

**Merritt Timber Supply Area
Socio-Economic Analysis**

January, 1995

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

Researched by:

Robinson Consulting & Associates Ltd.



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EXECUTIVE SUMMARY

The British Columbia Forest Service is presently conducting a provincial timber supply review to assist the chief forester in determining allowable annual cut (AAC) levels. The review examines the availability of timber, now and in the future. Four documents are prepared for each of the 36 TSAs reviewed. Two are technical documents; the timber supply analysis report (TSAR) and the socio-economic analysis (SEA). A public discussion paper summarizes the two technical reports. The final report presents the chief forester's AAC determination and rationale.

This report, the *Merritt TSA Socio-Economic Analysis*, provides a profile of the Merritt TSA communities, economy, and environment. From this baseline information, the implications of three harvest scenarios are assessed.

TSA Profile

The Merritt TSA covers 1.12 million hectares. It is located in the Kamloops Forest Region and is administered by the Merritt Forest District.

Community

- The TSA has a resource based economy, with forestry, mining, and agriculture being important sources of employment and income.
- Historically, TSA residents have had lower average incomes, lower levels of educational attainment, and higher unemployment rates, compared to provincial averages.
- Recently, Merritt has experienced economic growth. This is attributed to the opening of the Coquihalla and the Okanagan Connector highways.
- The TSA's major communities of Merritt and Princeton are formulating strategies to diversify their economies. This includes promoting value-added manufacturing in the forest sector, as well as developing opportunities offered by recreation and tourism.

First Nations

- There are ten First Nation bands with reserves in the TSA. All of the bands consider forestry to be an important avenue for economic development that could alleviate the unemployment currently experienced. The bands also have concerns regarding current harvest levels, protection of water quality, and the availability of timber.

Forest Industry

- The forest industry in the TSA includes multinational companies, independent companies, and individuals. There are five large sawmills and a number of smaller value-added wood manufacturers. These operations rely on the TSA harvest for about 84 percent of their input requirements. Additional volumes are brought in from other TSAs and purchased from private sources.
- It is estimated that the present TSA harvest level supports 927 person-years (PY) of direct forest sector employment within the TSA, and an additional 205 PY outside the TSA for a provincial total of 1 132 PY. Indirect and induced employment is 325 PY in the TSA or a total of 1 698 PY provincially. Forest sector activity is estimated to contribute \$26.3 million annually to BC government revenues.
- Industry is concerned with the difficulty, or inability, to access sufficient wood volumes to meet processing capacity.

Environment

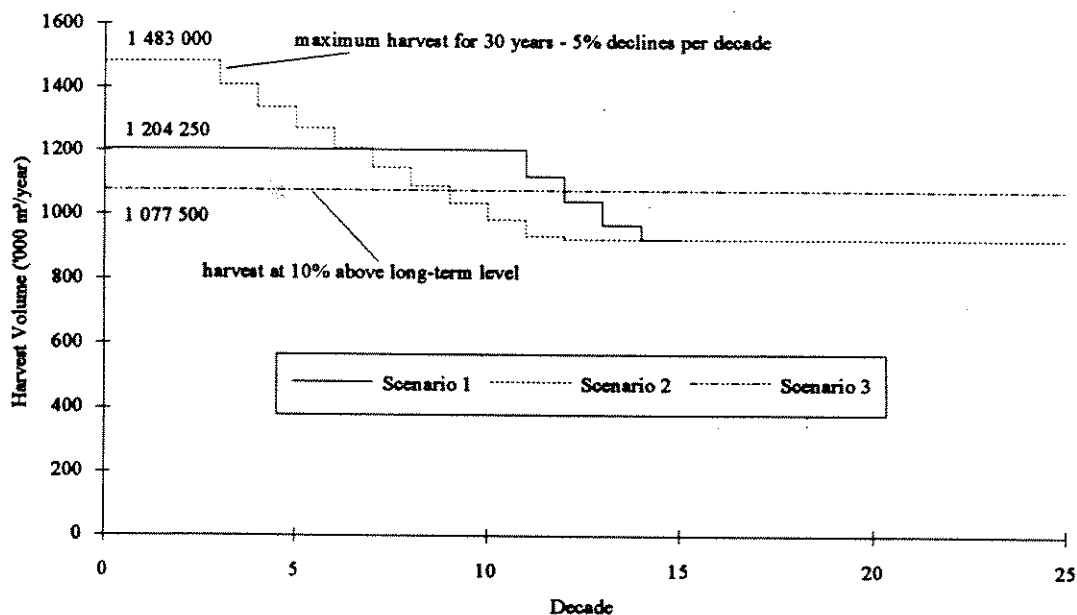
- The Southern Thompson Upland Ecoregion is dominant in the TSA. This ecoregion is characterized by flat plateau uplands, and two large lowlands. The Okanagan Range Ecoregion is present in the southern part of the TSA; it is characterized by high, rugged mountains, plateaus, and deep, dry valleys. The climate varies from hot and dry, to cool and moist. Historically, fires were relatively frequent. The fire history and climatic conditions have led to extensive grasslands and open fir and yellow pine forests at lower elevations, and stands of even-age lodgepole pine at mid elevations.
- The TSA contains significant fish and wildlife populations. The climate and topography produce a variety of habitats, which support many of the province's rare wildlife and fish species.
- The TSA contains six Class A parks. All of these are relatively small and accessible by road. There are also 87 forest recreation sites. Most of the parks and recreation sites are heavily used, particularly by residents of the Lower Mainland.
- Maintenance of good water quality supplies is an important issue in the TSA. There are approximately 10 community watersheds in the TSA and maintenance of the water resource is a primary consideration in these areas.
- A number of land use planning initiatives examining environmental values have taken place recently or are currently underway in the TSA. These include Protected Areas Strategy (PAS), Pennask Local Resource Use Plan (LRUP), Brook Creek LRUP, Lakes LRUP, Coquihalla Phase III Land Use Plan, Stoyoma Mountain Wilderness Recreation Area, Nicola Watershed Community Round Table, protection of heritage

trails, and forest ecosystem network mapping. Where appropriate, decisions from these initiatives were considered in the current Timber Supply Review process. Decisions resulting from on-going land use processes will be considered in future timber supply reviews.

Socio-Economic Analysis

- Three harvest scenarios from the *Merritt TSA Timber Supply Analysis* are examined in this socio-economic analysis (Figure ES-1). The three harvest scenarios demonstrate a range of implications associated with different harvest levels. The analysis of the harvest scenarios is for discussion purposes and no preferred harvest level is implied. In setting an AAC the chief forester considers a range of possible harvest levels.
- Scenario 1 would hold the harvest at its present level (1 204 250 cubic metres per year) for 11 decades before stepping down to the long term harvest level (925 000 cubic metres per year).
- Scenario 2 sets a harvest level 23 percent above the current one for the first three decades, after which time the harvest steps down five percent per decade until the long-term level is reached in decade 12.
- Scenario 3 sets an initial harvest level 10 percent below the current level and maintains it over the planning period.

Figure ES-1. Harvest Scenarios



Scenario 1 (Current harvest level for 11 decades)

- Scenario 1 maintains the current level of TSA harvest related economic activity for 11 decades. The economic impacts are summarized in Table ES-1.

Table ES-1. Scenario 1 Economic Impacts¹					
	Decade				
	Current	1-11	12	13	15
HARVEST (m³/year)	1 204 250	1 204 250	1 120 000	1 042 000	925 000
EMPLOYMENT (PY/year)					
TSA					
Direct	927	927	862	802	712
Indirect/Induced	325	325	302	281	250
Total	1 252	1 252	1 164	1 083	962
Provincial					
Direct	1 132	1 132	1 053	979	870
Indirect/Induced	1 698	1 698	1 579	1 469	1 304
Total	2 830	2 830	2 632	2 448	2 174
EMPLOYMENT INCOME (1993 \$ million after-tax/year)					
TSA					
Direct	\$31.1	\$31.1	\$29.0	\$27.0	\$23.9
Indirect/Induced	7.1	7.2	6.6	6.2	5.5
Total	38.2	38.2	35.6	33.2	29.4
Provincial					
Direct	\$37.6	\$37.6	\$35.0	\$32.6	\$28.9
Indirect/Induced	39.1	39.1	36.4	33.9	30.1
Total	76.7	76.7	71.4	66.5	59.0
PROVINCIAL GOVERNMENT REVENUE (1993 \$ million/year)					
	\$26.3	\$26.3	\$24.5	\$22.7	\$20.2
Note:					
1. Appendix 3 provides an overview of the methodology used to calculate economic impacts.					

- The forest sector would continue to be a mainstay in the TSA economy. While opportunities to expand forest sector employment could be developed (e.g. in value-added manufacturing), communities would still need to seek other economic opportunities to address the current high rates of unemployment.
- Scenario 1 could coincide with First Nations economic development aspirations if opportunities to participate in the forest sector were developed. However, First Nations interest in forestry development is balanced by their desire for responsible forest management.

- Harvesting of older forest stands would continue at the present rate under Scenario 1. The age class distribution of the forest would narrow and populations of species that depend on mature forests may decline, while those which adapt to a wide range of habitat types or immature forests may increase in numbers.

Scenario 2 (23 percent increase from current harvest level)

- A summary of economic impacts for Scenario 2 is presented in Appendix 4.
- The 23 percent increase from current harvest levels proportionately increases economic activity at the TSA and provincial levels (Table A4-1 in Appendix 4). TSA employment would increase by 290 PY and provincial employment by 655 PY, relative to current levels. The additional harvest could be processed by existing TSA mill capacity. Government revenue would increase by \$6.1 million as a consequence of the increased economic activity. The harvest level and the associated economic activity would begin to step down in the fourth decade, but would remain above the current level until after decade seven.
- Provided that existing TSA residents have, or acquire, the skills required for employment opportunities related to higher harvest levels, this harvest scenario could alleviate persistent high rates of unemployment in the TSA. If skilled workers were not available in the TSA, positions would be filled by individuals moving into TSA communities. The accompanying increase in population would increase the demand for housing and community and social services.
- The extent to which the increased harvest could address First Nations aspirations for economic development would depend on the skills of band members. Since timber harvesting rights are currently fully allocated, an increased harvest level could allow First Nations groups access to timber harvesting rights without a corresponding reduction in the rights of existing licensees (this is an apportionment issue and is not addressed in this report). An increased harvest level could heighten several of the bands' concerns regarding forest management, protection of water quality, and the level of the cut. Implementation of the Forest Practices Code, the effects of which are not considered in the Timber Supply Review process, may address some of these concerns.
- Harvesting of older forest stands would occur more rapidly under this scenario affecting species that depend on mature forest habitats. Options to protect large undisturbed areas may be lost.

Scenario 3 (Immediate 10 percent decrease in current harvest level)

- A summary of economic impacts for Scenario 3 is presented in Appendix 4.

- The 10 percent reduction in the harvest level would proportionately reduce employment, employment income, and government revenue (Table A4-2 in Appendix 4). This reduction would not be expected to lead to any mill closures.
- Communities may view this as a continuation of current trends, where jobs have been lost to technological improvements. The forest sector would remain a mainstay of the TSA economy, however, communities would need to seek other opportunities for economic growth. Merritt and Princeton appear to have generally adopted this strategy.
- A reduced harvest level would make it more difficult for First Nations to satisfy their economic development aspirations. However, the reduced cut level may address some of their forest management concerns.
- Harvesting of older forests would proceed more slowly under Scenario 3. The lower harvest rates may allow for greater flexibility to incorporate decisions from on-going land-use planning activities.

1.0 INTRODUCTION

1.1 Background

The British Columbia Forest Service is presently conducting a provincial timber supply review to assist the chief forester in setting allowable annual cut (AAC) levels. The review examines the availability of timber, now and in the future. Four documents are being prepared for each of the province's 36 Timber Supply Areas (TSA). Two of these are technical documents; the timber supply analysis report (TSAR) and the socio-economic analysis (SEA). The TSAR provides information on current management practices and timber supply. The SEA considers the economic, social and environmental implications of several harvest scenarios. A public discussion paper summarizes the technical information and provides a focus for public discussion of the issues surrounding timber harvest levels. A final report presents the chief forester's AAC decision and supporting rationale.

This report, the *Merritt TSA Socio-Economic Analysis*, describes the economy, physical environment and land use issues associated with the Merritt TSA. A profile of existing conditions provides the benchmark for considering the implications of three harvest scenarios identified in the *Merritt TSA Timber Supply Analysis* report.

1.2 Approach

The focus of this study is harvest scenarios that can be supported by the timber harvesting land base in the Merritt TSA. As will be discussed in later chapters, the timber from this land base makes up a large share, but is not the total volume of timber processed in the TSA.

The implications of the harvest scenarios are described from several perspectives to capture an array of values derived by British Columbians from the Crown forest resource. The effects considered include TSA and provincial economic impacts; TSA community implications; First Nations implications; and environmental implications.

The economic effects refer to employment, employment income, and government revenue impacts. These effects are amenable to quantitative measures; employment is expressed in person-years (PY), and employment income and government revenue in dollars. The economic impacts presented in this report are based on two assumptions.

1. It is assumed that impacts would occur concurrently with a change in the level of harvest. The analysis does not take into account potential time lags between harvest reductions and associated reductions in economic activity.
2. The estimates of future economic activity are based on current conditions. It is unlikely that current conditions will prevail very far into the future. Changes in technology, productivity, and markets could alter current employment coefficients. Changes in the timber harvesting land base and forest management practices could result from new guidelines (Forest Practices Code) or processes (comprehensive land claims negotiations, Protected Areas Strategy, Commission on Resources and

Environment, Land and Resource Use Management Plans, and Local Resource Use Plans).

The social and environmental implications are addressed in qualitative terms. With respect to the social implications of the harvest scenarios, opportunities and challenges for TSA communities and First Nations are considered. Finally, the potential effects on forest ecosystems are addressed in an environmental section.

It must be emphasized that the harvest scenarios examined in the SEA report were selected to demonstrate a range of socio-economic and environmental implications. The selection of these scenarios does not imply that they are the only options the chief forester will consider and they should not be construed as recommendations for permissible harvest levels. Similarly, the report describes a range of impacts, and there is no intention to identify a preferred AAC level.

1.3 Report Structure

This report is organized into six chapters. In the next chapter, the TSA profile is presented. This profile contains current information on the TSA's major communities, principle sources of economic activity, First Nations, environment, and major issues in the TSA. Chapter 3 focuses on the strategies and objectives of the Merritt Forest District in managing the Crown forest resource in the TSA. In this chapter the economic contributions of the TSA harvest to the TSA and provincial economies are reported, and the harvest scenarios are introduced. In Chapter 4, the quantitative economic impacts of the harvest scenarios are presented. In Chapter 5 the implications to communities, First Nations, and the environment are addressed. Chapter 6 provides a summary of results. Appendices include a glossary, list of contacts, a discussion of methodology, and supporting tables.

2.0 AREA PROFILE

2.1 Overview

The Merritt Timber Supply Area (TSA) covers a land area of approximately 1.12 million hectares (Figure 2-1). It is situated within the Kamloops Forest Region and administered from the Ministry of Forests Merritt Forest District office in Merritt and field office in Princeton. The TSA is characterized by the mountainous terrain of the Cascade Mountains to the west and the Thompson Plateau to the east. There are two main river systems: the Tulameen-Similkameen in the south and the Coldwater-Nicola in the north. The timber harvesting land base is dominated by stands of lodgepole pine, Douglas-fir, and spruce. Ecosystems in the area are prone to frequent, large fires. The Merritt TSA economy is dependent on several resource-based industries including forestry, ranching, mining, and tourism. Commercial timber harvesting began around 1970 and today is a substantial source of revenue in the area. The majority of ranches in the TSA are cow-calf operations producing beef cattle. Mining activity occurs north of Merritt and in Princeton. Tourism and recreation are becoming increasingly important because of the TSA's outdoor recreational opportunities and accessibility from large population centres such as the Lower Mainland and the Okanagan Valley.

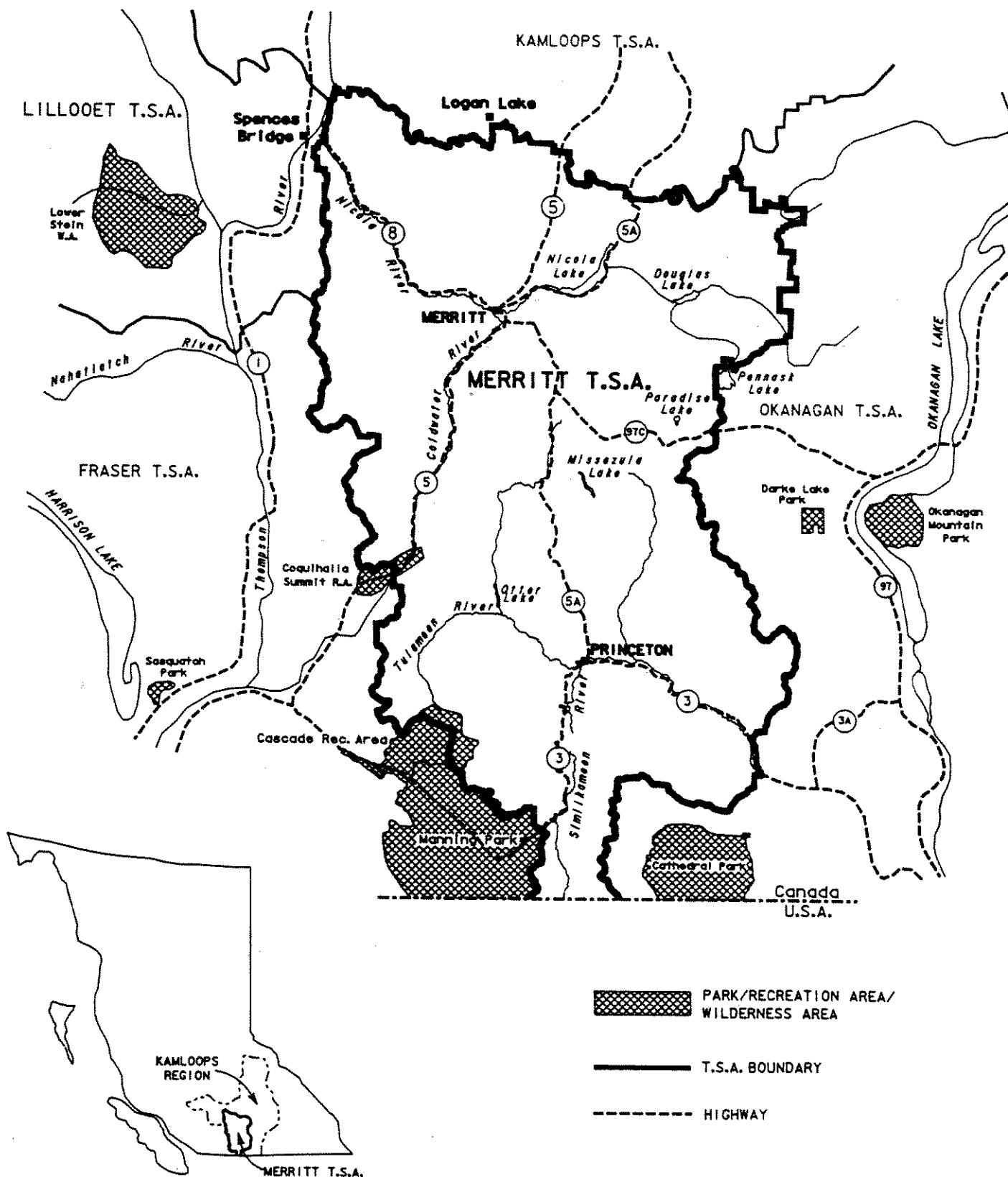
2.2 Socio-Economic Setting

2.2.1 Communities

The population of the Merritt TSA has remained fairly constant over the past decade: a 3.2 percent drop from 1981 to 1986, followed by a 2.2 percent increase from 1986 to 1991 (Table 2-1). The major communities in the TSA are Merritt and Princeton.

Table 2-1. Population			
	1981	1986	1991
Merritt	6 304	6 448	6 429
Princeton	3 142	3 027	2 875
Merritt TSA	15 105	14 620	14 940
Source: Statistics Canada, 1981, 1986, and 1991 Censuses			

Figure 2-1. Merritt T.S.A.



Merritt

Merritt is located at the confluence of the Nicola and Coldwater rivers, situated at the junction of the Coquihalla Highway (Highway 5), Highway 8, 5A, and 97C. The elevation is 595 metres and temperatures vary from an average low of -12.0 degrees Celsius in winter to a high of 25.8 degrees Celsius in summer. Average yearly precipitation is 316 millimetres.

In recent years, the Merritt economy has experienced increased construction activity.¹ For example, the value of housing starts in the first four months of 1994 is double that for the entire year of 1991. Much of that growth is directly or indirectly attributed to the completion of the Coquihalla Highway and the Okanagan Connector. There has been an expansion of the city's accommodation and restaurant facilities to cater to the increased traffic. Also, the reduced travel time to the Lower Mainland, Kamloops and Kelowna has enhanced Merritt's status as a retirement area. However, in spite of these positive signs, Merritt continues to suffer from very high rates of unemployment. The Nicola Valley Community Futures Association is pursuing economic diversification. However, some of the city's primary ethnic groups do not participate in community-based planning initiatives.

The 1991 census reports the population of Merritt as 6 429. Compared to population growth of 13.8 percent from 1986-1991 for the province, Merritt experienced no population growth during the same period.

The economy of Merritt depends largely on the resource sectors of forestry, agriculture and ranching. There is on-going concern that there is insufficient wood volumes to sustain the city's four sawmills. Mining is not as significant to Merritt as it is in the Princeton area. There has been significant growth in tourism and manufacturing in recent years. Given Merritt's geographic location, the service industry and retail trade are also likely to continue to develop. The number of business incorporations and bankruptcies has been fairly constant for the past five years (Table 2-2).

Table 2-2. Merritt Business Activity Indicators					
	1989	1990	1991	1992	1993
Incorporations ¹	16	16	15	14	14
Bankruptcies	10	12	14	10	n/a
Source: Federal Department of Consumer and Corporate Affairs					
Note:					
1. Figures may underestimate activity since not all businesses are incorporated.					

¹ Source: Her Worship, Ms. C. Norgaard, Mayor of Merritt and Ms. E. Salomon-de-Friedberg, Co-ordinator Nicola Valley Community Futures Association, Merritt.

The community has implemented a strategy to increase private sector investment diversity (particularly in tourism and manufacturing), strengthen Merritt's resource-based economy and develop a skilled labour force in the community.² To implement the strategy:

- The Nicola Valley Business Development Centre was formed to provide technical assistance, business counseling, and financing to new and existing businesses. Between November 1991 and November 1993, 23 new businesses were started, creating more than 100 jobs.
- Programs have been instituted to foster entrepreneurship and provide management skills to entrepreneurs.
- Programs have been provided to upgrade the skills of the unemployed. Unfortunately, retraining is most frequently perceived as a last resort for displaced workers.

The community has identified the lack of serviced land for commercial and industrial development, and insufficient educational facilities as constraints to economic growth.

The Nicola Valley Community Futures Association has suggested that the provincial government consider a partnership with local business development centres, perhaps through the BC 21 initiative. They have also suggested that the provincial government provide a strong financial commitment to the Nicola Valley Institute of Technology. Further development of the recreational tourism sector will also enhance the overall economy in the Nicola Valley.

There are three educational institutions in addition to public schools: University College of the Cariboo, Nicola Valley Institute of Technology (see discussion on First Nations in section 2.2.2) and Okanagan Regional Correspondence School. All institutions are experiencing an increase in demand for their programs. A variety of health services are offered by the Nicola Health Care Society. This organization is the umbrella organization responsible for the Nicola Valley General Hospital, Coquihalla House and Gillis House (intermediate and extended care facilities).

Princeton

Princeton is located in the Similkameen Valley at the confluence of the Tulameen and Similkameen Rivers, and at the intersection of Highways 3 and 5A. The elevation is 640 metres and the temperature ranges from an average low of -7.9 degrees Celsius in January to a high of 17.8 degrees Celsius in July. Annual precipitation for 1991 was 348 millimetres.

Princeton's population in 1991 was 2 875, a decline of 5.0 percent from 1986.

The economy of Princeton largely depends on mining and forestry, with agriculture also an important sector. Revenue is also generated from supplying services to commercial and

² *Nicola Valley Community Economic Summit November 26 1993*, Thompson/Okanagan Development Region, Ministry of Small Business, Tourism and Culture.

tourist travellers and local cattle ranchers.³ The number of business incorporations and bankruptcies has remained low since 1990 (Table 2-3).

Table 2-3. Princeton Business Activity Indicators					
	1989	1990	1991	1992	1993
Incorporations ¹	10	2	0	0	4
Bankruptcies	3	1	1	0	n/a
Source: Federal Department of Consumer and Corporate Affairs					
Note:					
1. Figures may underestimate activity since not all businesses are incorporated.					

During an economic summit held in the fall of 1993, the community outlined the following issues:⁴

- Economic diversification is critical, although the community will continue to be resource based. Information and training are key to this initiative.
- The community will need to provide inexpensive serviced land, post-educational facilities, and adequately plan for increased transportation and communication needs. To attract light industry, Crown land will have to be purchased for the creation of a business park.
- Improvements to the racetrack facility, to encourage growth of the light horse industry are possible with access to water and the proposed business park.
- The recreation tourism and agri-tourism sector needs to be developed.
- The \$45 million Similkameen Hydro Project proposed by Princeton Light and Power Ltd. is a 22 megawatt hydroelectric project to supplement power purchased from West Kootenay Power and Light. Certification is required for the project to proceed.

2.2.2 First Nations

Overview

Aboriginal settlement of the Nicola Valley may date back 5 000 years.⁵ These settlements were part of the Interior Salish Nation. The eastern end of the valley was peopled by the Okanagan Nation, and the western end by the Thompson Nation. Today, there are six First Nation bands with communities in the Merritt TSA. There are four other bands that have reserves in the TSA; the majority of their band members live in communities outside the Merritt TSA. General information on these bands is presented in Table 2-4.

³ Community Economic Development Summits Nicola Valley (Merritt) and Princeton, November 1993, Thompson/Okanagan Development Region, Ministry of Small Business, Tourism and Culture.

⁴ Source: Larry Olsen, Regional Economic Development Officer, South Okanagan-Similkameen.

⁵ Community Profile, Merritt Chamber of Commerce, undated.

Table 2-4. First Nations Summary

First Nation Band	Population		Total Reserve Area (hectares)	Band Administration Location
	Total	On Reserve		
Reside in TSA				
Coldwater ¹	583	365	2 498.9	Merritt
Lower Nicola ¹	743	462	7 096.3	Merritt
Nooaitch ¹	171	116	1 693.4	Merritt
Shackan ¹	112	68	3 873.7	Merritt
Upper Nicola ¹	715	431	12 503.1	Merritt
Upper Similkameen ²	41	41	2 602.5	Keremeos
Totals	2 365	1 483		
Reside Outside TSA				
Cook's Ferry	267	75	4 058.2	Spences Bridge
Lower Similkameen ²	313	275	15 276.4	Keremeos
Nicomen ³	85	53	1 175.6	Lytton
Westbank ²	456	235	962.4	Kelowna
Totals	1 121	638		

Source: Department of Indian and Northern Affairs Canada, 1993

Notes:

1. Affiliated with the Nicola Valley Tribal Council.
2. Affiliated with the Okanagan Tribal Council.
3. Affiliated with the Fraser Canyon Tribal Council.

Income levels for the majority of TSA First Nations people are at or below the poverty line.⁶ A contributing factor is the high unemployment rate among TSA First Nations people. Low educational attainment levels are also a factor. The First Nations are addressing these issues in a number of ways. The Central Interior Native Business Development Centre, supported by the Community Futures Program, provides financial assistance and technical support to small First Nations' businesses. The Nicola Valley Institute of Technology (NVIT) was formed in 1983 by the five First Nation bands in the Nicola Valley. NVIT has grown from one program and 12 students in 1983, to five major programs and 250 students in 1994. As of 1991, another 350 (full-time and part-time) individuals are enrolled in community-based and extension courses across Canada. Among the programs, a diploma in Natural Resource Technology is offered. The NVIT employs approximately 75 people in Merritt during peak times.

Forestry Issues

Merritt Forest District officials discussed the Timber Supply Review process, including the socio-economic analysis, with eight of the bands in the region. A survey was used to solicit First Nations' views on the nature and importance of the present forest resource,

⁶ *Central Interior First Nations Community Futures*, Brief submitted to Nicola Valley Community Economic Summit, p.64.

and outlooks and concerns for the future role of the resource. This survey used closed-ended questions to collect general information and concerns of First Nations peoples. Some of the expressed concerns related to local forest management or industrial activities, specifically logging practices and the current rate of harvest. Other issues of concern were the availability of timber for economic and cultural use, and the protection of special interest areas. Most First Nation bands expressed interest in becoming more involved in forestry activities, including silviculture, (planting, brushing, juvenile spacing, pruning, cone collection), harvesting, range use, and survey work. The specific views of bands that provided a written survey response are summarized below.

Coldwater Band - About five band members are employed in forestry-related activities. One is involved in logging and the others are employed by the Merritt Forest District, either directly or through contract. Many unemployed individuals (20-30) are interested in forest sector employment. Other sources of employment are ranching and the Department of Indian and Northern Affairs Canada. The latter is the single largest employer. The band sees forestry, particularly expanded silviculture activities, playing an important role in their community's future.

Lower Nicola Band - About 22 band members are employed in forest sector activities. Twelve are involved in harvesting, eight in silviculture, and two in layout and administration. Other important sources of employment include band administration, self-employed contracting, and ranching. The band indicated that about 80 percent of its members seeking work, are unable to find full-time employment. The protection of fish spawning grounds and land claims are key land use and resource management concerns. The band feels that forestry has the potential to provide economic development opportunities and employment for community members. It is expected that participation in logging, silviculture, and layout and administration will continue in the future.

Nooaitch Band - The band indicated that there are seven members employed in the forest sector. Five are employed part-time in silviculture activities, one full-time in logging, and another in milling. Band administration and agriculture (ranching and ginseng farming) are other important sources of employment. It is estimated that about 80 percent of the band members currently seeking full-time work are unable to find employment. The band indicated that land claims, range management, protection of spawning grounds, and maintenance of water quality are key resource management issues. The band feels that the forest resource will play an important role in their future in terms of protecting water quality and as a source of employment and economic development. In the future, the band will seek opportunities to become involved in incremental silviculture activities and selective logging.

Shackan Band - The Shackan Band has one person employed in logging and silviculture activities. Band administration was identified as the largest single employer. There are eight band members unable to find full-time employment. The key land use issue is the maintenance of the range resource. With respect to the future, the band wants greater

consultation with regard to logging in the area and the formulation of five year forestry development plans.

Upper Nicola Band - There are 15 band members involved in the forest sector; three are employed in harvesting, six in manufacturing, and six in silviculture activities. Band administration, N'Kwala School, and local ranchers are the major sources of employment. There are about 75 band members unable to find full-time employment. In the future, the band sees continued employment in harvesting, processing and silviculture activities. The band does not expect forest sector employment opportunities to increase and believes that a lower harvest rate would create long-term stability.

Upper Similkameen Band - Four band members are employed in silviculture activities. The band also employs about 15 members from other bands in logging, layout, and silviculture. The most significant sources of employment are band administration and the Nickel Plate Mine. Land claims are seen to be the main land use issue. The band feels that they do not have a large enough land base to pursue economic development activities. Forestry is expected to play a major role in the future, as the band views forestry as the only renewable and sustainable economic activity open to them. This view is contingent on the band having access to timber. In the future, band members may participate in all phases of forest activities.

Cook's Ferry Band - No band members are currently employed in forest sector activities. The major sources of income for band members are generated by employment with the band office, ranches, and self-employment. There are about 10 members on the reserve unable to find full-time employment. The key land use issues are the lack of land and resources available to the band to sustain itself. The band is not involved in resource management and land use decisions and is concerned about the allocation of resources to non-local industries. In the future, forestry could be important to the band if access to the resource were obtained. The band expressed the view that at the current rate of harvest all harvestable stands could be logged within the next twenty years.

Nicomen Band - Five members of the Nicomen Band are employed in silviculture activities. There are about 10 individuals unable to find full-time employment. Band land use concerns relate primarily to areas outside the TSA, in the Thompson-Fraser Canyon. Forestry, more specifically selective logging, tree planting, and other silviculture activities, is perceived to offer an important source of employment in the future.

2.2.3 Demographics

Income and Employment

The average income for males in the Merritt TSA is 12.4 percent less than the average for BC, 28.4 percent less for females, and 20 percent less for families. Princeton and Merritt both have slightly higher incomes for males and families than the TSA average (Table 2-

5). Princeton and Merritt rely slightly less than the provincial average on employment income, and to a larger extent on government transfer payments (Table 2-6).

Table 2-5. Average Income¹			
	Males (\$)	Females (\$)	Family (\$)
Merritt	28 027	13 020	42 514
Princeton	30 635	12 683	43 793
Merritt TSA	27 549	12 721	41 894
BC	31 443	17 761	52 403
Source: Statistics Canada, 1991 Census			
Note:			
1. 1990 dollars for population with an income, 15 years and older.			

Table 2-6. Sources of Income¹			
	Employment	Government Transfer Payments	Other
Merritt	74.4	16.9	8.7
Princeton	74.4	15.7	9.9
BC	76.0	11.0	13.0
Source: Statistics Canada, 1991 Census			

The labour force in the TSA is diversified (Table 2-7). Manufacturing, retail trade, and accommodation, food and beverage services account for 33 percent of the TSA total labour force. These sectors account for a similar proportion of the provincial labour force. Approximately 80 percent of the manufacturing sector labour force in the TSA is employed in wood processing industries. The primary industries of agriculture, forestry and mining are also significant, and account for a greater percentage of the TSA total labour force than they do in the province as a whole. A comparison of labour force distribution indicates that Princeton and Merritt have slightly different profiles, although both are dependent on natural resources. Merritt has a larger proportion of the labour force employed in the construction and manufacturing sectors, while Princeton has a higher percentage employed in the mining and forest sectors. The tourism sector, as represented by the accommodation, food and beverage labour force, is equally developed in both communities. The size of the labour force in Merritt is roughly double that of Princeton.

Table 2-7. Experienced Labour Force by Industry¹

	Merritt		Princeton		TSA		BC
	Jobs	% of total	Jobs	% of total	Jobs	% of total	% of total
Agriculture and Related Service	110	4	45	3	570	8	2
Logging and Forestry	200	7	135	9	570	8	2
Mining	105	4	190	13	510	7	1
Manufacturing ²	430	15	125	9	790	11	11
Construction	180	6	20	1	475	7	8
Transportation and Storage	190	7	65	5	390	5	5
Communication and Other Utilities	40	1	20	1	105	1	3
Wholesale Trade	35	1	20	1	80	1	5
Retail Trade	380	13	170	12	795	11	13
Finance, Real Estate and Insurance	85	3	45	3	185	3	4
Business Service	55	2	10	1	90	1	6
Government	170	6	70	5	445	6	7
Educational Service	230	8	130	9	535	7	7
Health and Social Service	210	7	115	8	485	7	9
Accomm., Food & Beverage Service	275	10	190	13	780	11	8
Other Service Industries	175	6	70	5	425	6	8
Total Labour Force Participation³	2 815		1 415		7 260		

Source: Statistics Canada, 1991 Census

Notes:

1. Experienced labour force is defined as persons who, during the week prior to June 4, 1990, were employed or unemployed, but who had worked since January 1990.
2. Includes wood processing industries.
3. Columns may not add due to Statistics Canada rounding procedures.

A recent report has attempted to measure relative economic diversity among provincial communities by means of a "diversity index."⁷ The diversity index reflects how dependent a particular community is on different economic sectors; greater diversity is indicated by higher index values. For example, Fort St. John is a diversified community with an index of 79. On the other hand, Vanderhoof's economy is highly specialized, relying primarily on forestry. It has an index of 44. The Merritt and Princeton areas have indexes of 67 and 65, respectively, suggesting that both communities are roughly equal in their degree of economic diversification.

Social Indicators

The percentage of single parent families is higher in both Merritt and Princeton than the BC average (Table 2-8). Both communities also have a higher percentage of the population over 15 year of age that have not attained Grade 12 when compared to the

⁷ G. Horne and L. Robson, *British Columbia Community Economic Dependencies*, Ministry of Finance and Corporate Relations, March 1993.

provincial average (Table 2-9). The labour force participation rate is less than the provincial average (Table 2-10). Both communities experience high unemployment (Table 2-11).

Table 2-8. Family Composition	
	% Single Parent Families
Merritt	15.0
Princeton	12.7
BC	11.0
Source: Statistics Canada, 1991 Census	

Table 2-9. Educational Attainment¹	
	% of the population without Grade 12
Merritt	49
Princeton	48
Merritt TSA	48
BC	34
Source: Statistics Canada, 1991 Census	
Note:	
1. Figures include all persons over the age of 15 years, including those enrolled in secondary education.	

Table 2-10. Participation Rates¹		
	Female (%)	Male (%)
Merritt	54.1	70.7
Princeton	56.0	74.3
Merritt TSA	56.7	72.2
BC	59.9	75.6
Source: Statistics Canada, 1991 Census		
Note:		
1. The participation rate is the ratio of women or men in the labour force, either working or actively seeking employment, relative to the total female or male working age population.		

Table 2-11. Unemployment Insurance Statistics¹

	1990 (%)	1991 (%)	1992 (%)	1993 (%)
Merritt	11.7	12.0	12.0	10.0
Princeton	9.6	10.9	9.9	7.7
BC	6.2	6.9	6.7	6.2

Source: Canada Employment and Immigration Commission

Note:

1. Figures are based on individuals receiving unemployment insurance benefits and represent claimants as a percentage of the working age population. This percentage is generally lower than Statistics Canada's official unemployment rate.

As shown in Table 2-12, the two communities have very different ethnic profiles.

Table 2-12. Ethnic Origin of Population

	Merritt	Princeton
Aboriginal origins	555	10
British	1 345	665
Canadian	65	80
Chinese	50	30
Dutch	110	25
East Indian	615	0
French	170	35
German	270	140
Italian	80	70
Ukrainian	115	45
Other single origins	380	255
Total - single origin	3 755	1 355
Total - multiple origins	2 465	1 410

Source: Statistics Canada, 1991 Census

In summary, the demographics for the TSA show an area of slow growth with recent increases due to easier access from the Lower Mainland, via the Coquihalla Highway. Incomes are generally lower, as is educational attainment when compared to the provincial average. Unemployment is high. Employment in the TSA is dependent on natural resources, with Princeton relying more heavily on mining, and Merritt on agriculture. Forestry plays an equal role in both of the TSA's major communities. The ethnic diversity of Merritt is greater than that of Princeton.

2.2.4 Major Economic Sectors

Forestry

The forest industry in the TSA consists of a range of operators, from individuals, and independent companies, to multi-national corporations. Economic activities directly

related to forestry include harvesting, primary and secondary manufacturing, silviculture and forestry services. For the purposes of this discussion, the industry is considered under the following categories: major licensees, Small Business Forest Enterprise Program (SBFEP), secondary manufacturers, and silviculture.

Major Licensees - Data on the five companies holding forest licences in the Merritt TSA is summarized in Table 2-13.

The annual licenced harvest of the major licensees is 1 025 694 cubic metres, plus temporary licences. Except for a small licenced volume to Riverside Forest Products in Kelowna and minor volumes removed from the TSA, the harvest volume is manufactured within the TSA. All TSA mills rely to varying degrees on additional purchased timber; Table 2-13 lists important sources of additional timber. Four mills are located in Merritt, providing approximately 700 person-years (PY)⁸ of direct employment (includes woods employment and mill employment). The mill in Princeton supports about 290 PY of employment. Essentially all of the licensees (with the exception of one) rely on independent harvesting contractors to harvest and transport logs to mill sites. Except for Riverside's logging contractor, major licensees generally contract with firms resident in the TSA. The mills rely on the region's good highway and rail links to transport their products to a variety of markets. All of the mills produce wood chips. Chip markets vary among companies. The primary chip destinations are the Weyerhaeuser pulp mill in Kamloops, coast pulp mills, and export markets.

Ardew Wood Products Ltd. is an independent mill that specializes in utilizing small diameter pine logs. It shares a 65 000 cubic metre timber sale licence with Aspen Planers for small wood. The ten year licence was issued by the Merritt Forest District to test the economic viability of utilizing this stratum of the forest profile. The experience has produced positive results and there is growing interest in the small wood resource (the implications of this are discussed further in Chapter 3). Aspen Planers is also an independent mill located in Merritt.

The Tolko Industry Ltd. mill (Nicola Valley Division) is one of several mills owned by Tolko Industries, of Vernon, BC. The company undertakes some limited inter-company log trades to optimize product recovery among its mills.

Riverside Forest Products Ltd. is a public company which purchased Fletcher Challenge Canada's southern interior operations in November, 1992. Riverside holds a small forest licence (19 340 cubic metres) in the Merritt TSA and processes volumes from this licence at their Kelowna mill. Most of this mill's wood comes from the Okanagan TSA and a Tree Farm Licence.

⁸ A person-year (PY) of employment is defined as 1 800 hours per year in order to provide a consistent measure of employment. To the extent employees work a greater or lesser number of hours, the measure of person-years presented here may not correspond to the number of individuals on-site.

Table 2-13. Summary of Major Licensees¹

	Ardev Wood Products Ltd.	Aspen Planers Ltd.	Tolko Industries Ltd.	Riverside Forest Products Ltd. ²	Weyerhaeuser Canada Ltd.	
Merritt TSA Forest Licence Volume (m ³)	36 100 and 32 500 (50% of TSL A18622)	132 744 and 32 500 (50% of TSL A18622)	268 954	19 340	568 556	
Mill Location	Merritt	Merritt	Merritt	Kelowna	Merritt	Princeton
Mill Average Roundwood Input (m ³)	117 214	210 666	357 987	593 500	354 527	407 699
Average Employment in TSA (PYs)						
Woods	33	41	79	Mill and contractors situated outside TSA.	35	98
Mill	77	92	170		156	183
Silviculture	1	7	16		6	13
Products	dimension lumber and metric sizes; chips	dimension lumber; chips	dimension lumber; J-grade; joinery veneer; chips	industrial clears, studs, J-grade, chips	dimension lumber, custom sizes, chips	dimension lumber, chips
Markets	75% Japan; 25% Vancouver Island furniture manufacturer	USA; Japan; Europe	Japan; Europe	Europe; Asia; USA	20% domestic; 72% USA; 8% other exports	
Mill Fibre Supply						
Merritt TSA Forest Licence	52%	69%	78%	N/A	67%	78%
Merritt TSA SBFEP	39%	6%	2%		12%	12%
Private	6%	19%	7%		9%	6%
Woodlots/Transfers	-	<1%	3%		6%	-
Outside Merritt TSA	3%	6%	10%		7%	4%

Source: TSA industry survey

Notes:

1. Mill input, employment, and fibre supply information are average values for the 1991 - 1993 period.

2. Employment associated with Riverside's Merritt TSA Forest Licence is included in the estimates of total provincial employment associated with Merritt TSA harvest levels.

Weyerhaeuser Canada Ltd. has a number of mills in BC, Alberta, and Saskatchewan. The company operates two mills in the Merritt TSA, and holds over half of the TSA AAC under one licence. The mill located in Princeton cannot efficiently manufacture logs greater than a 46 centimetre (18 inch) diameter. Over-sized logs are transported to the Merritt mill for manufacturing.

All of the major licensees cooperated in providing information to this study. An issue that was brought forward by several of the mills relevant to the Timber Supply Review process, is the apparent excess milling capacity relative to the AAC on Crown lands. The licensees indicated that this imbalance could be partially attributed to reapportionment of AAC (e.g. to the SBFEP program). However, the principle factor leading to excess processing capacity appears to be the expanded capacity arising from new investments (i.e. faster machines). All of the mills have on-going capital improvement programs. The general focus of new capital projects is to improve wood recovery. Recently, some mills have reduced the number of shifts to more closely match the amount of Crown wood available.

Small Business Forest Enterprise Program (SBFEP)⁹ - This province-wide program makes Crown timber available to qualified operators. In the Merritt TSA, the SBFEP apportionment is 145 700 cubic metres. Qualified operators register in one of two program categories.¹⁰ Category 1 registrants do not own or lease processing facilities. These are logging operators who harvest an area and market the logs. As of December 31, 1993, there were 44 Category 1 operators registered with the Merritt Forest District. Category 2 registrants either own or lease a timber processing facility. Processing facilities include sawmills, lumber remanufacturers, and specialty product manufacturers. At the end of 1993, there were five registered Category 2 operators. Operators usually register in the district where they reside, or where they expect to conduct most of their business activities. Once registered in the SBFEP, the operator may bid on timber sales anywhere in the province.

Volumes made available to Category 1 (Section 16.0 sales) registrants are issued to the highest bidder. Category 2 (Section 16.0) timber sales are open to registrants in that category, and are allocated to the highest bidder. Category 2 (Section 16.1) sales are considered on the basis of value-added manufacturing activity (termed 16.1 sales from Sec. 16.1 of the *Forest Act*). The term of the 16.1 sales may be up to five years, while the other timber sales are usually for one year. Information on 1993 Timber Sales in the Merritt TSA is summarized in Table 2-14.

⁹ Source: Merritt Forest District 1993 SBFEP Annual Report and discussions with Mr. Len Marsh, Resource Officer, Small Business, Merritt Forest District.

¹⁰ An individual or corporation may register in the Small Business Enterprise Program provided they meet specific requirements described in legislation. The main requirements are that they must not hold a major forest licence with an allowable annual harvest greater than 10 000 cubic metres and they must be in good financial standing.

Table 2-14. Summary of SBFEP Timber Sales (1993)

Category	Number Issued	Licenced Volume ¹ (m ³)	Aggregate Bid (\$ millions)
Category 1	31	96 966	\$4.20
Category 2	4	13 887	\$.67
Section 16.1	2	173 847	\$2.70

Source: SBFEP 1993 Annual Report, Merritt Forest District

Note:

1. The licenced volume is not equal to the annual SBFEP apportionment because licences may span several years.

A large proportion of Category 1 sales are awarded to operators resident in the TSA. No data was available with respect to the Category 2 sales. The two Section 16.1 sales in 1993 were awarded to operators living outside the TSA. However, the timber sold to a Vancouver Island furniture manufacturer is harvested and custom cut by Ardeu Wood Products in Merritt before shipment.

The SBFEP is intended to be self-financing at the forest district level. Revenue derived from sales supports planning and development activities undertaken by the forest district to accommodate the sale. Post-harvest silviculture treatment costs are also covered. During 1993, the Merritt Forest District's SBFEP expenditure was \$850 000. A large share of this was undertaken by forest industry contractors resident in the TSA.

Secondary Manufacturers: Secondary manufacturers in the TSA are relatively small operations, producing a broad array of products and serving a number of markets. None of the operators hold a replaceable forest licence, but several rely on the SBFEP discussed above. Data on secondary manufacturers with year-round operations are summarized in Table 2-15.

Secondary manufacturers serve niche markets and are involved in value-added opportunities generally not pursued by the major licensees. NMV Lumber Ltd. in Merritt purchases rough sawn lumber from sawmills throughout the province and remanufactures it to dimensions sought by specific customers. The specialized operators also create higher value products from the lower value range of the harvest profile. For example, in Princeton, SBC Firemaster Enterprises utilizes grade five logs (pulp grade) to produce packaged firewood. Princeton Wood Preservers produce treated fence posts and utility poles.

Almost all of the operations experienced steady growth over the past several years. This growth has been realized by moving towards year-round operations, or by expanding plant production. Mego Wood Products Ltd. of Princeton has announced plans to triple present output. This would require a capital investment of approximately \$3 million, and would add 25 operating positions. If plans proceed, the firm intends to relocate to the proposed business park in Princeton. Presently, the Mego wood supply is a Section 16.1 timber

sale. Its five year term expires in 1995 and the company is seeking another licence, approximately double the volume of the present one, to support the plant expansion.

The price and availability of wood supply were identified as key issues facing secondary manufacturers. Typically, operators purchase wood at prevailing market prices, either directly or through bidding for SBFEP sales. SBFEP sales are relatively short-term timber sales that do not provide long-term supply certainty. From the secondary manufacturer's perspective, their access to Crown timber is more tenuous than that of the major licensees.

Silviculture - Post-harvest silviculture includes planning, site preparation, planting, and stand tending (e.g. brushing, thinning). These activities are the responsibility of major licensees on lands harvested by them until the regenerated stand attains "free growing" status. The Merritt Forest District has this responsibility for SBFEP sale areas in the TSA. In addition, the forest district has been treating a backlog of sites where harvesting pre-dated licensees' current silviculture responsibilities. The Forest District also maintains an intensive silviculture program of about \$600 000 per year, which includes activities beyond the free growing stage. These activities include juvenile spacing, pruning and fertilization. In general, both licensees and the Merritt Forest District contract much of the silviculture work to specialized firms. Approximately 40 percent of the annual contract silviculture work is awarded to TSA resident operators. In addition, the district contracts approximately \$300 000 per year of forest health activities. These activities include aerial surveys, single tree disposal and insect control programs. Most of this work is performed by local contractors. Silviculture employment estimates in this report reflect basic silviculture activities and do not include employment related to back-log, incremental or forest health silviculture activities.

Table 2-15. Summary of Selected Secondary Manufacturers

Company Name	Began Operations	Mill Location	Input Volume (m ³ of roundwood)	Average Employment (PY)	Principal Product	Markets	Fibre Supply
NMV Lumber Ltd.	1983	Merritt	27.6 million board feet of rough sawn lumber	22 (June 1994)	specialty boards; metric sizes	Europe; Japan; some direct sales	10% to 15% from TSA
Mego Wood Products Ltd.	1990	Princeton	17 000	Mill: 23-25 Logging: 4	garden systems; fencing; housing components	BC; Europe; Japan	SBFEP 16.1 sale; trades with TSA mills
Princeton Wood Preservers Ltd.	1973	20 km east of Princeton	18 000	Full time: 16 Seasonal: 5 Logging contractors: 4	utility poles; fencing; orchard posts	BC; US Pacific Northwest	SBFEP 16.1 with Mego Woods; purchases from SBFEP contractors
Brewer	1980 (not presently operating)	bush		4-5 (10 months of the year)	squares and ties	BC	SBFEP Category 2 competitive bid
SBC Firemaster Enterprises Ltd.	1988	Princeton	9 000	Mill: 15 Outside TSA: 7	packaged firewood	BC and US retail chain stores	SBFEP Category 2; grade 5 logs; trades logs and buys privately

Agriculture

Ranching is an intricate part of the social and economic fabric of the area. The Nicola Valley is one of the best known cattle ranching areas in BC with one of the largest private ranches in Canada. Operations are primarily cow-calf operations for beef, although there is a trend to more finishing. There are approximately 117 ranching farms with 46 914 cattle and calves.¹¹ Most ranching activity is concentrated at lower elevations in valley bottoms; many operations are dependent on man made reservoirs and irrigation. Hay is grown in large quantities on irrigated land and used locally for winter feed. Areas of high value to ranching include grasslands, alpine and wet meadows that have no canopy and low growing vegetation.

The Merritt TSA supports a thriving ranching industry comprised of roughly 28 000 head of domestic livestock authorized for use on Crown range. Crown range is used during the months of May-October, with the animals wintering on private lands. Virtually all Crown range in the TSA is presently committed (94 percent of the land area is covered by grazing tenure). Range administration is therefore directed towards intensifying cattle management to provide more flexibility to reduce and resolve resource use conflicts.

Production levels are affected by the area of land producing forage, the extent of grass seeding programs, losses of land base as a result of urban expansion, roads, mines, protected areas or agricultural (i.e. non-range) development, silviculture activities, and noxious weed infestation.

Demands placed upon Crown range resources include both the need to provide quality forage to the livestock industry and to ensure the availability of forage and habitat required by wildlife. Integrated resource management strategies are required to integrate the needs of grazing, silviculture, timber harvesting, recreation, and other resource interests on forested range lands. At present, demand for Crown range exceeds the supply. Lack of spring range, an inadequately developed infrastructure, and forest encroachment on localized grassland sites contribute to this shortfall. Uncertainty with respect to land claims and Protected Areas has led to a high level of concern within the livestock industry. Merritt is particularly dependent on the ranching industry.

Other agricultural operations in the area include ginseng farms along the Nicola River and in the Merritt area; fallow deer and bison operations on private land; and a developing agri-tourism sector. Agri-tourism combines agricultural operations such as cattle ranches and orchards, with a range of tourism activities.

Mining

Within the TSA there are three active metallic mineral mines: Similco, Nickel Plate and the Hedley Tailings operation. Mining is an important source of regional employment for

¹¹ Agricultural Profile of B.C., 1991 Census Agriculture Small Area Data of B.C. Based on data for Thompson-Nicola Subdivision C and Okanagan Similkameen Subdivision C)

both Princeton and Merritt. A fourth mine, the Highland Valley Copper Mine, is located outside the TSA, but about 125 employees reside in Merritt, contributing to the local economy. Highland Valley is expected to remain a viable operation well into the future; however, it has laid off 65 people in an effort to cut operating costs. Table 2-16 shows the employment and production figures for each mine.

Lower copper prices affected BC copper mines during 1993 and the first half of 1994. Currently, copper prices have recovered. In November, 1993 declining copper prices resulted in the loss of approximately 280 jobs at the Similco mine in the Princeton area. This had a negative effect on the economy of Princeton since the annual Similco payroll was approximately \$16 million.¹² However, encouraging 1994 exploration results, combined with the devalued Canadian dollar resulted in the company re-opening the mine in August, 1994, although at slightly lower employment levels. To date, only the low grade stockpile is being milled. One or two deposits are being evaluated for mining. It is likely that one will go into production as soon as the permits are in place. Proven reserves would provide a four to five year mine life in an open pit and make use of the existing processing facilities at Similco.

The overall mineral potential of the area is high, with porphyry copper-gold and vein gold the main targets. Strong gold prices and comparatively weaker copper prices placed exploration for vein deposits ahead of porphyry targets in 1993 and the first half of 1994, both in terms of the number of projects and value of exploration investment. A continuous decline in exploration expenditures from 1988 to 1993 was attributed to depressed base metal prices, competition from outside jurisdictions and the impact of land planning initiatives on the industry's incentive to explore in the region.¹³ However, the notices of work for the Kamloops Region for 1994 is 200 percent greater than 1993 due to strong gold and copper prices and two provincial grant programs for exploration activities.

Hot spots of the 1994 exploration season include Highland Valley in the Guichon Batholith (copper porphyry), the Copper Mountain area (copper), the area around the Elk prospect (gold), and the Tulameen Complex (placer gold and platinum group elements). Rough estimates based on notices of work suggest a transient employment level equivalent to 45 person-years.

¹² *Community Economic Development Summits Nicola Valley (Merritt) and Princeton November, 1993*, Thompson/Okanagan Development Region, Ministry of Small Business, Tourism and Culture.

¹³ Meyers, R.E., *Exploration and Development of Highlights South-Central British Columbia - 1993*, Ministry of Energy, Mines and Petroleum Resources.

Table 2-16. Mining Operations					
Mine	Principal Minerals	Production to Date	Location	Average Employment/ Community Affected	Years in Operation
Current					
Highland Valley (HVC) ²	Copper Gold	<ul style="list-style-type: none"> • 2 510 million kg copper • 363 200 grams gold • 53 912 kg silver • 27 million kg molybdenum 	Logan Lake	125 Merritt (total employment 1 100)	Since 1950 Est. 14 years mine life left
Nickel Plate Mine (Homestake Canada Ltd.)	Gold Silver	<ul style="list-style-type: none"> • 50 million grams gold • 2.3 million grams silver (1990) 	Hedley	206 Princeton	1904-1994 Est. 3 years 1994 - est. 1997
Hedley Tailings (Candorado Mines Ltd.)	Gold Reworking old tailings	<ul style="list-style-type: none"> • 367 500 grams gold (to 1990) 	Hedley	28 Princeton Hedley Keromeos	Est. 2 years 1994-1996
Similco (Princeton Mining Corp.)	Copper Gold Silver	<ul style="list-style-type: none"> • 543 million kg copper • 12 million grams gold • 230 million grams silver (1908-1990) 	Princeton	140 (August, 1994) Princeton	1908-1994
Outlook					
Elk-Siwash North ³ (Fairfield Minerals Ltd.)	Gold Silver	<ul style="list-style-type: none"> • Bulk sampling 1993 • \$1.59 million A Tax on gold sales 	45 km SE Merritt	20 Merritt	Est. short life
Source: Mineral Market Update April 1994 Notes: 1. 1994 information. 2. Located in Kamloops TSA. 3. The operation is in the process of obtaining a permit which would classify it as a small mine (less than 10 000 tonnes per year mined).					

Industrial minerals are also receiving attention in the area. Zeolites have the potential to act as "molecular sieves", catalysts and water softeners. Dehydrated zeolite can absorb other liquids such as ammonia, alcohol and hydrogen sulfide. Preliminary data from Canmark International Resources Inc.'s drilling program in the Princeton basin confirmed an economic zeolite deposit. Other such deposits may exist in the area. As a result, the company will be pursuing potential markets. Related employment would equal six to ten person-years. There is currently no zeolite production in Canada.

Craigmont, owned by M. Seven Industries, is a magnetite recovery operation that supplies the coal industry. A newly constructed plant began operations in early 1994, employing 33 people. Future plans are to re-process magnetite-rich portions of the Craigmont tailings with potential for custom milling.

The Skagit-owned operation Quarry Pacific Industries, is a granite quarry within the TSA. It has operated intermittently, employing five to ten people for one month in the summer. The granite is then shipped and stockpiled.

Clayburn Industries Ltd. mines a pyrophyllite deposit once every three years and ships from a stock pile. Pyrophyllite is a material used in high temperature applications, less than one person-year employment is generated.

Tourism

The Coquihalla Highway and the Okanagan Connector have increased the ease of access from the Lower Mainland to the TSA. Merritt receives roughly 500 000 visitors per year. The area is heavily reliant on outdoor recreation activities which support the tourism base. Fishing and camping at lakes are major attractions. Other activities include golfing, sailing, swimming, water-skiing, hiking, cross-country skiing, and snowmobiling.

To a lesser extent Princeton also attracts outdoor enthusiasts. Hunting, camping, fishing, mountain biking, hiking, and cross-country skiing are some of the activities. Princeton also has the Allenby, Granite City and Black Burn ghost town sites.

It is difficult to determine the contribution of this sector to the TSA's overall economy. From the labour force distribution, accommodation, food, and beverage services account for 11 percent of the jobs in the TSA which is above the provincial average of 8 percent. Both Princeton and Merritt have targeted tourism as a growth market.

Recreation

Recreation within provincial forests is significant. An Outdoor Recreation Survey in 1989/90 found that there are an estimated 40 million visits per year to provincial forests, twice the usage of provincial parks. Forty-one percent of BC residents participate

in recreation activities in provincial forests for an average of 15 days per year. Nature study was the most popular activity.¹⁴

Based on the 1989/90 Outdoor Recreation Survey, projected increases in the BC population, and changes in participation by activity due to an increase in average age, it is estimated that visits have increased 17 percent in provincial forests since 1989. This equals an average annual increase of about three percent from 1989 to 1994.¹⁵ The survey also reports that about 18 percent of all use occurred in the Kamloops region, with 56 percent from residents of the region and 39 percent from residents of the Vancouver region.

There are key differences between the northern and southern parts of the TSA. North of Allison Lake Park the area is characterized by smaller streams and lakes, rolling topography, resulting in greater recreational pressure. The southern portion is characterized by a much steeper topography with fewer lakes.

The Merritt Forest District manages 87 recreation sites in the TSA, 18 are classified as 'high use' sites. The district also maintains 12 trails which total approximately 107 kilometres. The open nature of the area, coupled with the large number of roads, make it very accessible. It is estimated that in 1993 there were 200 000 user-days at Merritt Forest District recreation sites; 15 000 user-days for trails in the summer and 12 000 user-days in the winter and 50 000 user-days of dispersed use. Insufficient resources are available to maintain the heavily used recreation sites and there is a lack of funding to develop new sites to meet growing demand.¹⁶

Dominant activities in the Merritt TSA are fishing and camping. Lakes with high recreation values for fishing include: Thalia and Lodwick Lakes, Paradise Lake, Osprey Lakes, Pike Mountain, Boss Lake, Davis Lake, Tahla Lake, Harmon Lake, Kane Lake, Peter Hope Lake, Chataway Lakes and surrounding area, and Lundbom Lake. High use pressure emanates from the Okanagan and Lower Mainland populations. A Local Resource Use Plan (LRUP) being developed by the Merritt Forest District, with the participation of the Ministry of Environment, Lands and Parks and public groups will inventory and classify 120 of the highest profile lakes in the TSA. For each lake, the visual zone and the riparian and lakeshore management areas will be identified and management prescriptions developed.

Other activities in the TSA include canoeing, hiking, horseback riding, snowmobiling and cross country skiing. Two areas are managed in partnership with organized groups for snowmobile use and two cross country ski areas are managed in association with clubs. Interpretive trails exist at Harmon Lake and adjacent to the Merritt Information Centre.

¹⁴ *Outdoor Recreation Survey 1989/90 How British Columbians Use and Value their Public Forest Lands for Recreation*, Ministry of Forests, 1991.

¹⁵ Source: Terje Vold, Ministry of Forests, Victoria.

¹⁶ Source: Graham Seefeldt, Merritt Forest District, Ministry of Forests, Merritt.

In addition, an interpretive forestry information kiosk is located in Princeton on the Chamber of Commerce site.

Fishing - The number of fishing licences sold in Merritt was nearly twice that of Princeton during 1993, non-resident licences account for 18 percent of sales (Table 2-17).

Table 2-17. Fishing Licences Sold (1993)			
	BC Resident Licences	Non-Resident Licences	Total
Merritt	3 673	1 147	4 820
Princeton	2 465	208	2 673
% Total	82	18	100
Source: Ministry of Environment, Lands and Parks Statistics			

Using this information and a survey done by Fisheries Branch¹⁷ in 1990 it is estimated that for the TSA:

- Angler effort was 93 859 angler-days;
- Total catch in the TSA was 215 947 fish. The most common species was rainbow trout. This represented 2.2 percent of the total BC catch.
- Direct expenditures (food, bait, transportation) were estimated to be \$2 093 770 and \$3 311 070 was spent on capital purchases (boat, tackle).

Hunting - The number of animals killed by species for 1992 is shown in Table 2-18. A hunter may be recreating in the area and be unsuccessful; or may be active in the area for a few days and record one successful kill. It is therefore difficult to estimate the related number of hunter-days. Depending on the species, the ratio of kills to hunter-days may range from one in 50 for moose to one in 15 for mule deer. Using a conservative estimate of 15 hunter-days per kill, the number of hunter-days is estimated to be 34 650.

Guiding - There is no commercial guiding for wildlife in the northern parts of the TSA; two guides are active in the southern portions of the TSA. Table 2-19 shows the harvest for these two operators. There are also fishing guides active in the area.

¹⁷ 1990 National Survey Preliminary Analysis of Findings of Freshwater Anglers in BC, Ministry of Environment, Lands and Parks.

Table 2-18. Hunting Statistics

	1991	1992
	(number of animals harvested)	
Moose	317	196
White-tailed deer	45	54
Elk	19	28
Goat	1	1
Black bear	99	115
Mule deer	1 800	1 899
Cougar	20	26
Total	2 301	2 319

Source: Ministry of Environment, Lands and Parks, Wildlife Branch
Summary Statistics

Note:

1. Merritt TSA boundaries approximated by management units 312, 313, 318, 319, 804, 805, and 805.

Table 2-19. Guiding Statistics

	1991	1992	1993
Species	(number of animals harvested)		
Black bear	6	10	12
Cougar	10	6	12
Deer	4	8	5
Sheep	3	3	1
Goat	2	1	3

Source: Ministry of Environment, Lands and Parks statistics

2.3 Environmental Setting

2.3.1 Landscape

The Southern Thompson Upland Ecoregion is the dominant ecoregion in the Merritt TSA. It is an area with flat plateau uplands, steep sided plateau walls, and two large lowlands. It has the driest climate of any plateau upland in the Thompson-Okanagan Plateau Ecoregion, and has two large grassland areas. The Okanagan Range Ecoregion present in the south is characterized by the high, rugged mountains of the Eastern Cascades and deep, dry valleys that on the eastern side have bunchgrass and ponderosa pine. The Leeward Pacific Ranges present in the southwest is a coast transition ecoregion, with bold mountains having deep, narrow valleys in the north, while in the south the mountains become subdued.

There are six biogeoclimatic zones within the TSA; in order of greatest representation the zones are: Interior Douglas Fir; Montane Spruce; Engelmann Spruce-Subalpine Fir; Bunchgrass; Ponderosa Pine; and Alpine Tundra. The Interior Douglas Fir zone is the

second warmest forest in the dry interior. Historically, fires were relatively frequent. Warm and dry climatic conditions, combined with the fire history, have led to extensive grasslands and open fir and yellow pine at lower elevations, as well as stands of even age lodgepole pine at mid elevations. The lower elevation grasslands and forests are important for deer and elk winter range.

2.3.2 Fish and Wildlife

Resident fish are present in the larger river systems within the TSA. From a recreational perspective rainbow trout, kokanee, burbot, mountain whitefish, eastern brook trout, and steelhead (fished only in the Thompson River) are important. Many lakes in the area are stocked on an annual or semi-annual basis. Most fishing takes place primarily in the lakes; stream fishing is less common (with the exception of the large Similkameen and Tulameen Rivers). There are two blue-listed species of fish in the TSA: the chiselmouth and the mottled sculpin.¹⁸ The umatilla dace is a red-listed species found in the Similkameen River.

There are numerous wild stock lakes and some resident stream stocks of wild Rainbow trout in the Coldwater River, Nicola River, Guichon Creek, Spius Creek, Prospect Creek, Quilchena Creek and other tributaries. Wild trout populations are present in alpine lakes with consistent water levels. Wild stock lakes have associated stream spawning and rearing habitat. Some stocked lakes also have supplementary spawning and rearing creek systems. Steelhead populations are present in the Nicola, Spius, and Coldwater Rivers, Skuhun, and Shakan Creeks. The Thompson River summer steelhead run is a major conservation issue within this region. These stocks spawn in the Coldwater and Nicola rivers and to a greater extent in the tributaries of these two systems (Spius, Maka, Prospect, Miday and Juliet creeks). Kokanee are present in the TSA's larger lakes (e.g. Nicola, Missezula).

Coho, chinook, and pink salmon spawn in tributaries of the Fraser River. In 1984, the Department of Fisheries and Oceans undertook an initiative to double the 79-82 escapement numbers for chinook by changing commercial fishing patterns. Results show that the populations present in the Nicola system (Maka Creek, Coldwater River, Nicola River) are not responding well and that trends remain stable. This may be attributed to the timing of the fish entering the system such that they are not affected by the change in quotas; or there may be unmitigated habitat loss from agricultural and forestry practices especially on private lands. Coho numbers are declining in the Fraser River due to habitat loss. This species is very sensitive to land use practices since its habitat is small side streams. There is no salmon sport fishing in the TSA due to low stocks. Salmon hatcheries for coho and chinook are present on Spius Creek. High value systems are: Nicola River, Nicola Lake, Thompson River, Coldwater River, and associated tributaries such as Spius Creek. The Nicola Watershed is a demonstration watershed under the

¹⁸ The Ministry of Environment has identified two groups of species they consider at risk within the province. Red-listed species are considered threatened or endangered. Blue-listed species are considered sensitive or vulnerable.

Fraser River Management Board. The Nicola Watershed Community Round Table has been formed to address these and other land use issues in the Nicola Watershed.

The wildlife habitats in the TSA are diverse. They include extensive grasslands, lakes and wetlands, forested slopes, and alpine areas. At lower elevations, a greater number of species are present. Mammals commonly found in the TSA include: mule deer, moose, elk, mountain goats, cougars, black bears, grizzly bears, and furbearers (martens, weasels, and squirrels). Although the population of grizzly bears is low, the entire TSA is in the Canada/USA North Cascades Grizzly Bear Recovery Area. The Southern Interior Ecoprovince has the highest bat diversity in Canada. Many species are associated with grasslands, and others with low elevation forests.

Appendix 1 presents a listing of the red- and blue-listed species for the TSA, the habitat types and the potential impact of forest practices.

2.3.3 Parks

All the parks in the TSA are relatively small with easy access, used primarily for recreation during the spring, summer and fall. Allison Lake, Bromley Rock, and Stemwinder are used primarily as overnight stops for travellers through the area. Monck, Otter Lake and Kentucky-Alleyne are destinations where the primary recreation uses are camping and fishing. Nickel Plate is the least developed park, with no developed sites near the lake. Table 2-20 shows the area, number of sites, and campground use by party for the past four years for each park (except for Nickel Plate which does not have statistics). Based on 1992 and 1993 surveys, BC residents (primarily from the Lower Mainland) accounted for more than 75 percent of park usage.

Soap Lake is a 15 hectare ecological reserve in the northwest corner of the TSA. It contains an alkaline lake and has specialized plants and invertebrates associated with it. Another ecological reserve located in the TSA is the Whipsaw Ecological Reserve near Princeton.

BC Parks and the Ministry of Forests also manage the Centennial Trail in coordination with U.S. authorities. The trail transverses Manning Park and the Cascade Range, and is used for both horseback riding and hiking. Other historic trails are located in the southwest corner of the TSA.

Table 2-20. Park Use

Park	Area (ha)	Number of Sites	1993	1992	1991	1990
			(Number of party-days)			
Monck	87	71	8 227	8 164	9 424	8 995
Kentucky-Alleyne	144	61	5 209	4 277	5 216	3 446
Bromley Rock	149	17	1 417	1 448	1 578	1 803
Stemwinder	4	23	1 949	1 930	2 250	2 315
Otter Lake	51	45	2 523	2 491	2 247	1 702
Allison Lake	23	24	1 268	1 350	1 269	995

Source: BC Parks Statistics

2.3.4 Water and Community Watersheds

The maintenance of good quality water supplies is a long-standing issue in the southern interior of the province, particularly in the drier southern portion, where population centres are concentrated in valleys and close to major waterbodies. Although irrigation is the largest single demand on water resources, concerns about water quality have escalated in recent years as a result of the increasing population and land-use pressures.

The hydrologic impacts of forestry activities are varied and include:

Changes in stream flow - The largest flow-related impact of logging is the increase in spring run-off from melting snowpacks in clearcut areas. This is especially true of harvesting which occurs at higher elevations (which diminishes the benefits of tree height and canopy closure in reducing snow accumulation and melt). Over the long term, higher peak flows can have a variety of detrimental effects, such as changing channel creek equilibrium, scouring more sediment out of the channel and triggering landslides. Greater concentrations of runoff can also create water storage problems, such as reservoir overflows;

Land Slides - Poor harvesting and road construction within a watershed can also generate landslides, whose effects can range from minor water quality degradation to the initiation of a major debris torrent;

Surface Erosion - Poor roads and road construction practices can be major causes of surface erosion and soil disturbance and lead to potentially damaging sediment deposits in streams and stream bottoms. Severe sedimentation can have serious affects on the productivity of fish-bearing streams. Visible turbidity is aesthetically undesirable and can be associated with higher bacteria concentrations. Moreover, suspended sediment can be deposited in and reduce the capacity of irrigation ditches, storage ponds and water tanks. Turbidity may also be caused by natural occurrences, agriculture, septic tanks and construction dust.

Channel Change - The removal of stream side vegetation reduces the natural erosion protection provided by plant root systems. The exposed soil is easily eroded by high water flows. In addition to eroding land and threatening structures, unstable channels can adversely affect water quality and degrade fish habitat.

Yield Losses - The loss of forest cover can reduce overall water yield (especially in late summer) in watersheds over time.

The precise relationships between some hydrological impacts and forestry development remain unknown. Where it is agreed that forestry activities are having a major detrimental impact, many people blame road networks (including skid trails, landings, drainage, and culverts). Recent slides have increased the concern regarding roads (in particular that the annual increase in new road networks is not being offset by the deactivation of unused roads).

In the Merritt TSA there are approximately ten community watersheds that comprise a relatively small percentage of the net operable land base. For this reason, no community watershed zone was modelled in the timber supply analysis. However, maintenance of the water resource is a primary consideration in these watersheds.

More restrictive forest management requirements apply within community watersheds. The rate of cut, for example, should be slower than in other watersheds; cutblocks should be smaller and narrower (to maximize shading). In particular, the maximum area harvested should not exceed 20 percent clearcut, compared to the 30 percent clearcut which generally applies in other watersheds. (It should be noted that the 20 percent guideline is a recommended level. Forest District managers may reduce this level in particularly sensitive areas or increase it where watersheds are more resilient.)

To help address cut levels, a joint committee comprised of representatives from the Ministry of Forests, the Ministry of Environment, Lands and Parks, the Federal Department of Fisheries and Oceans, and the forest industry has developed the *Southern Interior Watershed Assessment Procedure*. The goal was to provide a structured approach for evaluating the overall condition of watersheds within the Kamloops Forest Region.

2.3.5 Land Use Planning

In order to recognize the diverse values that have been identified within the Merritt TSA, a number of land use planning initiatives have been undertaken. The following is a list of some of the land use planning initiatives within the TSA and the land base deductions which have been made for the purposes of the timber supply analysis to account for these values.

Pennask Local Resource Use Plan - This plan was initiated by the Merritt and Penticton Forest Districts to coordinate the diverse resource uses and recognize and protect the

special resource values of the area (i.e. Pennask Creek, fish rearing habitat for wild rainbow trout). Within the Merritt Forest District, four walk-in lakes were established and the surrounding area (107 hectares) was deducted from the productive land base.

Brook Creek Local Resource Use Plan - This plan was initiated within the Brook Creek Community Watershed to address residents concerns about forestry related issues in relation to domestic water quality. This plan is in the data collection, analysis and assessment stage and therefore, no specific deductions to the net operable land base have been made. These will be addressed once the plan is completed and approved by the district manager.

The Lakes Local Resource Use Plan - This plan was initiated in May of 1994 to classify all lakes over three hectares in size in the Merritt TSA. This classification will recommend management objectives for the lakeshore management zone surrounding all of these lakes. In order to protect and recognize the values associated with these lakes, 2 826 hectares of productive forest land base has been deducted from the net operable land base.

The Coquihalla Phase III Land Use Plan - This plan is presently underway in the Merritt TSA. This plan will identify all sensitive areas and special values within this proposed landscape unit and assess the impacts of the new Forest Practices Code. In addition, a detailed management strategy will be developed for timbered areas adjacent to the Coquihalla Highway system.

Stoyoma Mountain - This is a proposed wilderness recreation area that has special significance to First Nations and recreationists. To protect these values and to achieve the recommended visual quality objectives (VQO), 1 339 hectares have been netted out of the productive land base.

Heritage Trails - In order to recognize and protect the heritage and recreational value of the many trails within the TSA, a special management corridor is recognized adjacent to these trails. A 200 metre wide special management corridor has been established along all heritage trails in the TSA. The forested length of these trails is 27 kilometres. In addition, a 100 metre corridor has been established along 30.5 kilometres of non-designated heritage trails. A corridor (100 metres in width) has also been established along 84.6 kilometres of hiking trail. This has resulted in the withdrawal of 1 039 hectares from the productive land base.

Forest Ecosystem Network Mapping - This planning exercise is presently in progress in conjunction with the Ministry of Environment and resource users in the TSA. The objective of this project is to map and design management strategies for linkage corridors along major water systems and between areas designated as Areas of Interest under the Protected Areas Strategy. The results of this initiative will be modelled in a future Timber Supply Review.

Protected Areas Strategy (PAS) - The Regional Protected Areas Team (RPAT) has presently identified approximately 8.5 percent of the land base of the TSA as potential Areas of Interest. These 12 larger and eight smaller areas have been identified for inventory purposes at this time. These Areas of Interest will attempt to recognize high value settings such as, river flood plains, valley bottoms, lakes, grassland, and rolling subalpine. Potential conflicts with timber, range, and mining values are being evaluated. This important provincial initiative will be brought forward for public review and input in the near future.

Nicola Watershed Community Round Table - This community based planning process has been formed to assist with and ensure community participation in future land use planning initiatives. This group is open to all watershed residents to learn about, review and respond to various issues and initiatives which impact the community. This group is a demonstration community round table under the auspices of the Fraser Basin Action Plan.

3.0 MERRITT TSA FOREST SECTOR OVERVIEW

The Merritt Timber Supply Area (TSA) is Crown forest land managed by the Ministry of Forests. As noted in the forest industry discussion in section 2.2.4, timber volumes from the TSA form a large proportion of the industrial harvest in the Merritt Forest District. This chapter focuses on various elements of the TSA forest resource: the timber harvesting land base, current management practices, management zones, allowable annual cut, and fibre supply. Estimates of employment related to the TSA harvest are also provided. This information provides a baseline for comparing potential economic effects arising from the three harvest scenarios examined in this report.

3.1 Timber Harvesting Land Base

The total land area of the Merritt TSA is about 1.12 million hectares. Of this, 812 000 hectares is considered to be productive Crown forest land. Various reductions and additions to the land base are made to derive the total land base available for timber harvesting (Table 3-1). Given these adjustments, the timber harvesting land base is estimated to be 511 000 hectares, or about 46 percent of the TSA's total land base. Approximately 73 000 hectares were removed from the land base specifically to protect other forest values (e.g. environmentally sensitive areas, heritage trails, riparian areas, etc.).

In the future, the size of the timber harvesting land base could be affected by a number of factors including:

- aboriginal land claims;
- Protected Areas Strategy;
- *Forest Practices Code of British Columbia Act*, and;
- forest ecosystem networks.

The timing and impact of such factors on the land base and the associated harvest level is conjecture at this time. As the factors become better defined, they will be incorporated in future timber supply analyses.

Avenues for increasing the timber harvesting land base are not examined in this report. The recently announced Forest Renewal Plan may increase productivity through silviculture activities. An additional opportunity, associated with problem forest types, has been investigated by the Merritt Forest District. Over 174 000 hectares are classified as problem forest types and removed from the timber harvesting land base. This classification includes trees that have been considered too small for conventional harvesting and milling equipment. These stands are typically the result of dense stocking on dry, nutrient deficient sites following fires earlier this century. However, in recent years it has been recognized that the wood produced under these conditions is very tight grained, free of defects, and highly valued by furniture manufacturers. In 1986, the district awarded a joint Timber Sale Licence to Aspen Planers and Ardew Wood Products, to harvest and process small wood. This limited program has met with some success and the district has recently undertaken to re-inventory a portion of the problem forest category to obtain a more accurate

3.0 Merritt TSA Forest Sector Overview

assessment of its extent.¹⁸ Preliminary findings indicate that 98 000 hectares may be economic sawlog or small wood stands that could be included in the timber harvesting land base in future analyses of timber supply. Field work is on-going and in the future some of the "problem forest land" may be considered for re-classification as productive forest land.

Table 3-1. Timber Harvesting Land Base		
Classification	Area (ha)	
Total Land Base		1 115 914
less Non-Crown land	206 632	
less Non-forest land	96 770	
Total Productive Forest		812 512
less Reductions to productive forest		
-non-commercial cover	3 157	
-deciduous types	6 703	
-problem forest types	174 877	
-roads, landings, trails	11 731	
-not satisfactorily restocked	31 131	
-environmentally sensitive areas	59 768	
-Pennask LRUP	107	
-Stoyoma Mt. Wilderness	1 339	
-heritage trails	1 039	
-lakeshore management zones	2 826	
-lakeshore VQO's	380	
-riparian areas	7 962	
Total current reductions		301 020
Additions to land base	16 941	
Total Current Timber Harvesting Land Base		528 433
less future roads, landings	37 640	
Long-Term Timber Harvesting Land Base		490 793
Source: Merritt Timber Supply Analysis Report.		

Within the TSA, lodgepole pine (stands of pine, pine/spruce, and pine/fir) is the leading species on approximately 67 percent of the timber harvesting land base. Other leading species by land area include spruce/white pine/cedar (nine percent); balsam/hemlock (three percent); wet belt fir (two percent); and dry belt fir (19 percent). The forest profile is dominated by the preponderance of mature stands¹⁹, which make up about 77 percent of the timber harvesting land base.

¹⁸ Irm Consultation Services Inc. *Merritt Small Wood Inventory Project Executive Report*, June 1994.

¹⁹ Defined as a stand age being greater than the minimum harvest age. For leading pine stands, this is 80 years, and 120 years for all other species)

3.2 Current Forest Management Practices

The Timber Supply Review is a forest level analysis that focuses on identifying possible harvest scenarios on the basis of current management. Current management principles in the Merritt TSA include:²⁰

Promotion and Encouragement of Proper Planning Practices - to coordinate and integrate timber harvesting with livestock grazing, and to protect cultural values, fisheries, wildlife, water, outdoor recreation and other forest dependent values.

Management of the Resource - to protect and conserve the forest resource of the Crown with optimum timber utilization and proper prioritizing of timber stands.

Effective Tenure Administration; to encourage a healthy, efficient and competitive timber processing industry by administering and enforcing a fair and equitable tenure system.

Current management practices in the Merritt TSA are based on the *Kamloops Regional Integrated Resource Management Timber Harvesting Guidelines* and include the following features:²¹

Silviculture - In most of the TSA, a clear cut harvesting system is utilized, followed by planting or natural regeneration. About 21 percent of the timber harvesting land base is ecologically suited for selection harvest methods. In selecting the appropriate silviculture system, the following factors are considered:

- resource values associated with the area
- future crops
- maintenance of site productivity
- forest health
- optimization of Crown revenues and funding
- efficient use and arrangement of operations.

Forest Health and Unsalvaged Losses - The district prioritizes harvesting to protect adjacent stands and to minimize unsalvaged losses of commercial timber. Priorities include:

- beetle infested timber
- blowdown timber
- fire killed or other damaged timber
- over mature timber
- regular profile timber

²⁰ Source: Merritt Forest District Strategic Plan (draft).

²¹ See Appendix A in the *Merritt Timber Supply Analysis* for a more detailed description of current management practices.

Forest Cover Objectives - these objectives specify the desired distribution of areas by age class groupings to accommodate and enhance non-timber uses of the forest e.g. wildlife habitat, aesthetics.

3.3 Management Zones

Specific management practices are implemented according to forest cover management zones recognized in the TSA. The zones and the corresponding management practices are:

Ungulate Winter Range Zone: This zone covers over 12 376 hectares (two percent of the timber harvesting land base). In this zone, forest cover is managed to maintain or enhance forage production by dispersing harvest throughout winter range. A significant portion of the TSA's ungulate winter range is managed by selection harvest and is included in the selection management zone discussed below. In addition, the management requirements of the selection management zone (19 percent) also satisfy the deer winter range requirement.

Landscape Management Zone: This zone covers over 50 724 hectares (10 percent of the timber harvesting land base). Forest cover is managed so as to maintain visual quality along corridors where people live, work, recreate, and travel. This includes the visual corridor of the TSA's principle highways, and important recreation viewing areas.

Selection Management Zone: This zone covers 97 598 hectares (19 percent of the timber harvesting land base). Only small patch clearcuts are permitted during harvest. It is generally the case that this harvest method meets the zone's cover requirements (e.g. aesthetic and wildlife).

Integrated Resource Management Zone: This zone covers 350 794 hectares (69 percent of the timber harvesting land base). It covers all the remaining areas not zoned above. The emphasis is on long-term management regimes which integrate all resource values.

Timber supply projections in the Timber Supply Analysis Report are based on the continuation of current management practices as described above.

3.4 Allowable Annual Cut

The current AAC of 1 280 750 cubic metres is apportioned as indicated in Table 3-2. All of the harvest from Crown land is under the direct management responsibility of the Ministry of Forests in conjunction with other government agencies. The apportionments to Woodlot Licences and Temporary Licences are not necessarily harvestable volumes over the long-term. For this reason, these volumes were excluded from the timber supply analysis. The adjusted AAC is 1 204 250 cubic metres which is used in the remainder of this report.

Table 3-2. Merritt TSA AAC and Apportionment¹	
Apportionment	m³
Forest Licences, replaceable	1 025 694
SBFEP	
Category 1 (Section 16)	80 200
Category 2 (Section 16)	11 500
Bid Proposals (Section 16.1)	54 038
Forest Service Reserve	32 818
Woodlot Licences	11 500
Temporary Licences	65 000
Total Allowable Annual Cut	1 280 750
Note:	
1. Effective September 1, 1993	

3.5 Mill Fibre Supply

As part of the field work for this report, a survey of the forest industry was completed. All of the major licensees were contacted as were several licence holders, under the SBFEP. The objective of the survey was twofold. One objective was to better understand the contribution of the Merritt TSA harvest to forest sector activity at the TSA and provincial levels. The second objective was to obtain data on employment and production levels in order to derive employment coefficients. The coefficients are used to project future employment levels given the harvest scenarios discussed in this chapter.

Aggregate wood flow within the TSA, averaged over the last three years is summarized in Table 3-3. Major licensees secured about 71 percent of the total wood consumed from their own replaceable forest licences. The second largest source of fibre was purchased from small business operators within the TSA. In total, TSA fibre comprised about 84 percent of licensees' mills total consumption during the period. Other important fibre sources were private land within the TSA, and wood "imported" to the TSA (primarily via inter-company trades). Most of the logs were processed by chip-n-saw, reflecting the abundance of relatively small diameter logs in the TSA. Larger logs were processed into lumber products by head rigs, or into veneer. Pulp chips are a valuable by-product of the milling process. These were transported to pulp mills or other markets outside the TSA.

Table 3-3. Mill Fibre Supply¹

	(m ³)	% of total
Own licence	1 102 800	71
SBFEP	160 400	10
Woodlots	10 500	1
Trades/Transfers	40 100	2
Total TSA	1 313 800	84
Other TSAs	104 900	7
Private and Indian Reserves	136 800	9
Total Supply	1 555 500	100
Source: Industry survey.		
Notes:		
1. 1991-93 average for major licensees; average total throughput for TSA mills during this period was 1 448 000 m ³ .		
2. Does not include volumes associated with Riverside Forest Products Ltd.		

3.6 Employment Coefficients

The fibre flow and employment data collected from the industry survey were used to derive TSA specific direct employment coefficients. This information, and the methods used to derive indirect and induced employment, is presented in Appendix 3. The results of this analysis were applied to the current AAC to estimate the contribution of the TSA wood supply to the TSA and total provincial economy. This information is summarized in Table 3-4.

Approximately 82 percent of the direct employment occurs within the TSA. Direct employment outside the TSA is created in pulp mills and through silviculture activities as most of the planting is done by contractors resident outside the TSA. Direct employment outside the TSA also includes milling employment associated with the forest licence held by Riverside Forest Products Ltd. Indirect employment occurs in industries supporting forest industry operations and induced employment results from direct and indirect employees' consumer expenditures. Because the TSA economy is not broadly diversified, a large proportion of the indirect and induced employment occurs outside the TSA. In particular, it is estimated that the TSA harvest activity supports 325 person-years of indirect and induced employment within the TSA, which is roughly one fifth of the total indirect and induced employment created provincially.

Ministry of Forests employment is not included in Table 3-4. In 1993, the Merritt Forest District had 73 full-time equivalent positions with a total payroll of \$2.8 million. In addition, contracts totaled about \$4.2 million. It is estimated that the Merritt Forest District creates another 40 person-years of employment in support industries. Ministry of Forests operations encompass more than management of the Merritt TSA's AAC, which is only one component of the Ministry of Forests responsibilities in the TSA.

It is important to note that these economic effects relate only to the Merritt TSA harvest. The industry in the TSA supports a higher level of employment as it also processes wood from non-TSA sources. The employment effects relate primarily to harvesting and primary processing (including routine maintenance) activities; capital expenditures are not included. Most of the mills reported an on-going capital expenditure program of several million dollars per year. These expenditures support employment in the construction industry within the TSA and province. This employment is not included in Table 3-4.

	TSA Employment (PY)	Provincial Employment (PY)	TSA Coefficient (PY/1 000 m³)	Provincial Coefficient (PY/1 000 m³)
Major Licences				
woods	261	266	0.22	0.22
mill	523	534	0.43	0.44
SBFEP				
Category 1	29	30	0.02	0.02
Category 2 & Sec. 16.1	96	107	0.08	0.09
Silviculture	18	48	0.02	0.04
Pulp Mills	0	147	-	0.12
Total Direct	927	1 132	0.77²	0.94³
Total Indirect/Induced	325	1 698	0.27⁴	1.41⁵
Total Employment	1 252	2 830	1.04	2.36
Notes:				
1. Based on current AAC of 1 204 250 m ³ . See Appendix 3 for a description of employment estimates.				
2. Used to calculate TSA direct employment impacts. Column may not add due to rounding.				
3. Used to calculate provincial direct employment impacts. Column may not add due to rounding.				
4. Used to calculate TSA indirect/induced employment impacts.				
5. Used to calculate provincial indirect/induced employment impacts.				

3.7 Harvest Scenarios

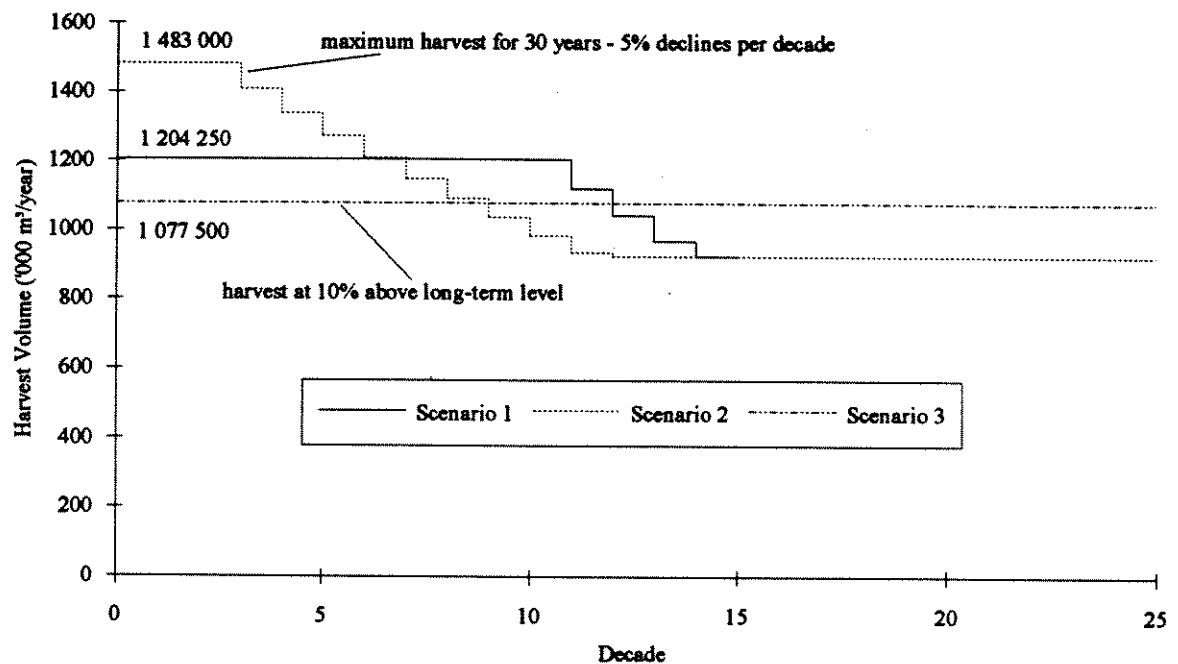
The *Merritt TSA Timber Supply Analysis* is a technical report that identifies possible timber supply scenarios given current management practices and expectations about particular critical factors. The timber supply analysis for the Merritt TSA found that the most significant factor affecting timber supply is the area and volume of mature forest. That is, approximately 77 percent of the TSA's timber harvesting land base is, or soon will be available for harvest. Given this mature forest, the analysis indicated that timber supply is not significantly affected within the first eight decades by variables tested in the sensitivity analysis.

Three harvest scenarios from the timber supply analysis are examined in Chapters 4.0 and 5.0. These harvest scenarios were selected to identify the range of effects that may result given different harvest levels. This information is intended to illustrate the implications of the harvest

scenarios and to promote discussion. No recommendation regarding a preferred harvest scenario is made or implied.

The three harvest scenarios are illustrated in Figure 3-1. Scenario 1 maintains the annual harvest at its current level (1 204 250 cubic metres per year) for 11 decades. After that point, the harvest level is phased down to the long-term harvest level of 925 000 cubic metres per year, which is reached in the 14th decade.

Figure 3-1. Harvest Scenarios



Given the abundance of mature timber, there are a number of feasible harvest scenarios. One such scenario is illustrated in Scenario 2. In this scenario, the initial harvest level is 23 percent above the current level. This higher level could be maintained for three decades and then would decline at five percent per decade to the long-term level in decade 12. Over the fourteen decades, the total harvest under Scenario 2 is approximately 124 000 cubic metres (0.4 percent) greater than Scenario 1. Scenario 2 brings harvest volumes forward in time, but does not significantly affect the total volume harvested. Scenario 3 examines the timber supply implications of commencing a harvest level approximately 10 percent below the current level. Since there is a relative surplus of mature timber, this harvest level could be maintained for the full 15 decades considered in this analysis. However, total harvest would be 10 860 000 cubic metres (seven percent) less than Scenario 1.

The economic implications of the three harvest scenarios are addressed in the following chapter. The social and environmental implications are discussed in Chapter 5.

4.0 ECONOMIC IMPACTS

In the previous chapter, the level of employment supported by the current level of harvest from the Merritt TSA was presented. In this chapter, economic impacts associated with the three harvest scenarios are discussed.

The method used to estimate economic impacts assumes that ratios of employment, employment income, and government revenue to the TSA harvest volume remain constant over the forecast period. Consequently, changes in economic activity are directly proportional to changes in harvest levels. Two key assumptions are:

- Any increase or decrease in the AAC will be shared among the various licences in proportion to the current apportionment. Employment coefficients vary across the categories of licences, depending on the harvesting and processing activities undertaken. To the extent the apportionment of the future AAC does not maintain the existing proportional distribution, employment levels may differ from those presented here.
- The ratio of employment to input wood volume will remain unchanged from current levels.

These assumptions are not unreasonable for predicting relatively short-term values. However, even in the short-term it is often the case that employment levels may change in discrete steps, rather than the continuous uniform changes assumed here. Over the longer-term these assumptions imply restrictions on change that generally do not hold. Common factors that may affect employment coefficients include mill modernization, changing product lines, changing input wood characteristics, and changing product and input prices. These changing relationships will often alter the size of the employment coefficient. Another example is the recently announced Forest Renewal Plan, which is anticipated to increase employment through intensive silviculture projects, and by promoting value-added manufacturing. Some factors will reduce employment coefficients (e.g. higher labour productivity), while others will increase coefficients (e.g. more intensive silviculture).

The employment coefficient is a dynamic variable that is subject to a host of influences. Historically, the relative prices of labour and wood, as well as other factors, have favoured technical change (i.e. investment in new capital) that substituted away from labour, hence reducing the employment coefficient. If this process were to persist, then the estimates presented here would overstate the employment actually realized in the presence of new investment. On the other hand, there are factors that may lead to a higher employment coefficient. The Forest Renewal Plan, with its emphasis on intensive silviculture and value-added, is an example. While it is acknowledged that the assumption used here to project employment impacts is restrictive, it is not clear at this time the bias this may impart. Given this finding, the projections should be considered indicative of the

economic effects that would accompany changes in TSA harvest levels, but they are not definitive. Provided industry activity is monitored, the precision of the estimates can be improved in the future.

The employment, income and government revenue impacts of Scenario 1 are presented in the next section. In Section 4.2 the corresponding impacts of the harvest scenarios are considered.

4.1 Scenario 1 Economic Impacts

Under Scenario 1 the harvest would be maintained at the current level for 11 decades. Given the forecasting methodology, employment, income and government revenues remain at current levels. While it was noted above that in reality these elements will be expected to change during this time span, the changes would arise from other factors, not from changing TSA harvest levels. Commencing in decade 12, the harvest level declines toward the long-term harvest level of 925 000 cubic metres which is reached in decade 15. This represents a drop of 25 percent from the present level. Employment and incomes would decline proportionately.

Employment and Income Impacts

Table 4-1 presents the quantitative forecast of employment and income effects that would occur within the TSA. Essentially, Scenario 1 provides a continuing economic base for the local economy for the foreseeable future.

Table 4-2 presents the total employment and income forecasts for the province. These include the TSA impacts and those occurring outside the TSA. There are significant employment impacts outside the TSA, in part from the processing of the TSA harvest, but primarily from the indirect and induced employment created in the industry supply businesses and consumer-oriented businesses, respectively. This can be attributed to the relatively small, not well diversified character of the TSA economy. Over the length of the forecast period, the TSA economy can be expected to grow and become more diversified. As this occurs, a greater share of the indirect/induced employment shown in Table 4-2 could accrue to the residents.

Table 4-1. Scenario 1 TSA Employment and Income Impacts¹

	Decade				
	Current	1-11	12	13	15
HARVEST (m³/year)	1 204 250	1 204 250	1 120 000	1 042 000	925 000
EMPLOYMENT (PY/year)					
Direct ²	927	927	862	802	712
Indirect/Induced ³	325	325	302	281	250
Total Employment	1 252	1 252	1 164	1 083	962
EMPLOYMENT INCOME (\$ 1993 millions after-tax/year)					
Direct ⁴	\$31.1	\$31.1	\$29.0	\$27.0	\$23.9
Indirect/Induced ⁵	7.1	7.1	6.6	6.2	5.5
Total Income	38.2	38.2	35.6	33.2	29.4

Notes:

1. See Appendix 3 for a description of the methodology used to estimate employment and employment income impacts. Ministry of Forests employment is not included in these impacts (see Appendix 3).
2. Direct employment includes harvesting, milling, and basic silviculture and is based on a TSA direct employment coefficient of 0.77 PY per 1 000 cubic metres (see Appendix 3).
3. Indirect and induced employment was calculated using a TSA indirect/induced employment coefficient of 0.27 PY per 1 000 cubic metres (see Appendix 3).
4. Based on a TSA net average direct wage of \$33 600 per PY (see Appendix 3).
5. Based on a TSA net average indirect/induced wage of \$21 942 per PY (see Appendix 3).

Table 4-2. Scenario 1 Provincial Employment and Income Impacts¹

	Decade				
	Current	1-11	12	13	15
HARVEST (m³/year)	1 204 250	1 204 250	1 120 000	1 042 000	925 000
EMPLOYMENT (PY/year)					
Direct ²	1 132	1 132	1 053	979	870
Indirect/Induced ³	1 698	1 698	1 579	1 469	1 304
Total Employment	2 830	2 830	2 632	2 448	2 174
EMPLOYMENT INCOME (\$ 1993 millions after-tax/year)					
Direct ⁴	\$37.6	\$37.6	\$35.0	\$32.6	\$28.9
Indirect/Induced ⁵	39.1	39.1	36.4	33.9	30.1
Total Income	76.7	76.7	71.4	66.5	59.0

Notes:

1. See Appendix 3 for a description of the methodology used to estimate employment and employment income impacts. Ministry of Forests employment is not included in these impacts (see Appendix 3).
2. Direct employment includes harvesting, milling, and basic silviculture and is based on a provincial direct employment coefficient of 0.94 PY per 1 000 cubic metres (see Appendix 3).
3. Indirect and induced employment was calculated using a provincial indirect/induced employment coefficient of 1.41 PY per 1 000 cubic metres (see Appendix 3).
4. Based on a provincial net average direct wage of \$33 258 per PY (see Appendix 3).
5. Based on a provincial net average indirect/induced wage of \$23 051 per PY (see Appendix 3).

The impacts of Scenario 1 on provincial government revenue are presented in Table 4-3. Scenario 1 would not cause changes in government revenues for the first 11 decades. After that point, government revenue would decline in proportion to declining harvest volumes.

Table 4-3. Scenario 1 Provincial Government Revenue Impacts¹					
	Decade				
	Current	1-11	12	13	15
HARVEST (m³/year)	1 204 250	1 204 250	1 120 000	1 042 000	925 000
REVENUE (\$1993 million/year)					
Stumpage ²	\$11.0	\$11.0	\$10.2	\$9.5	\$8.4
Personal Income Tax ³	8.4	8.4	7.8	7.2	6.4
Corporate Taxes ⁴	5.0	5.0	4.7	4.3	3.8
Other Revenue ⁵	1.2	1.2	1.1	1.0	0.9
Property Tax ⁶	0.8	0.8	0.7	0.6	0.6
Total	26.3	26.3	24.5	22.7	20.2
Notes:					
1. See Appendix 3 for a description of the methodology used to estimate provincial government revenue impacts. Federal government revenue is not included in these impact estimates (see Appendix 3).					
2. Based on stumpage coefficient of \$9 120 per 1 000 m ³ (see Appendix 3).					
3. Based on personal income tax coefficient of \$6 957 per 1 000 m ³ (see Appendix 3).					
4. Includes corporate income tax, logging tax, capital tax, sales tax, and electricity tax; based on a coefficient of \$4 160 per 1 000 m ³ (see Appendix 3).					
5. Includes scaling fees, range fees, interest, and miscellaneous fees; based on a coefficient of \$973 per 1 000 m ³ (see Appendix 3).					
6. Based on a coefficient of \$623 per 1 000 m ³ .					

In aggregate, the provincial government (including municipal and regional levels of government) collects about twice the revenue as the federal government. However, not incorporated in the table are the recent changes in the level of stumpage fees announced in April, 1994 as part of the Forest Renewal Plan. These changes could significantly increase provincial stumpage revenue provided the higher lumber prices that occurred in 1993 are maintained in the future. If average lumber selling prices were to exceed \$350 U.S. per thousand board feet, the average stumpage rate could be some 60 to 80 percent higher than the rate used in this analysis. Given that the changes to the stumpage system have just come into effect, it is not possible to forecast their impact at this time. It might be noted that increased stumpage revenue will reduce both provincial and corporate income taxes paid directly by the forest industry as the stumpage payment is an allowable cost for income tax purposes.

4.2 Alternative Scenario Economic Impacts

Scenario 2 would allow for a significant increase in harvest relative to today, which could be maintained for a reasonable length of time. Scenario 3 represents a reduction from Scenario 1.

Scenario 2

This harvest scenario commences at a level approximately 23 percent above the current harvest level. This level can be maintained for three decades, then gradually steps down to the long-term harvest level. The increased harvest level is feasible because of the abundance of mature timber. The scenario also serves to illustrate the potential effect of utilizing forest types that are currently considered non-merchantable.

Employment, income and government revenue impacts in the first five decades of Scenario 2 are presented in Appendix 4; significant effects are summarized below:

- With respect to direct employment impacts within the TSA, the initial higher harvest level would support 1 142 direct PY in the first three decades (Table A4-1). This is an increase of 215 PY over Scenario 1. There is sufficient milling capacity and available labour resources in the TSA to accommodate this increase. Provincially, the net gain in direct employment would be 262 PY (Table A4-1). Similarly, indirect and induced employment is projected above the levels that might be obtained by Scenario 1. Within the TSA, this "ripple effect" is forecast to add 75 PY, and provincially the increase above Scenario 1 is 393 PY (Table A4-1).
- Commencing in decade four, the harvest level begins to decline from its initial level. Given the forecasting methodology, employment declines at a corresponding rate. However, it is not until decade seven that the employment level associated with Scenario 2 is equal to that of Scenario 1. Thereafter, employment is projected to decline until the long-term harvest rate is attained in decade 12. In Scenario 1, this employment level is reached in decade 14.
- Employment income and government revenue are forecast to follow the same pattern as described above for employment. That is, initially increased incomes and revenues are realized relative to Scenario 1. However, after decade seven the revenues achieved by this alternative are less than Scenario 1. From decade 14 onwards the two alternatives are same. The quantitative forecasts of employment income and government revenue for the initial five decades are presented in Table A4-1.

Scenario 3

The harvest scenario indicates an immediate reduction from the current harvest level of roughly 10 percent. The timber supply analysis indicated that this level could be sustained over the 15 decade planning horizon.

The quantitative forecasts of employment and revenue for the initial five decades are also presented in Appendix 4. The key differences of this scenario relative to Scenario 1 are:

- Direct employment would initially decline by some 119 PY provincially with about 97 PY of the decline occurring in the TSA (Table A4-2). Thereafter, direct employment

would remain at 830 PY in the TSA or 1 013 PY provincially over the remainder of the 15 decade planning horizon. Relative to the Scenario 1, direct employment is projected to decline to the level of Scenario 3 by about decade 13.

- Until decade 13, employment income and government revenue associated with Scenario 3 are similarly below the values that could be obtained under the Scenario 1. The quantitative forecasts of income and government revenue for the initial five decades are presented in Table A4-2.
- To the extent long-term stability of wood supply is a desirable feature, Scenario 3 attains this characteristic to a greater degree than the other two harvest scenarios.

5.0 SOCIAL AND ENVIRONMENTAL IMPLICATIONS

This chapter presents the social and environmental implications of the three harvest scenarios. The social implications are considered with respect to the TSA's two principle communities and First Nations peoples. Similar to the discussion of economic impacts, the analysis of social effects is conducted as if changing harvest levels were the only factor impacting the community. This is an abstraction of reality, hence the discussion should be considered indicative of the potential impacts, rather than a projection of actual effects.

5.1 Social Implications

5.1.1 Scenario 1 (Current harvest level for 11 decades)

Community Impacts - Scenario 1 is a continuation of the present harvest level for 11 decades before declining to the long-term harvest level. Given this, there would be no incremental impact on employment levels, population levels, demand for community services, relative to current conditions as a consequence of the harvest decision. Forestry would continue to be a mainstay of the TSA economy.

On the other hand, the present desire by industry participants and others for greater wood supply would not be satisfied. In order to address the current rates of unemployment, communities would need to seek other avenues to expand and diversify their respective economies. The forest sector could play an important role in the communities' future growth, even in the absence of expanded harvest levels. That is, there may be viable value-added manufacturing opportunities, as well as dependable careers in silviculture. However, these potential effects are outside the scope of this analysis.

First Nations - First Nations foresee an important role for forestry as a source of employment and an avenue for future economic development. Scenario 1 could coincide with First Nations economic development aspirations if opportunities to participate in the forest sector were developed.

First Nations also expressed common concerns with respect to present forest management practices. In particular, they were concerned with harvest practices, the level of harvest, the availability of timber, the protection of special interest areas, the protection of spawning grounds, and water quality. Several of these concerns are not directly related to the harvest level, rather they are related to the manner in which harvesting and related activities are conducted.

5.1.2 Scenario 2 (Immediate 23 percent increase)

Community Impacts - This harvest scenario represents an increase in harvest level of about 23 percent increase from current levels. This level could be sustained for three decades before declining toward the long-term harvest level. It appears that the existing mill capacity is sufficient to accommodate this higher level of throughput. That is, it is not

necessarily the case that new construction (and the consequential impacts of a temporary work force) would result from this harvest scenario. An increase in the aggregate operating labour force during the first three decades was estimated in the last chapter to be some 208 person-years, and 73 person-years of indirect employment. These new employment opportunities could alleviate the TSA's high rates of unemployment. However, if TSA residents did not have the requisite skills, the employment opportunities would be filled by qualified workers moving into the TSA. This would lead to population growth in the TSA.

There is insufficient information to suggest the potential impacts an increase in population might have on TSA communities. For Merritt, an increase in population would reinforce the growth experienced in recent years and put pressure on the demand for community services, affect the real estate market, and heighten the demand for retail services. The degree to which these added demands may actually create "problems" depends on the size and timing of the population increase, and other factors (i.e. capacity of social infrastructure, population changes arising from other sources). Similar considerations apply to Princeton. New forest sector employment may offset the effects of reduced employment in the mineral sector.

Given that the stimulus of the higher harvest level is relatively long-term (relative to business investment planning horizons), there could be some diversification of the communities economies not reflected in the employment forecasts presented in the previous chapter.

First Nations - Potentially, a share of the increased harvest could address First Nation's aspirations for economic development and reliable employment opportunities. This would depend in part on aboriginal people acquiring the skills and experience which the new employment opportunity would require. Progress is being made in this regard as evidenced by the NVIT programs and the number of aboriginal people presently employed in the forest sector. The increased harvest may also permit bands to hold quota without a corresponding reduction to current quota holders. However, as indicated in the industry profile presented in chapter 2, most industry participants are also seeking a larger wood supply. This matter is addressed by the apportionment decision which follows the setting of the AAC, and is therefore not addressed here.

The higher harvest level may heighten several of the First Nation's concerns regarding forest management. In particular, the protection of special interest areas, and the protection of water quality. First Nations expressed concern that the current rate of harvest was too high.

5.1.3 Scenario 3 (Immediate 10 percent decrease)

Community Impacts - Given this harvest scenario, aggregate harvest would immediately be reduced ten percent, after which time a constant harvest level is projected for the entire planning horizon. It is estimated that this would result in an eventual loss of 95 person-

years of employment in the forest sector and 33 person-years of indirect and induced employment in supporting businesses.

The persistently high rates of unemployment experienced by Merritt and Princeton would be further aggravated by this harvest scenario. The adjustment to this harvest scenario might be viewed as a continuation of past trends where employment has declined due to technological change. It is not anticipated that this harvest scenario would lead to a mill closure, although it is noted that a rationalization of milling capacity may occur given current harvest levels. Employment loss will stress individuals and families, and may lead to a range of social problems²¹.

From the community development perspective, this harvest scenario would generally preclude the forest sector as an important avenue for future growth. Opportunities for creating greater value-added manufacturing would need to be pursued. Communities would need to focus their efforts on creating opportunities in other economic sectors. The positive support for the Community Economic Summit process suggests that both Merritt and Princeton have already adopted this approach.

The harvest levels of the two other harvest scenarios would eventually fall to levels below this one, but it is a very distant event (i.e. 130 years in the case of Scenario 1 and 100 years for Scenario 2). While planning over such spans of time may be appropriate for the forest resource, the planning horizon for most community developments, business enterprises, and individuals is much shorter. This relatively shorter term perspective negates any advantage this harvest scenario might offer towards the end of the forest planning horizon.

First Nations - A shrinking forest sector may make it more difficult for First Nations to satisfy economic development and employment aspirations from the forest resource. Like the non-aboriginal community, First Nations would need to focus their efforts on other sectors, in order to diversify, and to address their economic needs.

This harvest scenario does address several of the First Nations' current concerns regarding forest management. In particular there would be a lower rate of harvest under this scenario. Reduction of the rate of harvest may facilitate the protection of special interest areas, spawning grounds and the availability of wood for cultural purposes.

²¹ "Employee Transitions and Risk Following Timber Harvesting Reductions: Preliminary Estimates and Suggested Methodology", Lee, Robert G., March 1994.

5.2 Environmental Implications and Concerns²²

This section discusses the potential effects of current timber harvesting practices on the environment. These effects are discussed in general terms. Specific impacts for each harvest scenario are not identified because of the timber supply review's focus on aggregate changes in harvest levels as opposed to site specific changes.

The Ministry of Environment has expressed the following general forest management concerns which may be applicable to some forest stands and operations in BC. Current forest management practices, which are reflected in each of the three harvest scenarios examined in this report, could affect functional, natural ecosystems by:

- shortening the age class succession and eliminating old growth;
- simplifying ecosystems through intensive silviculture;
- simplifying the mosaic of habitats by managing for certain tree species (e.g. pine) and managing against others (e.g. aspen);
- increasing the fragmentation of habitats especially old growth forests through road construction and timber harvest;
- impacting watersheds thus affecting water quality and flow regimes to the detriment of fisheries, irrigation supply and domestic water users;
- impacting habitats required by red- and blue-listed species.

The *Forest Practices Code of BC Act* has been passed by the legislature, with implementation expected this fall. The Code will require increased environmental protection during forest management activities, with tough standards and enforcement. Current practices in the Merritt Timber Supply Area will be adjusted where necessary to be consistent with the standards of the Code.

The *Forest Practices Code of BC Act* will deal with the above issues by:

- manipulating patch sizes so that larger leave areas of mature timber and old growth will exist into the future;
- manage forests at the landscape level through the introduction of corridors of biological connectivity;
- managing forests at the stand level through: wildlife tree and coarse woody debris retention, slash management and other practices;
- relaxing the standards for silviculture performance e.g. introducing longer "free to grow" periods;
- addressing red-listed species and their habitats.

To further address environmental impact concerns, the Merritt TSA has recognized special habitat values and implemented specific management strategies. The following is a list of management practices to protect habitat values.

²² The comments and suggestions made in this sub-section were obtained from discussions with Ministry of Environment, Lands and Parks, Kamloops and Penticton.

Protection of Old Growth Stands

Human intervention in the natural life-cycle of the forest will result in a shift in age class distribution from mature old growth to managed forests. To maintain old growth forest habitat, certain objectives will be met in the Merritt TSA through various land use planning initiatives. These involve the Lakes Classification, Forest Ecosystem Networks, Protected Areas Strategy, Riparian Habitat and the continued prevention of wildfire in some ecosystems.

Protection of Ungulate Winter Range

Wild ungulates (deer, elk, mountain sheep, and to a lesser degree, mountain goats) depend on low elevation winter ranges to provide forage and cover during winters with heavy snow. In order to protect ungulate winter range, selection management is practiced in these areas within the Merritt TSA. Selection management is a silvicultural system used to maintain or create areas containing a wide range of tree ages or sizes. The time interval between harvests in such areas is fairly short (usually less than 30 years) and during these harvests, either single or scattered trees, or small groups of trees are removed from an area. Ungulate winter range is managed this way so as to sustain or enhance forage and to ensure adequate cover for deer during winter months. A total of 109 974 hectares or 21 percent of the Merritt TSA is managed selectively.

Protection of Riparian Areas

Riparian areas are the banks of streams, rivers, lakes and wetlands. These areas are very important to fish and wildlife and contain the highest number of species of flora and fauna. Disturbance of riparian and in-stream habitat can result in the reduction of shade, large organic debris, food sources and stream bank stability. Protection of these areas was afforded in the timber supply analysis by removing 7 962 hectares of productive forest area from the timber harvesting land base. The pending Forest Practices Code will increase the management constraints of this zone.

Impact of Forest Management on Wildlife

Forest management practices may affect wildlife species. Assessing the particular impacts on wildlife species is difficult, however, some effects on higher profile species have been documented. In general, the following effects have been noted:

- **forest bird species** (cavity nesters, raptors, woodpeckers): Species dependent on late successional forest and old growth attributes will be most at risk. As more of the productive land base is managed for timber production, there is likely to be a reduction in wildlife habitat features such as snags, deciduous stands and coarse woody debris.
- **carnivores** (grizzly and black bears, wolves, etc.): As forests are roaded and logged, the area of suitable habitat for carnivores may be reduced through reduction of prey species, and/or unsuitable levels of disturbance.

- **ungulates** (deer, elk, moose, mountain sheep, and mountain goat): Retention of productive winter range is critical for deer, elk and mountain sheep, and to a lesser degree, moose and mountain goats.
- **furbearers** (especially pine marten, bobcat): Species are dependent on older intact forests and populations decline with increased fragmentation.

Wildlife Habitat Areas, as defined by the Forest Practices Code, are designed to maintain, enhance or restore habitats and populations of red listed wildlife (threatened, endangered, or at risk of extirpation in BC), regionally important wildlife, and endangered species. Additional protection and management of wildlife species is afforded through the review of all harvesting plans by the Ministry of Environment prior to approval by the Ministry of Forests. A table of the red and blue listed species within the Merritt TSA can be found in Appendix 1.

Impact of Forest Management on Water and Fish Resources

Natural water flow patterns may be affected by harvesting operations, insect or disease infestation and large fires. Disturbances such as these may impact water quality, quantity and timing of run-off. Components of fish habitat, such as large organic debris and stream bank vegetation can also be affected by natural or human caused forest disturbances.

Changes in stream flow or vegetative cover can impact stream temperatures which may be detrimental to fish populations. Increased sedimentation from poor road building practices and increased stream bank instability from increased flow can be detrimental to the survival of fish eggs. Excessive disturbance, or improper forest practices within a Community watershed may also impact domestic water supplies.

All road plans are reviewed by the Ministry of Environment through the development plan referral process. Access Management Plans and Local Resource Use Plans are also being developed to better manage activities, such as timber harvesting, that may affect water and other forest resources. To further protect and manage the water resource and fish habitat, all road building plans for streams with salmon populations are subject to review by the Ministry of Environment and the Department of Fisheries and Oceans prior to approval by the Ministry of Forests. In addition, the pending Forest Practices Code will provide greater protection of streams and fish habitat.

Other initiatives which will reduce the environmental impact concern regarding forest harvesting are:

Lakeshore Management Areas - Lakeshore management areas are sensitive areas surrounding upland lakes. One hundred percent of this area has been removed from the productive land base and is unavailable for harvest (2 826 hectares), until such times as the lakes LRUP is completed.

Forest Ecosystem Networks - Forest ecosystem networks (FENS) are corridors connecting ecosystems throughout the landscape to help maintain biological diversity. Emphasis is now being placed on these corridors because they are believed to be of high value to wildlife and other biological systems. These special management areas are subject to constraints on timber harvesting, ranging from total protection to moderate constraints on harvesting activities. The identification of FENS and the drafting of appropriate management guidelines are presently underway within the Merritt TSA. The Biodiversity Guidelines of the Forest Practices Code will also assist with this endeavour.

Environmentally Sensitive Areas - Environmentally sensitive areas within the Merritt TSA have been removed from the productive land base. These areas may have high recreational values, high wildlife values or soils which are not suitable for harvesting. A total of 59 768 hectares of productive land base has been withdrawn to account for these areas.

The Merritt Forest District is currently addressing many of the Ministry of Environment, Lands and Parks environmental impact concerns with the above mentioned strategies. The Forest Practices Code of BC Act will ensure further protection of the environment.

6.0 SUMMARY AND CONCLUSIONS

The forest sector is a significant part of the economy in the Merritt TSA. Within the TSA, the present harvest level supports approximately 1 252 person-years of direct and indirect/induced employment and generates approximately \$38.5 million in after-tax employment income. Provincially, harvests from the Merritt TSA support an estimated 2 830 person-years of employment and generate approximately \$77.1 million in after-tax employment income. Provincial employment and employment income estimates include TSA employment and employment income. Government revenue associated with the current TSA harvest is approximately \$26.3 million.

This report has examined the potential economic impacts and social and environmental implications associated with three harvest scenarios from the *Merritt TSA Timber Supply Analysis* report. Scenario 1 maintains the annual harvest at its current level (1 204 250 cubic metres per year) for 11 decades. After that point, the harvest is phased down to the long-term harvest level which is reached in decade 14. Under Scenario 2, the initial harvest level is 23 percent above the current level (1 483 000 cubic metres per year). This higher level could be maintained for three decades. The harvest would then decline by five percent per decade until decade 12 when the long-term harvest level is reached. The long-term harvest level under Scenarios 1 and 2 is 925 000 cubic metres per year. Scenario 3 examines the timber supply implications of commencing at a harvest level approximately 10 percent below the current level (1 077 500 cubic metres per year). This harvest level could be maintained for at least 25 decades.

The analysis in this report assumes that economic impacts would be proportional to changes in the harvest level. Scenarios 1 and 2 indicate a decline in employment of 656 person-years over the next 120 to 140 years as the harvest declines to a long-term harvest level of 925 000 cubic metres per year. However, employment would remain at or above current levels for 110 years under Scenario 1 and 70 years under Scenario 2. Scenario 1 would allow communities time to prepare for harvest reductions. The first seven decades of Scenario 2 would have higher harvest levels and, therefore, higher employment levels than are currently experienced in the TSA. Under Scenario 3 there would be an immediate loss of 298 person-years of employment. However, there would be no further employment losses under this scenario.

The main difference between scenarios from an environmental perspective results from the timing of harvest reductions or increases. Harvesting of older age forest would proceed most rapidly under Scenario 2, followed by Scenario 1 and then Scenario 3. As the age class distribution of the forest narrows, populations of species that depend on mature forests may decline.

This study assumes that factors such as the timber harvesting land base, forest management practices, harvesting and processing technology, timber prices, and

6.0 Summary and Conclusions

productivity remain constant. A change in any of these variables would require re-visiting the analysis contained in this report.

MERRITT TSA RED AND BLUE LISTED SPECIES

The Ministry of Environment, Lands and Parks has identified two groups of wildlife considered 'at risk' in the province:

1. Red list species are considered endangered, threatened, or at risk of extirpation in BC, and;
2. Blue list species are considered vulnerable.

Listed species are not necessarily at risk globally. The following table shows red and blue list species that are known to be or may be present in the Merritt TSA, and the potential impact of forest practices on these species. In the future, the Forest Practices Code will require Wildlife Habitat Areas to maintain, enhance or restore habitats of red listed and regionally important wildlife populations.

Table A1-1. Merritt TSA Red and Blue Listed Species				
	Status	Zonal Group	Impact	Habitat
Amphibians				
Tiger Salamander	red	DryInt	few	lakes
Tailed Frog	blue	ESSF	high	riparian
Great Basin Spadefoot Toad	blue	DryInt	low*	grassland
Reptiles				
Painted Turtle	blue	DryInt	low	lakes
Rubber Boa	blue	DryInt	low	light forest
Western Yellow-bellied Racer	blue	DryInt	low*	riparian
"Great Basin" Gopher Snake	blue	DryInt	low*	grassland
Western Rattlesnake	blue	DryInt	low	grassland, light forest
Birds				
Western Grebe	red	DryInt	low	riparian, lakes
American Bittern	blue	DryInt	low	riparian
Tundra Swan	blue	DryInt	low	lakes, riparian
Trumpeter Swan	blue	DryInt	low	lakes, riparian
Surf Scoter	blue	DryInt	low	lakes
Turkey Vulture	blue	DryInt	low	perching trees
Swainson's Hawk	blue	DryInt, ESSF		nesting trees
Rough-legged Hawk	blue	DryInt	low	
"American" Perigrine Falcon	red	DryInt, ESSF	low	cliffs
Gyr Falcon	blue	DryInt	low	cliffs
Prairie Falcon	red	DryInt	low	cliffs
"Columbia" Sharp-tailed Grouse	blue	DryInt	low	grasslands
Lesser Golden-Plover	blue	DryInt	low	riparian
American Avocet	blue	DryInt	low	riparian
Wandering Tattler	blue	DryInt, ESSF	low	riparian
Upland Sandpiper	blue	DryInt	moderate	riparian
Long-billed Curlew	blue	DryInt, ESSF	low	grassland
Hudsonian Godwit	blue	DryInt	low	riparian
Short-billed dowitcher	blue	DryInt	low	riparian
Red-necked Phalarope	blue	DryInt, ESSF	low	riparian
California Gull	blue	DryInt	low	special lake
Barn Owl	blue	DryInt	low	open country
Flammulated Owl	blue	DryInt	high	old growth fir
"MacFarlane's" Western Screech Owl	blue	DryInt	moderate	old growth riparian

Table A-1. Merritt TSA Red and Blue Listed Species (continued)				
	Status	Zonal Group	Impact	Habitat
Birds (continued)				
Burrowing Owl	red	DryInt	low*	grassland
White-throated Swift	blue	DryInt	low	cliffs
Black-chinned Hummingbird	blue	DryInt	moderate	
Lewis' Woodpecker	red	DryInt	moderate	old growth ponderosa pine
"Western" Williamson's Sapsucker	blue	DryInt	moderate	larger aspen
White-headed Woodpecker	red	DryInt	high	old growth fir
Gray Flycatcher	blue	DryInt	low	ponderosa pine
Canyon Wren	blue	DryInt	low	canyons
Sage Thrasher	red	DryInt	low	grassland
Sprague's Pipit	red	DryInt	low	alpine
Yellow-breasted Chat	red	DryInt	low	riparian
"Sagebrush" Brewer's Sparrow	red	DryInt	low	grassland
Lark Sparrow	blue	DryInt	low	open
Grasshopper Sparrow	blue	DryInt	low	grassland
Bald Eagle	blue	DryInt	moderate	old growth fir, ponderosa pine, deciduous
Mammals				
Vagrant Shrew		DryInt	low	
Bats	red	DryInt	low	caves
"Cascades" Mountain Beaver	blue	DryInt, ESSF	moderate	seral riparian
Cascade Mantled Ground Squirrel	blue	DryInt, ESSF	low	forest openings, logs
"Western" Wolverine	blue	DryInt, ESSF	low	all seral stages
Fisher	blue	DryInt, ESSF	high	mature/old growth
Badger	blue	DryInt, ESSF	low*	openings
Grizzly Bear	blue	DryInt, ESSF	high	wet spruce in preferred areas
Source: Phil Holman, Ministry of Environment, Lands and Parks				
Notes:				
1. DryInt is made up of the bunchgrass, ponderosa pine, interior Douglas-fir, and montane spruce zones; ESSF is made up of the Englemann Spruce-subalpine fir zone.				
2. * denotes a higher conflict with grazing				

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APPENDIX 2

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ECONOMIC IMPACT METHODOLOGY

The economic effects of the harvest scenarios were developed from TSA specific information and an economic impact model. The general methods and important coefficient values are presented here.

Direct Employment and Income

The employment coefficients were derived from a survey completed during this study. The survey obtained pertinent information from the TSA major licensees for the 1991 - 1993. The licensees fully cooperated in the survey. To maintain confidentiality, the data obtained was aggregated and then averaged over the three year period. The estimates of direct employment attributable to the current AAC are summarized in Table A3-1.

Table A3-1 Direct Employment Attributable to Current AAC¹

	Direct Employment TSA (PY)	Direct Employment Province (PY)	Employment Coefficient TSA (PY/1 000 m ³)	Employment Coefficient Provincial (PY/1 000 m ³)
Major Licensees				
Woods	261	266	0.22	0.22
Mill	523	534	0.43	0.44
SBFEP				
Category 1	29	30	0.02	0.02
Category 2 & Sec. 16.1	96	107	0.08	0.09
Silviculture	18	48	0.01	0.04
Pulp Mills	0	147	-	0.12
Total	927	1 132	0.77 ²	0.94 ³

Notes:

1. Based on AAC of 1 204 250 m³.
2. Column may not add due to rounding.
3. Column may not add due to rounding.

In projecting the economic impacts (i.e. employment and income effects) of the harvest scenarios, it was assumed that input wood volumes and employment would continue to be combined in the same average proportions as is presently the case. The TSA direct employment coefficient is 0.77 PY per 1 000 cubic metres and the provincial direct employment coefficient is 0.94 PY per 1 000 cubic metres.

The employment numbers shown are presented on a person-year (PY) basis. Other than for silviculture employment, person-year estimates correspond to actual employee totals. In the case of silviculture, where much of the work is part-time, the actual number of workers would be higher than the person-year estimate.

APPENDIX 3

Estimates of direct incomes were developed from the survey information and from Statistics Canada data. Average gross direct incomes per person-year were:

Woods employment	\$49 000/PY
Mill employment (includes saw and pulp mill employment)	\$46 000/PY
Silviculture	\$32 035/PY

At the TSA level, the weighted average gross direct income per person-year was \$46 667. In 1993, the tax rate for this income level was 28 percent. Based on this tax rate, the average after-tax TSA direct income per person-year was \$33 600. The weighted average gross direct income at the provincial level was \$46 192. After-tax direct income at the provincial level was estimated to be \$33 258. The larger proportion of silviculture employment and the pulp mill incomes have the effect of lowering the average income value at the provincial level.

Indirect and Induced Employment and Income

From the estimate of direct employment and income, indirect/induced employment and income were estimated at the TSA and provincial levels. In order to determine the indirect/induced effects at the TSA level, a method recommended by the BC Ministry of Finance and Corporate Relations was used.¹ The steps involved are outlined below.

1. The estimates of TSA direct forestry employment (as shown in Table A3-1) were aggregated into two sectors: logging and wood manufacturing.

TSA Direct Employment Estimates	
Logging and Forestry Services	308 PY
Wood Manufacturing	619 PY

2. Total direct after-tax incomes for each sector were estimated by multiplying the employment estimates by average incomes provided in the Ministry of Finance method. These incomes were used to ensure consistency with the local area income multiplier used to estimate induced employment (see step 4).

TSA Direct After-Tax Income Estimates	
Logging and Forestry Services	308 PY x \$29 900/PY = \$9 209 200
Wood Manufacturing	619 PY x \$27 700/PY = \$17 146 300

3. Total indirect income was estimated using sector-specific indirect income factors provided by the Ministry of Finance procedure. These indirect income factors were multiplied by total direct after-tax income to provide an estimate of total indirect income by sector.

¹ G. Horne, Quantitative Analysis Branch, Ministry of Finance & Corporate Relations, Recommended Procedure for Estimating Regional Economic Impacts Resulting from Direct Changes in the Forest Sector, An Interim Procedure, March 1994.

TSA Indirect After-Tax Income Estimates	
Logging and Forestry Services	$\$9\,209\,200 \times .21 = \$1\,933\,932$
Wood Manufacturing	$\$17\,146\,300 \times .11 = \$1\,886\,093$

These indirect income estimates were converted to indirect employment estimates using average after-tax indirect incomes provided by the Ministry of Finance procedure. Once again, these incomes were used to ensure consistency with the local area income multiplier used to estimate induced employment (see step 4).

TSA Indirect Employment Estimates	
Logging and Forestry Services	$\$1\,933\,932 / \$24\,700/\text{PY} = 78 \text{ PY}$
Wood Manufacturing	$\$1\,886\,093 / \$22\,300/\text{PY} = 85 \text{ PY}$
Total Indirect Employment	$78 \text{ PY} + 85 \text{ PY} = 163 \text{ PY}$

4. Induced income was estimated using a local area multiplier of 1.1. This was an average for the Merritt and Princeton areas and was based on Ministry of Finance research. Induced income was estimated by applying the multiplier to the sum of direct and indirect income. This implies that each dollar of direct and indirect income generates an additional 10 cents in induced income.

TSA Induced Income Estimate
$\$30\,175\,525 \times (1.1 - 1) = \$3\,017\,552$

Induced employment was calculated by dividing total induced income by average induced income.

TSA Induced Employment Estimate
$\$3\,017\,552 / \$18\,900/\text{PY} = 160 \text{ PY}$

5. Having estimated direct, indirect, and induced employment using the Ministry of Finance procedure, employment estimates were then multiplied by current after-tax incomes to provide the income estimates shown in this report. Based on survey information, as outlined above, average direct after-tax income in the TSA was estimated to be \$33 600. Using information from Statistics Canada (Catalogue 72-002), average indirect/induced after-tax income at the TSA level was estimated to be \$21 942. This was based on a weighted average gross income of \$27 822 for indirect/induced employment and an average tax rate of approximately 21 percent.

TSA Employment and Income Estimates		
Direct	927 PY	\$31.1 million
Indirect/Induced	323 PY	\$ 7.1 million

APPENDIX 3

Indirect and induced employment at the provincial level was calculated using a total employment multiplier of 2.5 (i.e. each direct job is associated with 1.5 indirect and induced jobs). The steps involved in calculating provincial indirect and induced impacts are outlined below. Provincial impacts are inclusive of the TSA impacts outlined above.

1. Provincial direct employment (1 132 PY) as determined by the survey information (see Table A3-1) was multiplied by an average provincial direct after-tax income to determine total provincial direct income. The average provincial direct after-tax income, as determined by the industry survey, was \$33 258.

Provincial Direct After-Tax Income Estimate
$1\ 132\ \text{PY} \times \$33\ 258/\text{PY} = \$37.6\ \text{million}$

2. Indirect/Induced employment at the provincial level was determined by multiplying direct provincial employment by the indirect/induced component of the provincial employment multiplier.

Provincial Indirect/Induced Employment Estimate
$1\ 132\ \text{PY} \times (2.5-1) = 1\ 698\ \text{PY}$

3. Indirect/Induced income was determined by multiplying the indirect/induced employment estimate by an average provincial after-tax income as derived from Statistics Canada information. This average income was estimated to be \$23 051, based on a gross income of \$29 178 and a 21 percent tax rate.

Provincial Indirect/Induced Income Estimate
$1\ 698\ \text{PY} \times \$23\ 051/\text{PY} = \$39.1\ \text{million}$

Government Revenue Estimates

Except for stumpage revenue, personal income revenue, and property tax revenue, provincial government revenues were estimated using average industry values as provided by the Economics and Trade Branch, Ministry of Forests.

Provincial stumpage payments were estimated from the volumes billed as recorded by the Valuation Branch of the Ministry of Forests for the three year period 1991-1993. The two earlier years were converted to 1993 dollars using the consumer price index. The average value was determined to be \$9 120 per 1 000 cubic metres.

Personal income tax paid was estimated by applying the appropriate 1993 tax rates to the gross incomes presented above. Total tax revenue was estimated by subtracting total after-tax income from total gross income. Personal income tax payments to the provincial government were estimated at \$6 957 per 1 000 cubic metres.

APPENDIX 3

Provincial property tax was estimated as the sum of the major licensees actual property tax payments to the city of Merritt and the town of Princeton in 1993. The property tax base is the appraised value of land and structures. Property tax payments were estimated at \$623 per 1 000 cubic metres.

Other provincial government revenue includes corporate income tax, logging tax, capital tax, sales tax, and electricity tax. These taxes were estimated using a coefficient of \$4 160 per 1 000 cubic metres. Scaling fees, interest, and miscellaneous fees amount to \$973 per 1 000 cubic metres.

The federal government also collects revenues from forestry-related economic activity in the form of personal and corporate income taxes and a range of capital and consumption taxes. On the basis of a 2:1 ratio between federal and provincial personal income tax levels, impacts to federal government revenues would be approximately double those shown for the provincial government.

SCENARIO 1 AND 2 ECONOMIC IMPACTS

Table A4-1. Scenario 2 Economic Impacts¹				
	Decade			
	Current	1-3	4	5
HARVEST (m³/year)	1 204 250	1 483 000	1 409 000	1 339 000
EMPLOYMENT (PY/year)				
TSA				
Direct	927	1 142	1 085	1 031
Indirect/Induced	325	400	380	362
Total	1 252	1 542	1 465	1 393
Provincial				
Direct	1 132	1 394	1 324	1 259
Indirect/Induced	1 698	2 091	1 987	1 888
Total	2 830	3 485	3 311	3 147
EMPLOYMENT INCOME (1993 \$ million after-tax/year)				
TSA				
Direct	\$31.1	\$38.4	\$36.4	\$34.6
Indirect/Induced	7.1	8.8	8.3	7.9
Total	38.2	47.2	44.7	42.5
Provincial				
Direct	\$37.6	\$46.4	\$44.0	\$41.9
Indirect/Induced	39.1	48.2	45.8	43.5
Total	76.7	94.6	89.8	85.4
PROVINCIAL GOVERNMENT REVENUE (1993 \$ million/year)				
	\$26.3	\$32.4	\$30.8	\$29.2
Notes:				
1. Appendix 3 provides an overview of the methodology used to calculate economic impacts.				

Table A4-2. Scenario 3 Economic Impacts¹		
	Decade	
	Current	1-5
HARVEST (m³/year)	1 204 250	1 077 500
EMPLOYMENT (PY/year)		
TSA		
Direct	927	830
Indirect/Induced	325	291
Total	1 252	1 121
Provincial		
Direct	1 132	1 013
Indirect/Induced	1 698	1 520
Total	2 830	2 533
EMPLOYMENT INCOME (1993 \$ million after-tax/year)		
TSA		
Direct	\$31.1	\$27.9
Indirect/Induced	7.1	6.4
Total	38.2	34.3
Provincial		
Direct	\$37.6	\$33.7
Indirect/Induced	39.1	35.0
Total	76.7	68.7
PROVINCIAL GOVERNMENT REVENUE (1993 \$ million/year)		
	\$26.3	\$23.5
Notes:		
1. Appendix 3 provides an overview of the methodology used to calculate economic impacts.		

GLOSSARY OF TERMS

allowable annual cut (AAC)	The allowable rate of timber harvest from a specified area of land. The chief forester sets AACs for Timber Supply Areas (TSAs) and Tree Farm Licences (TFLs) in accordance with Section 7 of the <i>Forest Act</i> .
animal unit month (AUM)	The amount of forage required for one month by an average beef cow, aged six months or older.
basic silviculture	A term used to refer to the silviculture treatments that are carried out to ensure the establishment of a free growing tree crop. This may include: surveying, site preparation, planting, direct seeding or brushing.
biodiversity	The diversity of plants, animals and other living organisms and their habitats measured by factors such as genetic variability, number of species and variation in species composition.
bone-dry unit (BDU)	A bone-dry unit of pulp chips weighs 2 400 even dry pounds. The volume of solid wood in a BDU of chips varies with species density. In this study a conversion factor of 2.79 cubic metres per BDU has been used.
cutblock adjacency guidelines	Integrated management guidelines that specify the desired spatial relationship among cutblocks. They can be approximated by specifying the maximum allowable proportion of a forested landscape that does not meet green-up requirements.
direct employment	Employment in the forestry sector (harvesting, milling, silviculture, and value-added).
environmentally sensitive area (ESA)	An area with significant non-timber values, fragile or unstable soils, problems in establishing a new tree crop or where timber harvesting may cause avalanches.
forest cover requirements	Specify desired distributions of areas by age or size class groupings. These requirements can be used to reflect desired conditions for wildlife, watershed protection, visual quality and other integrated resource management objectives. General adjacency and green-up guidelines are also specified using forest cover requirements.
Forest Licence (FL)	This licence is the major forest-tenure in BC. It provides a replaceable AAC in a TSA to an operator who has an established or proposed processing facility.
green-up period	The time needed for a stand of trees to reach a desired condition (e.g. height) to ensure maintenance of water quality, wildlife habitat, soil stability or aesthetics.

harvest forecast	The flow of potential timber harvests over time. A harvest forecast is usually a measure of the maximum timber supply that can be realized, over time, for a specified land base and set of management assumptions. It is a result of forest planning models and is affected by the size and productivity of the land base, the current growing stock and management objectives, constraints and assumptions.
indirect employment	Employment in sectors which supply materials, equipment, and services to the forest sector.
induced employment	Employment supported by the local respending of the incomes of those employed in the direct (forestry) and indirect (service and supply) sectors.
inoperable areas	Areas defined as unavailable for harvest for terrain-related or economic reasons.
Kamloops Regional Integrated Resource Management Timber Harvesting Guidelines	Guidelines that specify management zones where certain resource values such as water, wildlife or timber are particularly important. Within these zones, special management practices are required to ensure particular resource values are protected.
Land and Resource Management Planning (LRMP)	A sub-regional integrated resource planning process for BC. LRMP considers all resource values and requires public participation, interagency co-ordination and consensus based land and resource management decisions.
management assumptions	Approximations of management objectives, priorities, constraints and other conditions needed to represent forest management actions in a forest planning model. These include, for example, the criteria for determining the timber harvesting land base, the specification of minimum cutting ages, utilization levels and standards, integrated resource guidelines and silviculture and pest management programs.
non-Crown areas	Areas not managed directly by the BC Forest Service (e.g., private land, Indian Reserves, and provincial parks).
non-forest areas	Areas not occupied by productive forest cover (e.g., rock, swamp and alpine areas).
non-commercial cover areas	Areas occupied by non-commercial tree or brush species.
non-merchantable forest types	Areas occupied by timber stands that are accessible and otherwise available for timber harvesting but are assumed to be non-merchantable due to stand characteristics such as small size, incidence of decay and low stocking.
participation rate	The ratio of women or men in the labour force, either working or actively seeking employment relative to the total female or male working age population.

person-year (PY)	A standard measure of employment that takes into account part-time and seasonal full-time work. For example, an employee working full-time for six months would represent 0.5 PY of employment. Using this measure allows different types of employment to be compared on a similar basis.
selection management	A silvicultural system used to maintain or create areas containing a wide range of tree ages or sizes. The time interval between harvests in such areas is fairly short (usually less than 30 years) and during these harvests either single or scattered trees or small groups of trees are removed from across the entire area.
Small Business Forest Enterprise Program (SBFEP)	A program introduced in 1978 to provide opportunities for small businesses in the forest sector. Timber is sold to loggers, small sawmills, and re-manufacturers.
timber harvesting land base	The portion of the total land area of a management unit considered to contribute to, and be available for, long-term timber supply. The harvesting land base is defined by reducing the total land base according to specified management assumptions.
Timber Sale Licence (TSL)	Licences providing established operators with a ten year AAC over undefined areas of Crown land in a TSA. These licences are replaceable in their last year. Shorter term timber sale licences are also issued to small business loggers and to timber processors who qualify for registration under the Small Business Enterprise Program.
Timber Supply Area (TSA)	An integrated resource management unit established in accordance with Section 6 of the <i>Forest Act</i> .
unsalvaged losses	The volume of timber killed or damaged annually by natural causes (e.g., fire, wind, insects and disease) and not harvested.
visual quality objective (VQO)	Defines a level of acceptable landscape alteration resulting from timber harvesting and other activities. A number of visual quality classes can be defined based on the maximum amount of alteration permitted.
Woodlot Licence	A licence issued to an individual to manage a specific area of Crown Timber, plus any private woodlands the individual holds. Requires the holder to file a management plan and to harvest at a pre-determined rate.

INCREMENTAL ECONOMIC IMPACTS

Table A6-1. Scenario 1 Incremental Economic Impacts				
	Decade			
	1-11	12	13	15
HARVEST (m³/year)	0	84 250	78 000	117 000
EMPLOYMENT (PY/year)				
TSA				
Direct	0	65	60	90
Indirect/Induced	0	23	21	31
Total	0	88	81	121
Provincial				
Direct	0	79	74	109
Indirect/Induced	0	119	110	165
Total	0	198	184	274
EMPLOYMENT INCOME (1993 \$ million after-tax/year)				
TSA				
Direct	\$0	\$2.1	\$2.0	\$3.1
Indirect/Induced	0	0.5	0.4	0.7
Total	0	2.6	2.4	3.8
Provincial				
Direct	\$0	\$2.6	\$2.4	\$3.7
Indirect/Induced	0	2.7	2.5	3.8
Total	0	5.3	4.9	7.5
PROVINCIAL GOVERNMENT REVENUE (1993 \$ million/year)				
	\$0	\$1.8	\$1.8	\$2.5

Table A6-2. Scenario 2 Incremental Economic Impacts			
	Decade		
	1-3	4	5
HARVEST (m³/year)	+278 750	74 000	70 000
EMPLOYMENT (PY/year)			
TSA			
Direct	+215	57	54
Indirect/Induced	+75	20	18
Total	+290	77	72
Provincial			
Direct	+262	70	65
Indirect/Induced	+393	104	99
Total	+655	174	164
EMPLOYMENT INCOME (1993 \$ million after-tax/year)			
TSA			
Direct	+\$7.3	\$2.0	\$1.8
Indirect/Induced	+1.7	0.5	0.4
Total	+9.0	2.5	2.2
Provincial			
Direct	+\$8.8	\$2.4	\$2.1
Indirect/Induced	+9.1	2.4	2.3
Total	+17.9	4.8	4.4
GOVERNMENT REVENUE (1993 \$ million/year)			
	+\$6.1	1.6	1.6

Table A6-3. Scenario 3 Incremental Economic Impacts		
	Decade	
	1	2-5
HARVEST (m³/year)	126 750	0
EMPLOYMENT (PY/year)		
TSA		
Direct	97	0
Indirect/Induced	34	0
Total	131	0
Provincial		
Direct	119	0
Indirect/Induced	179	0
Total	298	0
EMPLOYMENT INCOME (1993 \$ million after-tax/year)		
TSA		
Direct	\$3.2	\$0
Indirect/Induced	0.7	0
Total	3.9	0
Provincial		
Direct	\$3.9	\$0
Indirect/Induced	4.1	0
Total	8.0	0
PROVINCIAL GOVERNMENT REVENUE (1993 \$ million/year)		
	\$2.8	\$0

