provide added protection to community watersheds. The Code standards will set out detailed requirements for forest practices, including operational planning, soil conservation, recreation, range management, silviculture, road and bridge construction and timber harvesting. Provisions for riparian management areas and wildlife habitat areas will contribute to the maintenance of biodiversity, water quality and sustainable forestry practices.

Another major development in terms of enhancing environmental protection is *British Columbia's Forest Renewal Plan.* It is designed to help restore and protect the health of forest ecosystems by requiring the clean-up of environmental damage and conducting research into environmentally-sound forest practices. This plan will encompass many activities, such as stabilizing and replanting of unstable slopes, and repairing or removing logging roads currently not in use.[56]

6.3.1 Narrowing of the Forest Age Class Distribution

Natural forest stands are especially complex in early, and late (old growth) stages of succession -- in contrast with the simpler structure and composition of stands managed intensively for wood fibre production. In general, current forest management practices tend to eliminate or reduce the duration of these complex early and late seral forest stages, possibly eliminating ecological processes and species that are dependent upon them. As a result, forest ecologists suggest that biodiversity is best maintained by forest management practices that create forests resembling natural stand and landscape patterns, i.e. contain a broad mix of tree ages.

Under the base timber harvest forecast, most of the remaining net operable mature forests in the Kamloops TSA would be converted to immature forests within the next 250 years. Once converted, the majority of these forests will not redevelop to an old growth stage as they will be harvested again, before this occurs.[57] From a wildlife standpoint, the conversion of mature forests to immature forests may cause changes in species distribution and population levels[58]. Wildlife that use a wide range of habitat types and/or immature forests may increase in numbers. On the other hand, species that depend on mature forests, such as caribou and grizzly bears, could decline in numbers. In particular, the Kamloops TSA is recognized as having many important habitat areas for caribou. However, it should be noted that requirements for large ungulates, such as caribou are addressed under local resource and/or development plans.

6.3.2 Other Issues

In addition, several other environmental issues have been identified, including road impacts, water quality and habitat alterations.

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56 Province of British Columbia (1994), *British Columbia's Forest Renewal Plan.*

57 The minimum harvestable age for forest stands in the TSA is between 80 and 100 years depending on species and growing site. Based on current and proposed forest management habitat objectives, some areas of second growth will be allowed to develop back into old growth forest stands.

58 Source: S. MacDonal, Ministry of Environment, Kamloops.

Logging activity has contributed to the extensive network of roads in the TSA. These roads have become a concern because of the environmental impacts they can cause (especially sedimentation), and the access they provide. Roads often must traverse sensitive riparian habitat and may result in problems associated with siltation and debris blockages. Moreover, roads themselves are responsible for the convertion of significant areas of forest habitat. It is anticipated that future road construction will effect approximately 60 500 hectares of forested land within the Kamloops TSA.[59] In addition, roads often open an area, thereby exposing wildlife to additional hunting pressures and recreational traffic.

Riparian habitat within the TSA is rich in biodiversity. In particular, these areas support numerous plant and animal species whose habitat ranges are restricted by their requirement for moisture and cool temperatures. Timber harvesting in these areas may negatively impact many of these sensitive species. The Kamloops Timber Supply Analysis included a net down of approximately 10 500 hectares in arriving at the TSA's timber harvesting land base. Riparian guidelines under the Forest Practices Code are intended to address many of the issues pertaining to the maintenance of riparian habitat on the remainder of the timber harvesting land base. However, there are concerns that the Code may not adequately deal with riparian values for species other than fish, i.e. no reserve buffer is required on small streams that do not have fish present[60].

59 Ministry of Forests (1995), *Kamloops TSA Timber Supply Analysis Report.*
60 Source: S. MacDonald, Ministry of Environment, Kamloops.

7.0 Summary and Conclusions

Forestry is a significant part of the Kamloops/North Thompson economy. Within the Kamloops TSA, the current harvest level supports approximately 2 750 direct and indirect/induced full-time jobs and generates approximately $70.9 million in net employment income. The Kamloops TSA represents 4.4% of the provincial AAC, supports an estimated 5 450 full-time jobs province wide, and generates approximately $136.6 million annually in employment income (these figures include TSA-level employment) and $82.5 million in provincial government revenues.

This report has examined the potential socio-economic and environmental implications associated with the base timber harvest forecast in the Kamloops TSA Timber Supply Analysis report. The base timber harvest forecast indicates that the current harvest level of 2 393 180 cubic metres can be maintained for the next two decades, after which it will decline by 9% per decade until decade five, when the long-term harvest level of 1 958 000 cubic metres is reached. The economic, social and environmental implications associated with this harvest forecast are summarized in Table 7-1.

Economic Impacts

This analysis assumes that economic impacts would follow the trend in harvest level changes. Over the 30 year period from decades 3 to 5, total employment and employment income within the Kamloops TSA would decline to 2 245 PY's and $57.9 million - a decrease of 505 PY's and $13.0 million, respectively. On a provincial level, the forecasted harvest level reduction of 435 180 cubic meters would reduce total employment by 995 PY's, to 4 455 PY's, and employment income by $24.8 million, to $111.8 million. Government revenues would also decline, with provincial government revenues falling by $15.0 million, to $67.5 million.

Community Implications

Under the base timber harvest forecast, community impacts do not begin until 20 years into the future. Future impacts on specific communities and licensees, however, are difficult to determine. Currently, the major processing facilities in the area are highly dependent on TSA fibre, and will likely remain so. Future reductions will likely have the greatest impact in communities where these processing facilities are located.

First Nations Implications

First Nations communities in the Kamloops TSA have many diverse concerns and issues associated with forestry activity. The policy of the Secwepemc Nation Tribal Council is that British Columbia should avoid alienation or potential degradation of natural resources in Secwepemc Nation territory. Secwepemc people do not feel comfortable with the level of forest harvesting in the TSA and the detrimental impacts to the environment which have occurred in the past. The independent Little Shuswap Band is concerned about preservation of traditional lands and cultural sites, as well as distribution and access to timber for First Nations.

Environmental Implications

The main environmental implication of the base timber harvest forecast is the narrowing of the forest age class distribution. Over the next 250 years the distribution of stand ages is forecast to become gradually more even, resulting in approximately equal areas at ages up to about 120 years. Populations of species that depend on mature forests may decline. In addition, several other environmental issues have been identified, including road impacts, water quality and habitat alterations.

Table 7-1
Summary of Employment, Income and Government Revenue Impacts: Base Timber Harvest Forecast

ECONOMIC IMPLICATIONS	Decade One and Two		Decade Three		Decade Four		Decade Five	
	TSA	**Provincial**	**TSA**	**Provincial**	**TSA**	**Provincial**	**TSA**	**Provincial**
Employment and Employment Income								
Harvest Level (m^3)		2 393 180		2 177 794		1 981 792		1 958 000
Direct Employment (PYs/year)	1 675	2 180	1 525	1 980	1 390	1 805	1 370	1 780
Total Employment (PYs/year)	2 750	5 450	2 500	4 960	2 275	4 510	2 245	4 455
Direct After-Tax Income ($1994 million/year)	51.2	66.8	46.4	60.8	42.4	55.4	41.8	54.7
Total After-Tax Income ($1994 million/year)	70.9	136.6	64.5	124.5	58.7	113.3	57.9	111.8
Government Revenues ($1994 million/year)								
Total Provincial Revenues	82.5		75.1		68.3		67.5	
Total Federal Revenues	38.2		34.8		31.6		31.3	

SOCIAL AND ENVIRONMENTAL IMPLICATIONS

- Community impacts do not occur until twenty years into the future. Currently, the major processing facilities in the area are highly dependent on TSA fibre, and will likely remain so. Future harvest level reductions will likely have the greatest impact in those communities where these processing facilities are located.
- First Nations communities in the Kamloops TSA have many diverse concerns and issues associated with forestry activity. The policy of the Secwepemc Nation Tribal Council is that British Columbia should avoid alienation or potential degradation of natural resources in Secwepemc Nation territory. Secwepemc people do not feel comfortable with the level of forest harvesting in the TSA and the detrimental impacts to the environment which have occurred in the past. The independent Little Shuswap Band is concerned about preservation of traditional lands and cultural sites, as well as distribution and access to timber for First Nations.
- The main environmental implication of the base timber harvest forecast is the narrowing the forest age class distribution. Over time the next 250 years the distribution of stand ages is forecast to become gradually more even, resulting in approximately equal areas at ages up to about 120 years. Populations of species that depend on mature forests may decline. In addition, several other environmental issues have been identified, including road impacts, water quality and habitat alterations.

Appendix A

Glossary of Terms

Allowable Annual Cut (AAC)	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.
Basic Income	Basic income is assumed to flow into the community from the outside world, usually in response to exported goods and services produced in the community.
Basic Sector	This is the category through which outside income flows into a community. In B.C. the local economy can be divided into 12 basic sectors: forestry, mining, fishing and trapping, agriculture, tourism, public sector, other basic industries, unemployment insurance, pension, investment income, transfer payments, and social assistance.
Biodiversity	The diversity of plants, animals and other living organisms and their habitats measured by factors such as genetic variability, number of species, and variation in species composition.
Biogeoclimatic Zones	Areas which are defined by similar biological, physical and atmospheric characteristics.
Corm	Underground swollen stem base of some plants.
Cut-block Adjacency	Integrated management guidelines that restrict harvesting in areas adjacent to a cut block until that cut block has satisfied certain regeneration requirements (i.e., green-up requirements).
Direct Income and Employment	Income and employment associated with the forestry sector (i.e., harvesting, transportation, silviculture, and processing) arising from timber harvesting.
Ecosystem	Any complex of living organisms together with all the other biotic and abiotic (non-living) factors which affect them.
Environmentally Sensitive Area	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.
Ecoprovince	An area characterized by very broad ecological interactions between the four major environmental components of the ecosystem: air, water, land and biota (animal and plant life).
Green-up Period	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.
Indirect/Induced Employment and Income	Spin-off effects associated with related sectors or industries which supply materials or equipment to the forestry sector, arising from changes in the timber harvest. The induced sector includes consumer spending of forestry-related employment and employment income.

Integrated Resource Guidelines	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.
Land and Resource Management Planning (LRMP)	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.
Log grades 3, 4, 5, and 6	Log Grade 3 refers to dead saw logs from catastrophic causes (more than 50% sound); Grade 4 refers to alive but not suitable to mill into timber; Grade 5 refers to dead and not suitable to mill into lumber; Grade 6 refers to undersized.
Long-term Harvest	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.
Multiplier	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.
Person-year (PY)	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.
Protected Area	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.
Recreational User Day (RUD)	Recreational User Day is all or part of a calendar day spent participating in any form of recreation.
Riparian Zone	The stream bank and flood plain adjacent to streams or water bodies, with particular reference to the vegetation.
Seral Species	Seral species refers to organisms which are part of a biotic community which is in a development or transitory stage in an ecological succession.
Timber Supply Area (TSA)	An integrated resource management unit established in accordance with Section 6 of the Forest Act.
Visual Quality Objective (VQO)	Defines a level of acceptable landscape alteration resulting from harvesting and other activities. Several visual quality classes have been created based on the maximum amount of alteration permitted.
Watershed	An area drained by a particular stream or river. A large watershed may contain several smaller watersheds.
Wind Throw	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 the Kamloops TSA's AAC rely primarily on information collected from the licensees, forest contractors, forest unions, and the Ministry of Forests. This information is used to derive employment coefficients for the Kamloops TSA and is summarized in Table B-1. Average employment income is collected from the same sources and is summarized in Table B-2.

In this report employment figures are expressed in person-years (PYs) equivalents (1 800 hours per year) and employment income estimates represent after-tax income in $1994. Personal income tax paid by forestry employees is reported separately under government revenues (See Appendix C).

This analysis assumes that: (a) all licensees, SBFEP, and woodlot operators will continue to operate in a manner similar to 1993, (b) the proportion of TSA resident employees compared to non-TSA resident employees will remain constant, and, (c) that employment requirements remain constant. Therefore, changes in the AAC results in proportional changes in harvesting employment and employment income.

Employment

Employment coefficients are calculated based on information collected from licensees and contractors. Employment coefficients represent the PY's of employment required to harvest and process 1 000 cubic metres of timber. Coefficients were derived for harvesting, silviculture, processing and administration. Multiplying the coefficients by each forecast harvest level provides a projection of the number of workers that would be employed in the forest industry at selected intervals of the forecast period.

Table B-1

Estimated Direct Forestry Employment Coefficients (PY's per 1000 m3), 1993 harvest

Activity	TSA Employment Coefficient	Provincial Employment Coefficient
Harvesting		
Site Employment	0.14	0.17
Log Hauling	0.04	0.05
Road Building	0.02	0.02
Processing		
Saw mill	0.33	0.43
Pulp mill	0.10	0.12
Silviculture	0.05	0.06
Administration	0.02	0.06
Total	0.70	0.91

Employment Income

The forest industry is characterized by a wide range of employment income arrangements. For example, some contractors pay their employees by the tonne of timber harvested, and log haulers often earn a percentage of the truck's earnings. As a result, employment income varies within each forestry category. The employment income estimates presented in Table B-2 are felt to reflect "typical" incomes associated with the Kamloops TSA forest industry.

Gross employment income (employment income and employment benefits) has been supplied by: Ainsworth Lumber Co. Ltd.; Bell Pole Co. Ltd.; Gilbert Smith Forest Products Ltd.; International Forest Products Limited; Riverside Forest Products Limited; Slocan Forest Products Ltd.; Tolko Industries Ltd.; Weyerhaeuser Canada; and independent forest contractors. After tax wage rates have been calculated based on 1994 Revenue Canada tax tables, under the assumption that all forest workers fall within claim code 1 which allows for deductions up to $6 456.

Table B-2

Average Forestry Employment Income ($1994)

Activity	Gross Income (including benefits)	Gross Income (excluding benefits)	After-tax Income
Harvesting			
Site Employment	50 475	38 545	29 300
Log Hauling	53 700	42 675	31 775
Road Building	53 700	42 675	31 775
Processing			
Saw mill	53 350	37 400	28 565
Pulp mill	63 900	51 650	37 200
Silviculture	49 650	37 900	28 800
Administration	60 825	41 900	37 400

Harvesting

Site Employment

Information on timber volumes harvested, required crews, and residences of crews has been obtained directly from the major licensees, indenpendent contractors, independent processing facililities, and the Ministry of Forests. Employment associated with harvesting vary greatly depending on the method of logging, size of the harvest site, volume of timber on site, and experience of crew. The provincial average harvesting coefficient (i.e., residents employed inside and outside the TSA by the harvest) for the Kamloops TSA is 0.17 PYs per 1 000 cubic metres.

The average TSA gross employment income (i.e., wages and benefits) is $50 475 ($1994) per PY. The after-tax employment income associated with harvesting is $29 300 per PY ($1994).

Log Hauling

Log hauling is similar to harvesting operations in that all work is performed by independent contractors. Several of the contractors in the TSA, operate both logging trucks and harvesting equipment. The employment coefficient for log hauling varies depending on the distance that the timber must be transported and the tonnage the truck can carry. Some harvest sites are only a few kilometres from the mill, while in other instances the timber may come from over a hundred kilometres away to the mill. The provincial employment coefficient (i.e., residents employed inside and outside the TSA by the harvest) for log hauling is estimated to be 0.05 PYs per 1 000 cubic metres.

The average gross employment income is $53 700 ($1994) per PY. The after-tax employment income associated with log hauling is $31 775 per PY ($1994).

Road Building

Information on road building activities, crew size, and residences of crews has been obtained from the major licensees. The average employment derived for these major licensees has been applied to volumes associated with the SBFEP harvests. The average provincial road building coefficient in the TSA is 0.02 PYs per 1 000 cubic metre.

Gross road building employment income is estimated to be $53 700 per PY ($1994). After-tax employment income associated with road building is $31 775 ($1994).

Processing

Sawmill

Information has been obtained directly from the major licensees and the independent processing facilities in the Kamloops TSA. The licensees provided information on: total volumes processed at specific company mills in 1993; total labour force wages by mill (including hourly and salaried staff); and the TSA volumes processed at each mill in 1993. Processing coefficients derived from this information are then applied to the harvest levels to determine employment associated with the TSA.

The Kamloops TSA harvest provides fibre to several processing facilities inside and outside the TSA. Inside the TSA the major licensees operations include: Ainsworth Lumber Co. Ltd. Savana plywood mill; International Forest Products Ltd. Adams Lake sawmill; Tolko Industries Ltd. Louis Creek sawmill and Heffley Creek Veneer and Plywood operations; Gilbert Smith Forest Products Ltd. Barriere cedar mill; Slocan Forest Products Ltd. Vavenby sawmill; Weyerhaeuser Canada Ltd. Vavenby and Kamloops sawmills. As well as the processing facilities of the major licensees there is an additional fourteen smaller processing facilitates.

Outside the TSA the major licensees operate mills which receive some amount of their fibre from the Kamloops TSA. The non-TSA facilities that benefit from the TSA harvest include: Ainsworth Lumber Co.

Ltd. Chasm sawmill in Clinton, Exeter sawmill in 100 Mile House, Veneer plant in Lillooet, and Troika Fingerjoint plant in Abbotsford; Bell Pole Co. Ltd. in Lumby and Revelstoke pole processing facilities; and Riverside Forest Products Ltd. Armstrong sawmill.

The sawmill employment coefficient for the Kamloops TSA is 0.43 PYs per 1 000 cubic metres with 0.33 PYs per 1 000 cubic metres associated with sawmill processing inside the TSA.

The gross employment income (wages and benefits) for sawmill employees is $53 350 ($1994). The associated after-tax employment income for this group is $28 565 ($1994).

Pulp mill

The pulp mill employment and employment income in the Kamloops TSA is mostly associated with the Weyerhaeuser pulp mill in Kamloops. Wood chips not processed by Weyerhaeuser in Kamloops are transported to the Lower Mainland where they are either shipped out of the province, or processed at Lower Mainland facilities. The TSA pulp mill processing coefficient is 0.10 PYs per 1 000 cubic metres while the provincial processing coefficient is approximately 0.12 PYs per 1 000 cubic metres.

The gross employment income for pulp mill employees is $63 900 ($1994) with an associated after-tax employment income of $37 200 ($1994).

Silviculture

Information on silviculture spending has been obtained from the Kamloops 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.

The provincial silviculture employment coefficient derived from the Kamloops TSA is approximately 0.06 PYs per 1 000 cubic metres while the TSA silviculture employment coefficient is 0.05 PYs per 1 000 cubic metres. Gross silviculture employment income is $49 650 per PY ($1994) with holiday pay rates of approximately 4% contributing to the after-tax employment income level of $28 800 ($1994) per PY.

Administration

Administration employment includes management and support staff located at regional and head offices. This information has been obtained from the major licensees in the Kamloops TSA. The administration labour force is pro-rated over companies' entire harvest levels in order to develop an employment coefficient. The provincial employment coefficient for this category is 0.06 PYs per 1 000 cubic metres of which 0.02 PYs per 1 000 cubic metres is employment inside the TSA.

Wages for administrative staff vary widely with incomes ranging from senior management to administrative clerks. The average gross employment income is $60 825 ($1994) per PY with associated after-tax employment income of $37 400 ($1994).

Ministry of Forests

Administration of the Kamloops TSA supports government employment at the Clearwater and Kamloops Forest District offices, as well as the Kamloops Forest Region office. An employment coefficient has not been derived for the Ministry of Forests positions which are assumed to be unaffected by direct change in the timber harvest. For example, in 1984 the provincial harvest was 74.55 million cubic metres while the Ministry of Forests directly employed 3 692 persons. In 1992, the harvest was 74.00 million cubic metres and the Ministry of Forests employment had climbed to 4 248 persons. As a result, government employment is considered to be less dependent on the size of the harvest and more associated with budgetary issues and the immediate priorities and responsibilities of the Ministry than on the level of harvest.

Wood Grades 3,4, 5, and 6

The Kamloops TSA harvest profile includes several wood grades which are not considered part of the AAC. These wood grades include: grade 3, dead sawlogs from catastrophic causes; grade 5, dead and not suitable to mill into lumber; grade 6, undersized; grade 4, alive but not suitable to mill into lumber. These wood grades represent an additional 70 000 cubic meters of timber over and above the AAC.

Appendix C

Government Forestry Revenues Estimates

Government revenues are divided into two categories, (1) provincial, and (2) federal, and are comprised of stumpage, rent, personal income tax, scaling fees, residue and waste charges, and other taxes (e.g. corporate). Table C-1 provides a summary of current government revenues and their associated rates per 1 000 cubic metres.

Stumpage and Rent

Stumpage information for Kamloops TSA has been provided by the Valuation Branch of the Ministry of Forests. Due to the number of changes in the provincial stumpage rates in the past year, estimated stumpage payments are based on the 1994 Kamloops TSA billed volumes. Rent estimates are based on information from the Economics and Trade Branch of the Ministry of Forests,[1] based upon a five year average (1987/88 to 1991/92 inclusive).

Personal Income Tax

Provincial and federal income taxes were estimated using 1994 Revenue Canada tax tables. A total income tax bill was determined for the direct, indirect and induced activity and was prorated (33% provincial, and 67% federal) to estimate federal and provincial portions. The total direct, indirect and induced personal income tax per 1000 cubic metres is $22 735. Total provincial income tax per 1000 cubic metres is $7 675; total federal income tax is $15 060.

Scaling Fees, Residue and Waste Charges

The revenue derived from scaling, residue and waste charges are from the Ministry of Forests, Valuation Branch. These fees are based on the actual revenues derived from the Kamloops TSA for 1991 and 1992 and is averaged over the billed volumes in those years to obtain an average rate.

Other Taxes

Other provincial taxes include property, corporate, logging, sales, and electricity taxes. Total other provincial taxes averaged $5 945 per 1000 cubic metres over the period 1989 to 1993. Other federal taxes include corporate, sales, excise and withholding taxes and averaged $915 per 1000 cubic metres over the same period. These estimates are based on information from the Economics and Trade Branch of the Ministry of Forests.

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1 Ministry of Forests, Economics and Trade Branch (1994), *Economic Impacts of Timber Harvesting in British Columbia.*

Table C-1

Kamloops TSA Government Forestry Revenues

Revenue Type	Revenues per 1 000 m3 of timber harvested (in dollars)
Provincial Government Revenues	
Stumpage	20 460
Rent	285
Personal Income Tax	7 675
Residue and Waste charges	110
Other Provincial Taxes (Logging, Sales, Electricity)	5 945
Total Provincial Government Revenues	34 475
Federal Government Revenues	
Personal Income Tax	15 060
Other Federal Taxes (Corporate, Sales, Excise)	915
Total Federal Government Revenues	15 975
Total Government Revenues	$ 50 450

Appendix D

Multipliers

Economic sectors are interrelated and changes in one sector cause ripple effects throughout other sectors of the economy. In this report, multipliers are used to estimate employment and employment income effects resulting from changes in the harvest level in the Kamloops TSA.

When timber harvest levels change, there are *direct* employment and income impacts as jobs in the forest sector are either lost or gained. *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. They result from the re-spending of employment income by direct and indirect forest sector workers. Multipliers are used in this report to estimate the indirect and induced employment and income impacts of various timber harvest levels at both the region (Kamloops TSA), and province levels.

Regional Multiplier

The Ministry of Finance and Corporate Relations has derived regional employment multipliers by forest district.[2] The methodology underlying these multipliers is referred to as the economic base method. It is predicated on the assumption that the regional, or forest district economy is divisible into a basic, or export, sector and a non-basic, or service sector. The basic sector is assumed to be the driver of the local economy. Thus, economic expansion is the result of growth in the basic sector, i.e., growth in the production of goods and services that will flow out of the region. All activity producing and providing inputs to the production process is included in the basic sector. The non-basic sector captures all the activity involved with the sale of goods and services for final consumer demand, thus the induced effects. The relationship between the basic and non-basic sectors is assumed to be linear, i.e. the non-basic sector will change by a constant proportion to a change in the basic sector.

The multiplier used in this report is for the Kamloops forest district, and assumes migration, i.e. non safety net. This multiplier will overstate first year employment losses that result from a decrease in the timber harvest level. Unemployment insurance benefits would serve as a mitigating factor during this first year. However, as these benefits run out, employment losses would likely reflect those indentified by this multiplier.

Table D-1 presents the employment multipliers provided for the Kamloops TSA under both sets of assumptions, i.e. migration and no-migration. The multipliers indicate that for every one direct forestry job there is an associated indirect/induced job. For example, the pulp and paper multiplier with migration of 2.01 suggests that for every one direct pulp and paper job there would be an associated 1.01 indirect/induced jobs.

2 G. Horne and C. Powell, Ministry of Finance and Corporate Relations (1995), *The Forest District Tables.*

Table D-1
Regional Employment Multipliers
(Kamloops TSA)

	Logging and Forestry	Pulp and Paper	Other Wood Manufacturing
Migration	1.77	2.01	1.60
No-migration	1.44	1.62	1.32

The logging and forestry multipliers are premised on the assumption that direct harvesting jobs do not include jobs associated with log hauling (trucking), or road construction. In the case of the Kamloops TSA, a survey was conducted that identified the employment associated with these activities. Because the majority of these transport and construction contractors are dependent on timber harvesting their employment has been included as part of the direct harvesting PY coefficient. As such, the logging and forestry multiplier has been adjusted downward to 1.49 for the purposes of calculating indirect and induced harvesting impacts.

Incomes associated with regional indirect and induced employment impacts were calculated using an average after-tax wage rate of $18 485.[3]

Provincial Multiplier

Determining indirect and induced impacts at the provincial level involves the application of a provincial employment multiplier of 2.5, which implies that each direct job in the forest sector is associated with 1.5 indirect and induced jobs. This multiplier is used by the Ministry of Forests and is based on a review of studies outlining the impacts of the forest sector on the B.C. economy.

Incomes associated with provincial indirect and induced employment impacts were calculated using an average after-tax wage rate of $22 280.[4]

3 Based on average non-basic after tax wage rates provided by Horne and Powell in *The Forest District Tables*, March 1995. This wage rate (1991) was then scaled up to $1994 using the CPI.

4 Based on current income for the indirect and induced sectors from Statistics Canada. The average before tax wage rate is $27 700. The provincial rate is applied only to the indirect/induced PY's over and above the regional PY's. Income associated with the regional PY's is calculated using the regional average after-tax wage rate of $18 485.

Appendix E

List of Contacts

G.E. Bridges and Associates Inc., as part of the Kamloops LRMP process, held formal and informal discussions with upwards of 200 individuals representing communities, industry sectors, government and special interest groups within the Kamloops TSA. Their input has been incorporated into this report. In addition, the people listed below were specifically consulted about the Timber Supply Review.

Ministry of Forests	
D. Coffey	Economist, Economics and Trade Branch
A. Coyne	Economist, Economics and Trade Branch
L. Malkinson	Research Assistant, Kamloops Forest District
M. Mullins	Economist, Economics and Trade Branch
D. Peterson	Timber Supply Analysis, Kamloops Forest Region
G. Reay	Resource Officer, Kamloops Forest District
F. Seymour	Aboriginal Forestry Advisor, Kamloops Forest District
G. Townsend	Manager, Economics and Trade Branch
W. Wai	Economist, Economics and Trade Branch
Forest Companies	
M. Hopkins	Ainsworth Lumber Co. Ltd.
D. McCurdy	Ainsworth Lumber Co. Ltd.
N. Wilcox	Ainsworth Lumber Co. Ltd.
K. Roche	Gilbert Smith Forest Products Ltd.
L. McNeilly	International Forest Products Ltd.
B. Carlson	Riverside Forest Products Ltd.
R. Sommers	Tolko Industries Ltd.
C. Milne	Slocan Forest Products Ltd.
B. Helfrich	Weyerhaeuser Canada Ltd.

First Nations Representatives	
S. Adamson	Forestry Advisor, Little Shuswap Band
A. Casimir	Range Manager, Kamloops Band
M. Peters	Councillor, Skeetchestn Band
T. Porter	Chief, Bonaparte Band
P. MacKasey	Forest Lands Director, Shuswap Nation Tribal Council
R. Matthew	Councillor, North Thompson Band
D. Morgan	Councillor, Bonaparte Band
J. Thomas	Councillor, Kamloops Band
Other Provincial and Federal Government Representatives	
P. Bluemel	B.C. Statistics, Victoria
K. Kirby	B.C. Statistics, Victoria
E. Panzenboeck	B.C. Statistics, Victoria
S. MacDonald	Ministry of Environment, Lands and Parks
C. Randall	Indian and Northern Affairs Canada
D. Schrier	B.C. Statistics, Victoria