LAKES TSA

SOCIO-ECONOMIC ANALYSIS

Economics and Trade Branch
Ministry of Forests
Victoria, B.C.

Prepared by:
Crane Management Consultants Ltd.

June, 1995

TABLE OF CONTENTS

EXECUTIVE SUMMARY I
1.0 INTRODUCTION 1
1.1. Background 1
1.2. Objectives and Methodology 1
1.3. Data Sources 2
1.4. Report Structure 3
2.0 PROFILE OF THE LAKES TSA 5
2.1. Introduction 5
2.2. Environmental Overview 5
2.2.1. Setting 5
2.2.2. Issues and Concerns 9
2.3. Socio-Economic Overview 13
2.3.1. Population 13
2.3.2. Labour Force 15
2.3.3. Community Setting 16
2.3.4. The Forest Industry 20
2.3.5. Recreation and Tourism 24
2.3.6. Trapping 29
2.3.7 Ranching 30
2.4. First Nations 30
2.4.1. Treaty Negotiations 31
2.4.2. Employment 32
2.4.3. Economic Development 32
2.4.4. Aboriginal Forestry Activity 33
2.4.5. Aboriginal Organization Profiles 34
3.0 TIMBER SUPPLY SITUATION 37
3.1. Introduction 37
3.2. Current Forest Management Guidelines 37
3.3. Current AAC 38
3.4. Current TSA Forest Industry Operations 38
3.4.1. Employment Attributable to Lakes TSA Wood 39
3.5. Description of Harvest Scenarios 40
3.5.1. Scenario One 40
3.5.2. Scenario Two 40
3.5.3. Scenario Three 40
4.0 SCENARIO ONE IMPACT ANALYSIS 43
4.1. TSA Impacts 43
4.1.1. Economic Development 43
4.1.2. Community Impacts 44
4.1.3. First Nations Impacts 45
4.2. Provincial Impacts 46
4.2.1. Economic Impacts 46

4.2.2. Environmental Impacts 47
4.2.3. Government Revenue Impacts 49
5.0 ALTERNATIVE SCENARIOS 51
5.1. Timber Supply 51
5.2. TSA Alternative Scenario Impacts 51
5.2.1. Economic Development 51
5.2.2. Community Impacts 53
5.2.3. Aboriginal Impacts 58
5.3. Provincial Alternative Scenario Impacts 58
5.3.1. Economic Impacts 58
5.3.2. Environmental Impacts 59
5.3.3. Government Revenues 59
6.0 SUMMARY 61
6.1. TSA Impacts 61
6.2. Provincial Impacts 63
6.3. TSA Issues 65

APPENDIX 1 Qualifications to Analysis A1
APPENDIX 2 Glossary A3
APPENDIX 3 Bibliography A5
APPENDIX 4 Contacts A8
APPENDIX 5 Lakes TSA Licensee Apportionment A10
APPENDIX 6 Timber Harvesting Land Base in the Lakes TSA, 1995 ..... A11
APPENDIX 7 Methodologies and Issues A12
APPENDIX 8 Impact Analysis - Scenarios 2 & 3 ..... A20
APPENDIX 9 Incremental Impact Changes A23

EXECUTIVE SUMMARY

INTRODUCTION

- The BC 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 amount of timber available for harvesting in timber supply areas (TSAs). Four documents are being prepared for each of the province's 37 TSAs: two technical documents (Timber Supply Analysis and Socio-Economic Analysis) offer information on timber supply alternatives and their social, environmental, and economic implications; a Discussion Paper summarizes the technical information and provides a focus for public discussion; and a fourth report describes the rationale behind the Chief Forester's AAC determination.

PROFILE OF THE LAKES TSA

- The Lakes Timber Supply Area (TSA) encompasses 1 123 667 hectares and is one of nine TSAs in the Prince Rupert Forest Region. The Lakes Forest District Office in Burns Lake administers the TSA. The TSA occupies the easternmost portion of the Prince Rupert Forest Region, lying along the western edge of British Columbia's interior plateau.

Environmental Setting

- The Lakes TSA, lying along the western edge of British Columbia's interior plateau, is characterized by gently rolling uplands and a high concentration of lakes. The TSA extends from Babine Lake in the north to the Entiako River in the south. Three major water bodies divide the Lakes TSA: Babine Lake, Francois Lake and Ootsa Lake. The TSA is adjacent to the north-east portion of Tweedsmuir Provincial Park.

- The TSA falls mainly within the Sub-Boreal Spruce Biogeoclimatic Zone, the dominant zone in BC's central interior. This zone is generally found in valley bottoms up to the 1 300 metre level. In the southern reaches of the TSA, below Tetachuck Lake, is the Sub-Boreal Pine-Spruce Zone, generally found on relatively high elevation plateaus in the central interior between 850 and 1 300 metres. Small pockets in the northern and eastern regions of the TSA are within the Engelmann Spruce-Subalpine Fir Zone, found at elevations between 1 300 and 2 100 metres. Some very small areas above 2 100 metres lie in the Alpine Tundra Zone.

- Important ecological factors for wildlife common to the Sub-Boreal Spruce Biogeoclimatic Zone are long snowy winters, the dominance of dense spruce, sub alpine fir and pine forests on gently rolling terrain, and abundant wetlands. Wildlife that inhabit this zone is adapted to either survive or avoid the severe winters.

- Caribou use the Engelmann Spruce-Sub alpine Fir Zone as summer range and adjacent Sub-Boreal Spruce Zones for winter cover. This is particularly evident in the Tweedsmuir-Entiako caribou winter range where approximately 550 woodland caribou from the higher elevations of the northeast corner of Tweedsmuir Provincial Park migrate through the Chelaslie Corridor to lower Sub-Boreal Spruce Zones around Entiako Lake.

- Other big game wildlife includes moose, mule deer, black bear, and grizzly bear. Several species, including small game, are considered of management concern.

Fisheries

- Especially significant fishery systems include: Uncha Creek, Babine River/Lake, Pinkut Creek, Sutherland River and Bulkley River. Fishing of both migratory and non-migratory species is an important recreation and tourism feature of the region.

Communities and Economic Activity

- Burns Lake is the largest community with a population of about 1 600 and is the supply and distribution centre for various rural areas and the smaller communities of the TSA. These smaller communities are situated along the Highway 16 corridor and in the area between Francois and Ootsa Lakes.

- The total 1991 TSA population of 5 635 represented only a 0.4 percent increase over the 1986 population of 5 615. The area's labour force also grew only slightly during the same period. In 1991, the combined labour force was 2 660. The most recent region-wide unemployment rate was 9.6 percent, 1.6 percentage points above the BC average rate of 8.0 percent.

- Growth in the TSA population over the last decade is projected to increase in future years. The population is expected to grow more than six percent every five years well in to the next century.

- Burns Lake and the surrounding TSA are anchored by the forestry industry which supports 37% of the total employment in the TSA (27.6 percent of the labour force is directly involved in timber harvesting and processing).

- The economy of the area is one of the least diversified of any area in the province.

- Between 1986 and 1991, in the TSA as a whole, there were declines in the manufacturing sector labour force but this was offset by significant increases in the service sector, especially in accommodation/food/beverage service (AFB). In Burns Lake, declines in forestry processing, transportation, communication and utilities, and AFB were offset by small increases in forest harvesting, construction, trade and services other than AFB.

The Forest Industry

- The Lakes TSA has an Allowable Annual Cut (AAC) of 1 500 000 m^3/year. The established licensees and their AAC apportionment appear in Appendix 5. The Small Business Forest Enterprise Program has the largest allocation with 29.9 percent of the total available AAC. Babine Forest Products Company (28.7 percent), West Fraser Sawmills Limited (24.5 percent), Decker Lake Forest Products Limited (9.2 percent), Northwood Pulp and Timber Limited (3.8 percent) and L & M Lumber Limited (1.5 percent) are the Forest Licence holders of the Lakes TSA. The remainder of the AAC is made up of Woodlot Licences (1.4 percent) and Forest Service Reserve (1.0 percent).

- The industry consists mainly of harvesting and processing. Direct employment of about 600 is split between the two sectors.

Recreation and Tourism

- Outdoor recreation is a driving force behind tourism and contributes to quality of life for local residents. Fishing, boating and hunting are the major outdoor tourism activities.

- In the Lakes TSA, low population density and remoteness lead to a relatively modest use of provincial parks when compared to visitation figures from more populated regions. Nonetheless, the forests provide a fundamental backdrop to these activities which in turn support a variety of businesses and their employees.

- Usage of the 28 Ministry of Forests recreation sites in the Lakes TSA has increased 10 percent over the last two years.

- Tourism supports about 9% of the employment in the TSA.

Trapping

- There are approximately 111 official traplines located within the Lakes TSA. The exact proportion of aboriginal and non-aboriginal trappers is unknown.

- Trapping within the Lakes TSA has been a traditional activity for aboriginal residents for many years and has important cultural significance. Trapping is also an important lifestyle choice for most non-aboriginal trappers.

Ranching

Agriculture supports about six percent of the employment in the TSA. Due to a very short growing season, agriculture has been virtually restricted to raising livestock, predominantly beef. Generally, ranchers operate on a part-time basis and supplement their income with other employment, mainly forestry.

First Nations

- Six First Nations have reserve lands and traditional territory in the Lakes TSA: Nee-Tahi-Buhn Band; Burns Lake Band; Broman Lake Band; Cheslatta Carrier Nation Band; and, Lake Babine Band. The sixth, the Skin Tyee Band, officially part of the Nee-Tahi-Buhn Band, is currently seeking independence. Total membership of these bands is approximately 2 200, with on-reserve populations of 1 300. The traditional territories and land claims of these bands cover all of the TSA land base.

- First Nations' have been actively involved in the forest industry. Forestry is one of the major employers of aboriginal people and some ownership positions have also evolved. The Burns Lake Native Development Corporation (BLNDC) is owned by bands in the area. BLNDC has an ownership interest in Babine Forest Products Company and Burnslake Specialty Wood Ltd. These companies together employ as many as 98 aboriginal workers. BLNDC also owns a subsidiary called Yin Waghunlee Silviculture Corporation that employs 30 aboriginal workers. Burns Lake Native Logging is a well established logging contractor that has been in business since 1976. The company employs 13 people of which nine are aboriginal.

- While forestry is an important source of employment and income to First Nations people, there are other economic activities and values which can conflict with timber harvesting. Trapping is an important, traditional activity and protection of traplines is a key concern of First Nations' representatives. Aboriginal groups feel that there is not enough consultation from the forestry industry.

TIMBER SUPPLY SITUATION

- Three harvest forecasts are examined in this socio-economic assessment. The forecasts were chosen to illustrate a range of social, environmental, and economic implications associated with different harvest levels. The forecasts are neither meant to suggest a preferred AAC level nor do they represent the only options that could be considered in the final AAC determination.

- The Ministry of Forests' Timber Supply Branch has estimated the long-run harvest level (LRHL) of the Lakes TSA at 1 441 000 m^3/year. The long-run harvest level is a 3.9 percent reduction below the current AAC. All three harvest forecasts drop to this level through different reduction schedules, as shown in Table ES-1 and Figure ES-1.

TSA IMPACTS

Impacts at the TSA level of all three harvest forecasts are summarized in Table ES-2.

Economic Development

- In Scenario One, direct forest sector employment in the TSA would remain unchanged for 70 years. Indirect/induced employment would also remain unchanged for the same time period. In the eighth decade, direct forest sector employment would decline by 81 person-years (PYs). There would be a further 37 PYs of associated indirect/induced jobs lost, leading to a total decline of 118 PYs. The corresponding direct and indirect/induced after-tax employment income losses would be $2.58 million and $0.86 million, respectively. There would then be another decline in year 80 resulting in a loss of 32 PYs. The corresponding total employment income loss would be $0.95 million in year 80. At this stage, total cumulative job losses from current levels would be 150 PYs and total cumulative employment income losses would be $4.39 million. No further changes would occur for 90 years.

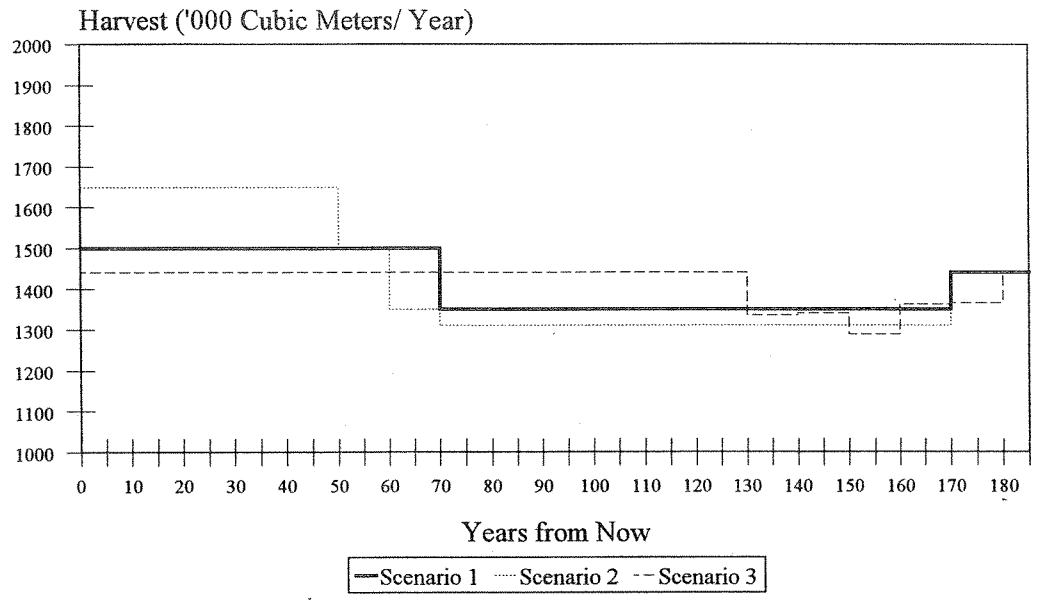
- In Scenario Two, there would be an increase in employment immediately. Direct forest sector employment in the TSA would rise by 80 person-years above present employment levels. There would be a further increase of 36 PYs of associated indirect/induced jobs, leading to a total increase of 116 PYs. The corresponding direct and indirect/induced employment income gains would be $2.56 million and $0.84 million, respectively. No further changes would occur for 50 years when the harvest level decreases for three decades running. This would lead to job total losses of 116, 118 and 32 PYs for decades six, seven and eight, respectively. Total income losses from current levels would be $3.40 million, $3.44 million and $0.95 million, respectively. By decade eight, total cumulative job losses from current levels would be 150 and total cumulative income losses would be $4.39 million. No further changes would occur for 100 years.

- In Scenario Three, direct forest sector employment in the TSA would immediately decrease by 32 person-years below present employment levels. There would be a further decrease of 15 PYs of associated indirect/induced jobs, leading to a total decrease of 47 PYs. The corresponding direct and indirect/induced employment income losses would be $1.02 million and $0.35 million, respectively, for a total of $1.37 million. No further changes would occur for 130 years.

- The three harvest flows would have similar tourism and outdoor recreation economic impacts over the long 200 year timber planning horizon.

Figure ES-1

Lakes TSA Harvest Scenarios



Source: Ministry of Forests

Table ES-1: Harvest Flow Forecasts
('000 m^3/year)

	Scenario One			Scenario Two			Scenario Three		
Harvest	Harvest	Change		Harvest	Change		Harvest	Change	
Period	'000 m^3	'000 m^3	%	'000 m^3	'000 m^3	%	'000 m^3	'000 m^3	%
Current	1 500			1 500			1 500		
0	1 500	0	0	1 650	150	10	1 441	-59	-4
10-49	1 500	0	0	1 650	0	0	1 441	0	0
50	1 500	0	0	1 500	-150	-9	1 441	0	0
60	1 500	0	0	1 350	-150	-10	1 441	0	0
70	1 350	-150	-10	1 310	-40	-3	1 441	0	0
80-129	1 310	-40	-3	1 310	0	0	1 441	0	0
130	1 310	0	0	1 310	0	0	1 337	-104	-7
140	1 310	0	0	1 310	0	0	1 341	4	0.3
150	1 310	0	0	1 310	0	0	1 288	-53	-4
160	1 310	0	0	1 310	0	0	1 363	75	6
170	1 441	131	10	1 441	131	10	1 365	2	0.1
180	1 441	0	0	1 441	0	0	1 441	76	6

Table ES-2: Summary of TSA Accounts

			Scenario One					Scenario Two					Scenario Three				
			Years from Present					Years from Present					Years from Present				
		Current	0	10	20	30	60	0	10	20	30	60	0	10	20	30	60
Harvest in '000 m^3		1 500	1 500	1 500	1 500	1 500	1 500	1 650	1 650	1 650	1 650	1 350	1 441	1 441	1 441	1 441	1 441
Economic Account																	
Employment	Direct	809	809	809	809	809	809	889	889	889	889	728	777	777	777	777	777
(PY/Year)	Indirect	370	370	370	370	370	370	406	406	406	406	333	355	355	355	355	355
	Total	1 179	1 179	1 179	1 179	1 179	1 179	1 295	1 295	1 295	1 295	1 061	1 132	1 132	1 132	1 132	1 132
Employment	Direct	25.83	25.83	25.83	25.83	25.83	25.83	28.39	28.39	28.39	28.39	23.25	24.81	24.81	24.81	24.81	24.81
Income ($1992	Indirect	8.64	8.64	8.64	8.64	8.64	8.64	9.48	9.48	9.48	9.48	7.78	8.29	8.29	8.29	8.29	8.29
Millions/Year)	Total	34.47	34.47	34.47	34.47	34.47	34.47	37.87	37.87	37.87	37.87	31.03	33.10	33.10	33.10	33.10	33.10
Community Account																	
Population			▪ no effect					▪ no effect					▪ small population decrease possible				
Local Government			▪ no effect					▪ minimal positive effect					▪ small effect in short to medium-term if small mill closes				
Social Fabric			▪ no effect					▪ minimal positive effect					▪ moderate strain immediately				
Aboriginal Account																	
Economic			▪ no forestry-related impacts ▪ continuing threat to traplines					▪ increase in short and medium-term forest jobs and income ▪ increased threat to traplines					▪ small forest job loss immediately ▪ reduced threat to traplines				
Cultural/Historical			▪ indeterminate					▪ indeterminate					▪ indeterminate				
Land Claims			▪ indeterminate					▪ indeterminate					▪ indeterminate				

Community Impacts

- There would be no community impacts associated with timber supply reductions in Scenario One in the short and medium-term as there are no reductions in the AAC until year 70.

- It is difficult to judge where the employment benefits from the increased AAC in Scenario Two would accrue as it is not known how the additional 150 000 m^3/year would be allocated. It is likely that Burns Lake would gain a majority of the 80 PYs of new forestry employment and 36 PYs of new indirect/induced employment while the remainder would accrue to the smaller communities in the TSA. It is unlikely that population would be significantly affected. There should be some small but positive impacts on the social well-being of these communities.

- Under Scenario Three, the communities in the Lakes TSA would face impacts immediately. On the basis of the survey of licensees, approximately 80 percent of TSA harvesting personnel and a similar proportion of manufacturing employees reside in and around Burns Lake. Burns Lake would be the focal point of community impacts. Job losses could have small effects on population numbers in the short-term. In the long-term, BC's growing population and the possibility of mitigation measures should off-set population losses arising from job losses due to timber supply reductions. Scenario Three would probably not result in a major mill closure in the short-term as the reductions are moderate and local mills are operating at over 80 percent of capacity. Older or less educated forest workers in Burns Lake would have the greatest difficulty in obtaining alternative employment. They would also be less likely to relocate and may become reliant on social assistance.

First Nations Impacts

- Employment of First Nations people within the Lakes TSA who work in the forest industry would mirror the general economic impacts of the three scenarios. The impact of past harvesting practices on trapping and traplines, the fisheries resource, and cultural/historical values is seen as critical to First Nations. First Nations believe Scenario Two would further conflict with these resources while Scenario Three reductions may reduce these negative impacts.

PROVINCIAL IMPACTS

The provincial impacts of the three harvest forecasts are summarized in Table ES-3.

Economic Impacts

- In Scenario One, both direct and indirect/induced forest sector employment in the province would remain unchanged for 70 years. In the eighth decade, direct forest sector employment would fall off by 117 PYs. There would be a further 175 PYs of

associated indirect/induced jobs lost, leading to a total decline of 292 PYs. The corresponding direct and indirect/induced employment income losses would be $3.77 million and $4.08 million, respectively. There would then be another decline in the following decade resulting in 78 PYs

of total job losses. The corresponding total employment income loss would be $2.12 million. At this stage, total cumulative job losses from current levels would be 370 PYs and total cumulative employment income losses would be $9.97 million. No further changes would occur for 90 years.

- In Scenario Two, there would be an increase in employment immediately. Direct forest sector employment in the province would rise by 116 person-years, above present employment levels. There would be a further increase of 174 PYs of associated indirect/induced jobs, leading to a total increase of 290 PYs. The corresponding direct and indirect/induced employment income gains would be $3.76 million and $4.06 million, respectively. No further changes would occur for 50 years when the harvest level decreases for three decades running. This would lead to job total losses of 290, 292 and 78 PYs for decades six, seven and eight, respectively. Total income losses would be $7.82 million, $7.85 million and $2.12 million, respectively. By decade eight, total cumulative job losses from current levels would be 370 PYs and total cumulative income losses from current levels would be $9.97 million. No further changes would occur for 100 years.

- In Scenario Three, direct forest sector employment in the province would immediately decrease by 46 person-years, below present employment levels. There would be a further decrease of 69 PYs of associated indirect/induced jobs, leading to a total decrease of 115 jobs. The corresponding direct and indirect/induced employment income losses would be $1.48 million and $1.61 million, respectively. No further changes would occur for 130 years.

Environmental Impacts

- The environmental impacts stem from activities on the timber harvesting land base in the Lakes TSA, which constitutes 56.5 percent of the TSA's total land base or 73.3 percent of the forested land base. Forty-three percent of the TSA land base cannot be harvested for one reason or another. Ongoing local resource use plans, if implemented, would mitigate some of the impacts noted below, but are not accounted for in the Timber Supply Review. Implementation could lead to future reductions in the available timber supply.

- The conversion of mature forests to immature forests would result in reduced habitat, and thus reduced populations, of species dependent on old growth stands for part or all of their life cycles. Examples of such species are marten, grizzly bear, the brown creeper, pileated woodpecker, and the occipeters (forest hunting raptors).

- The increase in area of early seral stage forests would potentially result in population increases of species that utilize such habitats. Moose, deer, black bear, and many small mammal populations could increase if hunting pressures do not significantly change. This would also be conditional on maintenance of the attributes of older forests throughout the landscape.

- The Tweedsmuir-Entiako caribou herd is one of the few left in south and central BC and is therefore of provincial importance. The maintenance of the winter range for this herd, located south of Tetachuck Lake (in the Nechako Reservoir), and which is critical for the survival of the herd, was not included in the constraints for all the scenarios. The impact on the Tweedsmuir-Entiako herd would be significant, ranging from sharp declines in herd size to possible extirpation of the herd.

- Road access into presently unroaded areas is an eventual outcome of all three scenarios. This increases the risks of negative impacts on wildlife populations which are sensitive to hunting pressures.

- Forest practices impact fish habitat in many ways. Direct damage can include bank destabilization, the removal of stream side vegetation and debris jams. Measures to protect streamside and lakeshore habitats from these impacts are outlined in the Interim Regional Timber Harvesting Guidelines of the Prince Rupert Forest Region [1992] .

Government Revenue Impacts

- The present AAC generates an estimated $65.06 million in annual provincial government revenues. In Scenario One, the first harvest reduction in decade eight results in a loss of $6.51 million/year in revenue. The reduction in decade nine results in a loss of $1.73 million annually. No further changes would occur for 90 years.

- In Scenario Two, the immediate increase in the harvest level increases provincial government annual revenue by $6.50 million. Declines of $6.50 million/year, $6.51 million/year and $1.73 million/year are experienced for decades six, seven and eight, respectively. No further changes would occur for 100 years.

- In Scenario Three, annual provincial government revenues decrease immediately by $2.57 million. No further changes would occur for 130 years.

Table ES-3: Summary of Provincial Accounts

			Scenario One					Scenario Two					Scenario Three				
			Years from Present					Years from Present					Years from Present				
		Current	0	10	20	30	60	0	10	20	30	60	0	10	20	30	60
Harvest in '000 m^3		1 500	1 500	1 500	1 500	1 500	1 500	1 650	1 650	1 650	1 650	1 350	1 441	1 441	1 441	1 441	1 441
Economic Account																	
Employment	Direct	1 164	1 164	1 164	1 164	1 164	1 164	1 280	1 280	1 280	1 280	1 047	1 118	1 118	1 118	1 118	1 118
(PY/Year)	Indirect	1 746	1 746	1 746	1 746	1 746	1 746	1 920	1 920	1 920	1 920	1 571	1 677	1 677	1 677	1 677	1 677
	Total	2 910	2 910	2 910	2 910	2 910	2 910	3 200	3 200	3 200	3 200	2 618	2 795	2 795	2 795	2 795	2 795
Employment	Direct	37.59	37.59	37.59	37.59	37.59	37.59	41.35	41.35	41.35	41.35	33.82	36.11	36.11	36.11	36.11	36.11
Income ($1993	Indirect	40.77	40.77	40.77	40.77	40.77	40.77	44.83	44.83	44.83	44.83	36.69	39.16	39.16	39.16	39.16	39.16
Millions/Year)	Total	78.36	78.36	78.36	78.36	78.36	78.36	86.18	86.18	86.18	86.18	70.51	75.27	75.27	75.27	75.27	75.27
Government Revenue Account ($1993 Millions/Year)																	
Provincial:																	
Stumpage and Rents		49.53	49.53	49.53	49.53	49.53	49.53	54.48	54.48	54.48	54.48	44.58	49.53	47.58	47.58	47.58	47.58
Personal Income Taxes		8.25	8.25	8.25	8.25	8.25	8.25	9.07	9.07	9.07	9.07	7.42	8.25	7.92	7.92	7.92	7.92
Other Taxes		7.28	7.28	7.28	7.28	7.28	7.28	8.01	8.01	8.01	8.01	6.55	7.28	6.99	6.99	6.99	6.99
Total		65.06	65.06	65.06	65.06	65.06	65.06	71.56	71.56	71.56	71.56	58.55	65.06	62.49	62.49	62.49	62.49
Federal		18.64	18.64	18.64	18.64	18.64	18.64	20.50	20.50	20.50	20.50	16.77	18.64	17.90	17.90	17.90	17.90
Environmental Account			▪ reduced populations of old growth dependent species ▪ increased population of early seral stage inhabitants ▪ decline in overall biodiversity ▪ sharp decline of Tweedsmuir-Entiako caribou herd					▪ fastest reduction to populations of old growth dependent species ▪ increased population of early seral stage inhabitants ▪ decline in overall biodiversity ▪ sharp decline of Tweedsmuir-Entiako caribou herd					▪ slowest reduction to populations of old growth dependent species ▪ increased population of early seral stage inhabitants ▪ decline in overall biodiversity ▪ sharp decline of Tweedsmuir-Entiako caribou herd				

1.0 INTRODUCTION

1.1. Background

The BC 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 amount of timber available for harvesting in timber supply areas (TSAs)[1]. Four documents are being prepared for each of the province's 37 TSAs: two technical documents (Timber Supply Analysis and Socio-Economic Analysis) offer information on timber supply alternatives and their social, environmental, and economic implications; a Discussion Paper summarizes the technical information and provides a focus for public discussion; and a fourth report describes the rationale behind the Chief Forester's AAC determination.

1.2. Objectives and Methodology

Three harvest forecasts from the Lakes TSA Timber Supply Analysis report[2] are examined in this socio-economic assessment. These forecasts represent possible harvest flow patterns given current land base and forest management practices in the Lakes TSA. The forecasts were chosen to illustrate a range of social, environmental and economic implications associated with different harvest levels. **The forecasts are neither meant to suggest a preferred AAC level nor do they represent the only options that could be considered in the final AAC determination.**

The impacts of the three harvest forecasts are assessed within a "multiple accounts" framework. A multiple accounts analysis focuses attention on a range of values derived from the forest resource and recognizes that a number of factors may need to be considered when examining options for forest land management. The objective of multiple accounts analysis is to present the implications of alternatives in terms of these factors.

The multiple accounts framework used in this study, as outlined in Table 1-1, has been adapted from interim guidelines developed for land and resource management planning[3]. The implications of the harvest forecasts are evaluated in terms of six accounts. Three accounts consider economic development, community, and First Nations concerns at the TSA (or regional) level. Economic development, environment, and government revenue impacts are viewed on a province-wide basis. The impact estimation methodologies are discussed in Appendix 7.

---

1 Current management practices are assumed in the review. These cover many but not all practices identified in the new Forest Practices Code. Future changes in practices will be included in the next reassessment of the timber supply, expected in approximately five years.

2 Ministry of Forests, Timber Supply Branch. (1995). *Lakes TSA Timber Supply Analysis.*

3 Integrated Resource Planning Committee. (1993). *Social and Economic Impact Assessment for Land and Resource Management Planning in British Columbia: Interim Guidelines.*

Table 1-1: Multiple Accounts	
Account	Impacts
TSA Level	
Economic Development	Direct and indirect/induced income and employment impacts.
Community	Impacts on population, provision of local services, local government revenues and the provision of local government services and infrastructure. The impacts on community goals such as stability and quality of life.
First Nations	Impacts on aboriginal community resources, cultural values, traditional activities and economic development goals.
Provincial Level	
Economic Development	Province-wide direct and indirect/induced income and employment impacts.
Environment	Impacts on the environment assessed from an ecological perspective.
Provincial Government	Impacts on gross government resource-related taxes and other revenues.

1.3. Data Sources

The study utilized information and data from a variety of sources. The regional profile was prepared with data from Statistics Canada, BC Central Statistics Branch, the Bulkley-Nechako Regional District (BNRD), various BC Government ministries and individual municipalities.

The economic impact assessment draws upon information from Lakes TSA licensees, Ministry of Forests' Timber Supply Branch and Integrated Resource Branch, Lakes Forests District Office in Burns Lake, and Ministry of Finance in Victoria. The data and assumptions from these sources were updated, verified, and in some cases supplemented by further discussions with the appropriate agencies and companies.

The environmental account is based on reports from BC Environment, Environment Canada, Ministry of Forests, Fisheries and Oceans Canada and local environmental organizations.

The community account was based on a series of telephone interviews conducted with forest company representatives, forest workers, union representatives, community leaders and other stakeholders. Where possible, impact statements were supplemented by available industry studies and discussions with other industry officials.

Meetings and telephone discussions with First Nations representatives were used to define and gauge impacts on the aboriginal community.

A bibliography and list of study contacts are provided in Appendices 3 and 4, respectively.

1.4. Report Structure

The next chapter of this report provides a socio-economic profile of the Lakes TSA communities. Chapter Three explains the timber harvest projections which drive the analysis. Chapters Four and Five examine the impacts of the harvest scenarios. The final chapter presents a summary of impacts.

2.0 PROFILE OF THE LAKES TSA

2.1. Introduction

The Lakes Timber Supply Area (TSA) encompasses 1 123 667 hectares and is one of nine TSAs in the Prince Rupert Forest Region. The Lakes Forest District Office in Burns Lake administers the TSA. The Village of Burns Lake is the largest community with a population of about 1 600 and is the supply and distribution centre for various rural areas and smaller communities in the TSA. These smaller communities are situated along the Highway 16 corridor and between Francois and Ootsa Lakes. A map of the TSA is shown in Figure 2-1.

The Lakes TSA occupies the easternmost portion of the Prince Rupert Forest Region, lying along the western edge of British Columbia's interior plateau. The TSA extends from Babine Lake in the north to the Entiako River in the south. Three major water bodies intersect the Lakes TSA: Babine Lake, Francois Lake and Ootsa Lake. The northeast section of Tweedsmuir Provincial Park is adjacent to the TSA.

The forest industry anchors the regional economy. There is an extensive history of logging and timber processing that continues to provide the largest source of revenue and employment to the region. There are two sawmills in Burns Lake, one of which is among the largest in the province. Sports fishing in the lakes along with significant wildlife populations (including moose, deer and black bear) help drive summer tourism which supplements employment and income for local merchants and guides. The agricultural sector, mainly cattle production, is also a visible contributor to the local economy.

2.2. Environmental Overview

2.2.1. Setting

The Lakes TSA, lying along the western edge of British Columbia's interior plateau, is largely characterized with gently rolling uplands and a high concentration of lakes. The TSA extends from Babine Lake in the north to the Entiako River in the south. Three major water bodies intersect the Lakes TSA: Babine Lake, Francois Lake and Ootsa Lake. The TSA is adjacent to the north-east portion of Tweedsmuir Provincial Park.

Forests

The TSA falls mainly within the Sub-Boreal Spruce (SBS) Biogeoclimatic Zone, the dominant zone in BC's central interior and one of four Biogeoclimatic Zones making up the Lakes TSA. This zone is generally found in valley bottoms up to elevations of 1 300 metres. The climate of this zone is characterized by seasonal extremes of temperature; severe, snowy winters; relatively warm, moist and short summers; and moderate annual

Figure 2-1
Lakes TSA

precipitation. Lodgepole pine, hybrid white spruce and subalpine fir are the dominant climax tree species. The zone is an important habitat for wildlife including moose, caribou and many other species adaptable to this particular environment [Ministry of Forests 1991].

In the southern region of the TSA, below Tetachuk Lake, lies the Sub-Boreal Pine-Spruce (SBPS) Zone. This zone is found on relatively high elevation plateaus in the central interior at between 850 and 1 300 metres. The climate consists of cool, dry summers and cold, dry winters. Lodgepole pine is the dominant tree species and, with white spruce and trembling aspen, are the only common tree species. As with the SBS zone, wildlife such as moose and caribou that can adapt to long, cold winters occur in this zone. The fur harvest in the SBPS zone in general is among the highest in the province [Ministry of Forests 1991].

Small pockets in the northern and eastern regions of the TSA are within the Engelmann Spruce-Subalpine Fir (ESSF) Zone, found at elevations between 1 300 and 2 100 metres. The wet, cool summers, long, snowy winters and steep topography characterize this area. It is an important wildlife habitat for ungulates and furbearers [Ministry of Forests 1991].

In very small areas above 2 200 metres lies the Alpine Tundra (AT) Zone. This harsh alpine climate is cold, windy, and snowy, and its growing season is short. The alpine zone is, by definition, treeless, but trees are common at lower elevations in stunted form. Its wildlife diversity and density are low [Ministry of Forests 1991].

Wildlife

Important ecological factors for wildlife common to the Sub-Boreal Spruce Biogeoclimatic Zone (the dominant biogeoclimatic zone in the TSA) are long snowy winters, the dominance of dense pine, spruce and subalpine fir forests on gently rolling terrain, and the abundant wetlands. Wildlife that inhabit this zone are adapted to either survive or avoid the severe winters.

There has been no comprehensive inventory of wildlife undertaken in the Lakes TSA; however, certain areas with wildlife of management concern have been studied. Caribou use the ESSF zone as summer range and adjacent SBS zones for winter cover. This is particularly evident in the Tweedsmuir-Entiako caribou winter range where approximately 550 woodland caribou from the higher elevations of the northeast corner of Tweedsmuir Provincial Park migrate through the Chelaslie Corridor[4] to lower SBS zones around Entiako Lake [Entiako LRUP Working Group 1993 - draft]. The migration corridor and winter range has been studied extensively and is of crucial interest to the Entiako Local Resource Use Plan (LRUP) planning group. Both these areas are ranked as prime

[4] The area between the Chelaslie River, Tetachuk Lake and Tweedsmuir Provincial Park has been termed the Chelaslie Migration Corridor.

Protected Areas Strategy (PAS) candidates by the Prince Rupert and Prince George Forest Region Regional Protected Areas Teams (RPAT).

One study focusing on this caribou herd [Industrial Forestry Service Ltd. 1993] recorded evidence of a number of other wildlife species in the Chelaslie Corridor: grey wolf, coyote, black bear, mule deer, snowshoe hare, moose, porcupine, beaver and red squirrel. A number of bird species were also sighted: golden-crowned kinglet, Swainson's thrush, yellow warbler, yellow-rumped warbler, blackpoll warbler, olive-sided flycatcher, Hammond's flycatcher, pileated woodpecker, hairy woodpecker, Canada Goose, mallard, common loon, spotted sandpiper, American robin, ruffed grouse and spruce grouse, black-capped chickadee, red-breasted nuthatch, common raven, common merganser, winter wren, common snipe and American kestrel.

A LRUP prepared for the Sutherland area, located at the east end of Babine Lake in the northeast corner of the TSA, specifically mentioned moose, mule deer and grizzly bear as inhabitants of the area [Sutherland LRUP 1992 - draft]. These mammals and those mentioned above are common inhabitants of SBS zones [Ministry of Forests 1991]. Other wildlife not specifically noted in the literature but common to SBS zones and thus, likely to be found in this TSA are: lynx, red fox, fisher, marten, ermine, big brown bat, little brown myotis, woodchuck, northern flying squirrel, southern red-backed vole, deer mouse, pygmy shrew, beaver, meadow jumping mouse, and yellow pine chipmunk.

Amphibians and reptiles are poorly adapted to cold temperatures and deep snow and therefore, only three amphibians and one reptile occur in the SBS zone. The western toad, wood frog, spotted frog and the common garter snake are found in riparian and wetland habitats as well as adjacent forests.

Species of management concern are listed in Table 2-1. One species, the short-eared

Table 2-1: Species of Management Concern in the Lakes TSA

S1[5] and S2[6] Rank	S3[7] Rank	
Short-Eared Owl	American Bittern	Grizzly Bear
	Bald Eagle	Swainson's Hawk
	Bull Trout	Trumpeter Swan
	Fisher	Wolverine

Source: British Columbia Conservation Data Centre, Ministry of the Environment, December 6, 1994.

owl, is considered imperilled because of rarity and may occur in the TSA . Additionally, there are numerous rare or uncommon species which could be susceptible to large scale disturbances. Among the more notable species are the bald eagle and the grizzly bear.

5 Critically imperiled on a provincial scale because of extreme rarity.
6 Imperiled because of rarity.
7 Rare or uncommon; may be susceptible to large scale disturbances.

Additionally, caribou and the grizzly bear are blue-listed by the Ministry of Environment meaning they are "sensitive" and deserving management attention. There is local public concern over moose populations with the rod and gun club seeking tighter regulations and better enforcement.

Fisheries

Especially significant fishery systems include Uncha Creek, Babine River, Pinkut Creek, Sutherland River and Bulkley River. Stream summary information for these appear in Table 2-2. Lake information is not available, but the TSA's lakes are known to have a high fishery value. For example, Francois Lake is populated with sockeye salmon, pink salmon, burbot, lake trout, rainbow trout, whitefish, squawfish and suckers. It supports heavy sportfishing and a native food fishery.

In addition to some specific areas of management concern discussed below, another important issue is that of access to lakeshores created by logging roads or cut blocks. Ease of access increases the potential for overfishing, of trout especially, resulting in the loss of large fish in many lakes. The Ministry of Environment in the Skeena Region has stated that at least 12 percent of lakes should remain unaccessed for this reason. [pers. comm., John Stadt].

2.2.2. Issues and Concerns

Protected Area Strategy

Under its Protected Area Strategy (PAS), the BC Government is committed to doubling its system of protected areas from six to 12 percent of the province's land base by the year 2000 [BC Government 1993]. Protected areas are defined as inalienable areas where no industrial extraction or development is permitted. Various parties have proposed several areas for protection within the TSA.

Presently, the BC Government is identifying, mapping and analysing sites for possible protected designation. The PAS is a flexible process allowing the BC Government to designate sites at any time. There is one PAS study area within the Lakes TSA and three areas of interest. All of these areas extend into the Prince George TSA and require joint decision-making. Two of these PAS areas are especially significant with respect to forestry as harvesting activity within these areas has been deferred.

Fleming Lake PAS - located on the southeast end of the Klaytunkut/Tildesly area, this area is part of a larger wilderness ecosystem of 6 880 hectares which extends east toward Trembleur Ridge in the Prince George TSA. The area has been deferred from development planning as a PAS area of interest. Babine Forest Products has a chart area in this region.

Table 2-2: Summary Information for Major Streams in the Lakes TSA

Stream	Fish Distribution	Fisheries Issues	Other Use Issues
Uncha Creek	Rocky Mountain whitefish, northern squawfish, rainbow trout, suckers	Most productive trout stream to Francois Lake; excellent cover and abundant rearing areas; no salmon but excellent spawning potential	No information available
Babine River	sockeye salmon, coho salmon, steelhead, burbot, cutthroat trout, Dolly Varden, kokanee, lake trout, lake whitefish, Rocky Mountain whitefish, rainbow trout	Heavy sport and first nation fishery; major sockeye spawning in accessible tributaries	Information available for main tributaries only (see Pinkut Creek and Sutherland River).
Pinkut Creek	sockeye salmon, coho salmon, pink salmon, burbot, kokanee, lake trout, lake whitefish, rainbow trout	High productive potential; suitable spawning beds above falls	Logging in area by Babine Forest Products and six small sawmills operate in upper reaches
Sutherland River	sockeye salmon, coho salmon, steelhead, kokanee, Rocky Mountain whitefish, rainbow trout	Extremely large population of rainbow trout are present and spawning; native net fishery exists for this stock at mouth in spring; numerous beaver dams	Logging proposals in the headwaters of the Sutherland drainage located in the Vanderhoof Forest District
Bulkley River	sockeye salmon, coho salmon, pink salmon, chum salmon, steelhead, burbot, cutthroat trout, Dolly Varden, lake trout, lake, whitefish, Rocky Mountain whitefish, rainbow trout	Heavy sport and native food fishery; upper section frequently changes course, very heavy beaver activity	No information available

Source: Department of Fisheries and Oceans

Tetachuck Lake PAS - located south of Tetachuck Lake, this area provides an important winter range for caribou. Approximately 550 woodland caribou from the higher elevations of the northeast corner of Tweedsmuir Provincial Park migrate through the Chelaslie Corridor[8] to lower SBS zones around Entiako Lake [Entiako LRUP Working Group 1993 - draft]. The winter range has been studied extensively as the main subject of an interim Entiako LRUP. A large portion of the winter range has been accepted as a PAS area of interest by cabinet and both the LRUP and logging in the area has been deferred until a final decision has been reached.

The Tetachuck Lake PAS study area is an estimated 158 000 hectares of which approximately half is within the Lakes TSA. The area within the TSA accounts for seven percent of the operable land base of the TSA and the current timber supply analysis does not take into account how management for caribou habitat in this area could affect timber harvest levels. Affected areas have been allocated to Fraser Lake Sawmills, L & M Lumber, and Northwood Pulp & Timber. No future plans for harvesting have been made as yet. The Ministry of Environment favours no logging whatsoever as logging creates road access which can significantly affect the herd. Additionally, as lichen is a key winter food, the maintenance of stands containing lichen are important to the herd.

Two additional PAS areas of interest are also under consideration and include the Sutherland Valley (14 025 ha.) and Cheslatta Lake (31 800 ha.). More information on these areas is provided below. None of these possible PAS areas have been accounted for in the Timber Supply Analysis.

Special Management Areas

Special Management Areas (SMAs) of the Lakes TSA are generally large landscapes exhibiting significant wildlife, recreational and/or other values in addition to timber values. These areas have been identified by the Interim Regional Timber Harvesting Guidelines for the Interior Portion of the Prince Rupert Forest Region [1992] (modified by the Lakes Forest District) as deserving planning consistent with each area's specific need over and above existing guidelines. These SMAs are as follows:

Tildesly Uplands - largest area with an elevation above 1 300 metres in the Lakes TSA. This area is undeveloped and therefore represents a wilderness opportunity.

Klaytunkut/Tildesly - one of three Lakes TSA wetlands located in the northern tip of the TSA. A LRUP was completed in early 1991 which outlines harvesting guidelines intended to achieve wildlife objectives. The primary issue was the preservation of riparian zones for moose habitat.

Dominant South Facing Landscapes (outside the Endako-Bulkley lowlands) - these unique ecosystems provide moderate to high value moose and deer winter range, high

[8] The area between the Chelaslie River, Tetachuk Lake and Tweedsmuir Provincial Park has been termed the Chelaslie Migration Corridor.

visual sensitivity, a concentration of cultural and archaeological values and the corresponding recreational values associated with these assets. Creeks in the area also act as important wildlife corridors to upland riparian areas. These areas contain a portion of the Cheslatta PAS area of interest.

Dominant North Facing Landscapes - these areas provide high visual quality, moderate value ungulate winter range, high cultural and archaeological values, and a high proportion of old growth forest. These areas contain a portion of the Cheslatta PAS area of interest.

Sutherland Valley - this valley has been identified as the most valuable fish and wildlife area within the TSA by the Ministry of Environment. Specifically, the area provides high value fisheries, high to very high value ungulate winter range, high value grizzly habitat and cultural significance. An LRUP was completed in 1992 and the area is now a PAS interest area.

High Elevation Riparian - this area includes the Pierre-Twain upland north and east of Nez Lake, the Henriette uplands southeast of the Sutherland Valley and the Michel uplands north of Tetachuck Lake. The area provides moderate value ungulate summer range and stands of old growth timber.

Lower Pinkut Creek - this area includes the Pinkut Creek valley between Taltapin Lake and Babine Lake. A large portion of this area lies within the Sutherland LRUP. Important characteristics include fish habitat and ungulate summer range.

Endako/Bulkley Lowlands - this area provides moderate to high value ungulate winter range, scenic values and important fish habitat and is also an important range for livestock.

Colleymount/Ramsey - this area is adjacent to the north shore of Francois Lake to the west of the ferry landing. The area provides high value deer and moose winter range and high fisheries values in Ramsey, Allin and Henkel Creeks.

Tweedsmuir Entiako Caribou Migration Corridor - this area is an important caribou migration route, located near the Chelaslie River between Tweedsmuir Park and Tetachuck Lake.

Tweedsmuir Entiako Caribou Winter Range - this is a provincially significant caribou winter range located south of Tetachuk Lake. For more details see the Protected Areas Strategy subsection above.

2.3. Socio-Economic Overview

The information in this section covers the TSA including the Village of Burns Lake.

2.3.1. Population

Basic statistics describing the demographic and labour force characteristics of the region appear in Table 2-3. The total 1991 TSA population of 5 635 represented only a 0.4 percent increase over the 1986 population of 5 615. The TSA population growth rate is well below the 13.8 percent experienced by the province during that period.

Table 2-3: Key Regional Economic Statistics

	Burns Lake	TSA	BC
Population (1991)	1 682	5 635	3 282 061
Annual Growth (1986-91)	-0.5%	0.1%	2.6%
Per cent Change (1986-91)	-2.4%	0.4%	13.8%
Land Area (square kms)	7.1	11 237	892 677
Labour Force	840	2 660	1 748 920
Unemployment Rate[9] (Nov. 94)	9.6%		8.0%
Average Income (1991)	$22 874	$24 075	$25 985

Source: 1991 Census Data, Statistics Canada
Monthly Labour Force Survey, Statistics Canada
BC Central Statistics

Most of the growth that has occurred has been in rural areas while the main community of Burns Lake lost 2.4 percent of its population. The area's labour force also grew only slightly in the late 1980s. In 1991, the combined labour force was 2 660. The most recent region-wide unemployment rate was 9.6 percent, 1.6 percentage points above the BC rate of 8.0 percent. Average incomes were significantly lower in the Burns Lake and the TSA than in BC.

There are some significant demographic trends in the TSA. The average age of the regional population has steadily advanced over the last two decades as the baby boom generation moves into its middle age years. Table 2-4 compares the regional population age profile for the census years of 1981 and 1991.

9 The unemployment rate provided for the TSA and Burns Lake encompasses the Bulkley Nechako, Caribou and Fraser-Fort George Regional Districts.

Table 2-4: TSA Age Profile for 1991 and 1981		
Age Group	**1991**	**1981**
0-14	28.1%	31.4%
15-24	14.8	19.0
25-34	15.9	17.4
35-44	15.0	11.2
45-54	11.1	9.0
55-64	8.0	6.5
65+	7.1	5.5
Total	100.0%	100.0%
Source: 1981, 1991 Census Data, Statistics Canada		

Between 1981 and 1991, the 0-34 age group lost 9.0 percent from its share of the total population. This was picked up predominantly by the 35-54 age groups, which gained 5.9 percent in its share, and by smaller gains in the above 65+ age group.

The slow growth in the TSA population over the last decade is projected to increase in future years. As shown in Table 2-5, the population is expected to grow more than six percent every five years well in to the next century.

Table 2-5: TSA Population Projections[10] for 1993 - 2018		
Year	**TSA Population**	**Per cent Change**
1994	5 757	-
1999	6 149	6.8%
2004	6 536	6.3
2009	6 961	6.5
2014	7 395	6.2
2019	7 821	5.8
Source: BC Stats		

The regional population's ageing trend is also expected to continue well into the next century. The percentage share of the 15-34 and 45+ age groups will increase significantly while the other age groups will decline.

10 The Central Statistics Branch projects populations for regional districts only. We have assumed that Burns Lake and the TSA will grow at the same rate as the regional district itself. The figures are presented for illustrative purposes only and are not meant as reliable forecasts.

2.3.2. Labour Force

Labour force statistics are the best source of official information about the economic structure of a region. The percentage share by industry of the regional labour force for the 1986 and 1991 census years appears in Table 2-6. For the TSA, declines in the manufacturing sector were offset by significant increases in the service sector, especially in accommodation/food/beverage service (AFB). In Burns Lake, declines in forestry processing, transportation/communication/utilities, and AFB were offset by small increases in forest harvesting, construction, trade and services other than AFB.

Table 2-6: Experienced Labour Force in the TSA
Percentage Share 1991 and 1986

Industry	Burns Lake		TSA	
	1991	1986	1991	1986
Forestry[11]	9.1%	6.0%	13.2%	14.0%
Other Primary	0.0	0.0	6.3	5.6
Forestry Processing[12]	10.8	19.1	14.4	19.0
Other Manufacturing	0.7	0.9	0.6	0.8
Construction	3.0	1.2	3.8	2.4
TCU	7.3	11.7	8.1	10.2
Trade	23.0	20.1	13.5	14.0
FIRE	6.7	2.5	3.8	2.2
Government	10.9	7.4	6.3	5.0
AFB	4.8	8.0	8.8	5.8
Other Service	23.0	22.1	21.2	21.0
Total	100.0%	100.0%	100.0%	100.0%

Key: TCU-Transportation, Communications, Utilities; FIRE-Financial, Insurance, Real Estate; AFB-Accommodation, Food and Beverage Service.
Source: 1991 and 1986 Census Data, Statistics Canada.

The forest workforce is accounted for in two categories: the primary forest sector (mainly logging) and the manufacturing sector (mainly lumber processing). In 1991, 27.6 percent of the TSA labour force was made up of forest industry employees. This represents a significant decline from 33.0 percent in 1986. The total forestry workforce for Burns Lake declined from 25.1 percent to 19.9 percent. In both cases, reductions in the processing workforce, predominantly resulting from technological improvements at local mills, are responsible for virtually all of this decline.

The Ministry of Finance and Corporate Relations [Horne and Powell 1995] has reviewed the dependency of the Lakes Forest District on the basic industry sectors in the district. Table 2-7 illustrates the dependence of employment in the Lakes Forest District on the

11 Includes logging activity, but does not include processing.

12 Forestry processing data for 1986 is based on the 1991 ratio of forestry to non-forestry related manufacturing as 1986 data was not available.

basic sectors in the district. The basic employment in the forest sector includes persons directly employed in the forest sector (forestry, logging and wood processing) and those indirectly employed by providing goods and services to the forest industry. Non-basic employment is comprised of those whose employment depends on the spending of the families supported by the forest sector. Table 2-7 also reveals the percentage of total employment in the Lakes TSA that is supported by the various basic sectors. In the Lakes TSA, about 37 percent of all employment results from forest related activities. The public sector is the next largest with 28 percent of total employment, followed by tourism with nine percent.

Table 2-7: Employment Dependencies in the Lakes TSA

Basic Sector[13]	Basic Employment[14]	Non-Basic Employment[15]	Total Employment	% of Total Employment
Forest	697	164	861	37%
Mining	20	6	26	1
Agriculture	125	17	142	6
Tourism	189	20	208	9
Public Sector	541	103	644	28
Construction	70	14	84	4
Other[16]	209	37	246	11
Non-Employment[17]	0	110	110	5
Total Employment	1 850	471	2 321	100%

Source: Horne and Powell March 1995

2.3.3. Community Setting

Background

The Village of Burns Lake was first settled in the late 19th century in connection with the construction of an overland telegraph line to Alaska and Siberia. In the 1950s, the construction of the Kenney Dam for Alcan attracted more people to the area. In 1968, Decker Lake Forest Products began operations and in 1975, Babine Forest Products opened a major lumber mill creating a milestone for the forestry industry of Burns Lake. These companies are currently the two largest employers in Burns Lake and the TSA.

13 Basic sectors are assumed to be the drivers of the local economy and provide a source of income from outside the region.

14 Basic employment is comprised of both direct and indirect employment in each basic sector. In this table, indirect employment differs from the indirect employment used in the rest of this report where indirect also includes the non-basic (or induced) portion of total employment.

15 Non-basic employment (or induced) results from the spending of wages and salaries of those in the basic sector.

16 Other includes some manufacturing, transportation and construction.

17 The non-employment sector is generated through the spending of pension income, unemployment insurance, investement income and other social transfer payments.

Babine Forest Products employs approximately 400 and Decker Lake Forest Products employs 120 in their TSA operations. The number of forestry processing jobs has been shrinking over the past decade and the community itself has been losing population as a result. The opening of Burnslake Specialty Wood Products remanufacturing mill in 1992 increased value-added wood processing employment. The mill currently employs about 60 individuals. While processing employment has declined over the last decade, forestry harvesting employment has increased.

There are a host of supply, service and transportation related businesses which derive the majority of their business from the local sawmills. Many service and trade jobs in the community are supported by the spending of the families of the sawmill workforce.

After forestry, the public sector and tourism (discussed further on in the recreation and tourism section) are important contributors to the Lakes economic base. The retail trade sector is somewhat robust due in part to the fact that there are no large regional centres nearby although a significant amount of business is lost to Prince George - approximately 2.5 hours away by road. Over the last 15 years, employment increases in government services, and health and social services has blunted the effects of declining forestry processing employment. However, employment growth in these areas is believed to be over.

Social infrastructure includes the Burns Lake & District Hospital, six primary/elementary schools and two high schools, a campus of the College of New Caledonia, provincial government social services office, and a library. The nearest Human Resources Development Canada office is in Houston.

South of Burns Lake and a 20 minute ferry ride across Francois Lake is a collection of rural communities that reach as far as Ootsa Lake and are home to approximately 2 000 people. This represents the second major concentration of residents within the Lakes TSA. Industry in this area is primarily timber harvesting and cattle ranching. Ranching consists mostly of part-time ventures often supported by small sawmills or other non-farm income. Most supplies and services are purchased in Burns Lake.

Social Profile

Table 2-8 shows key health indicators for the Bulkley Nechako Regional District (BNRD). The health indicators show high mortality rates in the region. These are largely a result of a high level of external causes of deaths, especially motor vehicle accidents among males. Discussions with local RCMP indicated that this is related to dangerous stretches on Highway 16 shared by logging trucks and recreational vehicles and a particularly dangerous corner in Burns Lake. Both these problems have been dealt with through road improvements. The BNRD has a low teen birth rate and an average number of general practitioners per resident, but a relatively high infant mortality rate.

Table 2-8: Health Indicators, 1991		
	BNRD	BC
Mortality Rates[18] - per 1 000 pop'n:		
All Causes - Both Sexes	68.0	52.1
Motor Vehicle Accidents - Males	6.9	2.4
Infant Mortality Rate[19]- per 1 000 pop'n	13.6	7.9
Teen (<20 yrs.) Birth Rate[20] - per 1000 live births	46.2	59.1
General Practitioners - per 10 000 pop'n	9.2	9.4
Source: BC Stats		

Table 2-9 shows low birth weight rates and potential years of life lost (PYLL) by the Burns Lake Local Health Area (LHA). The Ministry of Health considers both of these statistics to be valid indicators of the health of a community as it relates to long-term ability to develop human resources. Low birth weight rates are caused by maternal malnutrition, smoking, drug use or premature birth and are often associated with teenage pregnancies or mothers with low socio-economic status. PYLL is indicative of premature mortality and the resulting loss of potential social and economic productivity.

Table 2-9: Low Birth Weight Rate and Potential Years of Life Lost Index		
	Burns Lake[21]	BC
Low Birth Weight Rate[22]	40.7	48.1
Potential Years of Life Lost Index[23]	1.27	1.00
Source: Ministry of Health, Division of Vital Statistics, 1992.		

The Burns Lake Local Health Area exhibited a lower rate of low birth weights than the province between 1987 and 1991. The PYLL is only marginally higher than the provincial average.

Table 2-10 shows crime rates for Burns Lake. Between 1988 and 1993, Burns Lake experienced some rise in its crime rate from 122 infractions per thousand of population to 148 but the growth is not significantly different from BC. The current crime rate is comparable to the provincial crime rate.

18 3 year average to 1990. Local Health Area (LHA) age standardized rates by sex, weighted by the 1989 male and female populations in the LHA.

19 3 year average to 1990.

20 3 year average to 1990.

21 The statistics provided in this column refer to the Burns Lake Local Health Area which does not exactly correspond to the TSA, however they should reflect the given health conditions.

22 Birth weight less than 2,500 grams per 1000 live births in 1991.

23 PYLL Index = Observed PYLL/Expected PYLL and is calculated over the period of 1987 to 1991.

Table 2-10: Crime Rates of Policing Jurisdictions, 1988 and 1993 (Crimes per 1 000 Population)			
	1988	1993	% Change
Burns Lake	122	148	21.3%
BC	130	147	13.1
Source: BC Central Statistics Branch, BC Ministry of Attorney General			

Data in Table 2-11 indicates long-term social assistance caseloads are near the provincial average, while the number of children on social assistance are lower than the provincial average.

Table 2-11: Social Profile Indicators		
	BNRD	BC
Long-term (>1 yr) Social Assistance Caseload - Sept. 1993 (as % of total)	45.4%	48.8%
% of Children (<19) on Social Assistance - Sept. 1993	8.9%	13.4%
Source: BC Central Statistics Branch		

The income and education indicators in Table 2-12 help to describe a community's ability to satisfy basic needs and cope with economic and social change.

Table 2-12: Incidence of Low Income Families and Population With a Minimum High School Education		
	Incidence of Low Income Families[24]	Population With a Minimum High School Education
BNRD	8.1%	43.2%
BC	12.1	66.0
Source: Statistics Canada 1991		

The BNRD has lower incidence of low income families than BC, but has a lower level of residents with a high school education. A lower level of education suggests the community is less able to adapt to changing economic situations.

[24] The proportion of economic families or unattached individuals in a given classification below the low income cutoff. The cutoff will differ according to the number of individuals in the family and the size of the community. For example, the cutoff for a family of three in a community whose population is between 30 000 and 99 999 is $22 103.

2.3.4. The Forest Industry

In the Lakes TSA, timber harvesting and lumber production are the most important contributors to the local economy. In fact, there are few economic sectors in Burns Lake which are not tied in some way to the forest economic base. The area's logging operations are very important to local manufacturers as a large portion of harvested wood remains within the TSA for processing. Many support services in the region, including transportation, equipment supply and maintenance, and fabrication, are purchased by established licensees and manufacturers. Forest industry employees make up the largest share of the regional labour force and create, through their spending and consumption, significant levels of employment in the trade and services sectors. The forest industry supports about 37% of the total employment in the TSA. While diversification into other sectors has occurred over the years, the dependency on the forest industry is still high.

Lakes TSA Activity

The Lakes TSA has an Allowable Annual Cut (AAC) of 1 500 000 m^3. The names of established licensees and the volumes committed to each appear in Appendix 5. The Small Business Forest Enterprise Program holds the largest allocation with 29.9 percent of the total available AAC. Babine Forest Products Limited (28.7 percent of the total AAC), West Fraser Sawmills Limited (24.5 percent), Decker Lake Forest Products Limited (9.2 percent), Northwood Pulp and Timber Limited (3.8 percent) and L & M Lumber Limited (1.5 percent) are the Forest Licence holders. The remainder of the AAC is made up of Woodlot Licences (1.4 percent) and Forest Service Reserve (1.0 percent).

Actual TSA harvests in the last four years were 1 708 064 m^3 (1990/91), 1 543 549 m^3 (1991/92), 1 592 221 m^3 (1992/93) and 1 398 343 (1993/94)[25]. In 1993 the private harvest in the Lakes TSA was 131 785 m^3. This harvest has risen dramatically in the last few years in response to high lumber prices, but owing to the small private land base, is not believed to be sustainable even in the short-term. Already, local mills are importing logs from the Yukon, a distance of approximately 800 kilometres, to meet their processing needs.

Licensees

Babine Forest Products (BFP) Company - BFP is a major Lakes TSA operator in terms of both harvesting and manufacturing. BFP began operations in 1976 as a Joint Business Venture between Weldwood of Canada Ltd., Westar Timber Ltd., Eurocan Pulp and Paper and the Burns Lake Native Development Corporation. Current ownership consists of Babine Forest Products[26] with a 68 percent interest and West Fraser Timber Co. Ltd.

---

25 Under the Ministry's Cut Control Policy, a licensee can annually harvest up to 50 percent more or less than its AAC and up to 10 percent more or less over the five year cut control plan. Over and under harvesting can be made up in a subsequent five year plan.

26 Weldwood owns 85 percent of Babine Forest Products while the Burns Lake Native Development Corporation owns the remaining 15 percent.

with a 32 percent interest. Weldwood holds the management contract and is responsible for timber acquisition, sawmill operations and marketing.

Babine Forest Products operates a fully modern sawmill, one of the largest in BC, with optimization equipment and a planer. The mill is located about 25 kilometres east of Burns Lake on Highway 16 and employs 242. Harvesting operations are taking place in the drainages of North Babine Lake, Burns Lake and Ootsa Lake and employ a total of 161. Of this, a crew of 55 operate out of a logging camp at North Babine. Virtually all of the company's Lakes TSA harvested wood goes to their mill which accounted for about 57 percent of total inputs in 1993. This amount is supplemented by fibre from local SBFEP operators, neighbouring TSAs and private wood.

Aboriginal involvement includes a seat on the Management Committee and some 75 jobs. Of the 75 jobs, 68 are key operator or trades positions; the sawmill superintendent, safety committee chairman and a maintenance supervisor are aboriginal people [Council of Forest Industries March 1994].

West Fraser Mills - West Fraser is a major harvester in the region, with almost a quarter of the total AAC, but does not have a mill in the Lakes TSA. The wood harvested in the TSA is destined almost exclusively for the company-owned Fraser Lake Sawmills in the neighbouring Vanderhoof Forest District. The sawmill, now employing 300 workers, was established in 1926. Since this time, the mill has undergone ownership changes with the most recent being Eurocan's gradual transfer of mill ownership to West Fraser in the 1980s and 1990s. West Fraser is a major lumber manufacturer with another five large sawmills scattered throughout BC's interior and north coast.

Harvesting in the Lakes TSA is taking place in the eastern end of Ootsa Lake where a camp is located. Harvesting operations in the Lakes supports 126 person-years of employment.

Decker Lake Forest Products - This operation, which began in 1968, is an independent lumber producer, privately owned by a group of Burns Lake and Fort St. James individuals. The mill is located in Palling, BC, about 20 kilometres west of Burns Lake. The mill manufactures lumber as well as utility poles. Harvesting in the TSA supported 26 jobs in 1993 and the mill supported 96 jobs.

Currently, harvesting operations are focusing on Maxan, Tchesinkut and Pinkut drainages. All the harvested wood is processed in their own mill. This accounted for 60 percent of total throughput in 1993 and is supplemented by fibre from Lakes TSA SBFEP operators and a small amount of private wood.

Northwood Pulp and Timber - Northwood began operations in the 1940s. The company has a relatively small share of the AAC and does not manufacture within the TSA. The company operates three very large sawmills in the interior with one of these, the largest in BC, located in the adjacent Morice TSA.

Harvesting operations are located in the Maxan and Ootsa Lake drainages and employ approximately 14. All harvested wood leaves the region for the company's mill in Houston.

L & M Lumber - L & M has the smallest share of the AAC and does not manufacture within the TSA. The company operates a mill in Vanderhoof (Prince George TSA). This company's harvest has fallen from approximately 40 000 m^3 in 1991 to zero in 1993 due to the absence of a five year harvesting plan for the Entiako region of the TSA where virtually all the company's logging rights fall. This is related to the Entiako LRUP, discussed in Section 2.2.2, which is attempting to resolve the conflict between harvesting and caribou wintering areas. In the event that this land is removed from the TSA harvesting land base, all licensees would likely share in the reduction and L & M would move operations when the licences are re-allocated.

Small Business Forest Enterprise Program (SBFEP) - The BC Forest Service provides timber to registered small business operators through the SBFEP. Introduced in 1987, the program's objectives are to generate new opportunities, diversification and jobs, and to increase competition. In the Lakes TSA, the AAC of the SBFEP has grown gradually over the years to its current level of 448 178 m^3/year, giving it the largest allocation in the TSA with 29.9 percent of the AAC. There are approximately 100 small business operators registered with the Ministry of Forests Lakes District Office. Approximately 17 have been actively purchasing SBFEP Timber Sale Licences (TSLs) in recent years. Many small business operators also serve as contractors for established licensees. Approximately 100 harvesting personnel are directly employed through the program[27].

Among the SBFEP operators are approximately 15 horse loggers. There is a relatively small amount of horse logging occurring in the TSA and horse loggers would not be greatly affected by AAC changes. Horse loggers are concerned, however, that the areas most suitable for horse logging could be licensed to other operators [pers. comm., Alfred Horning]. Another concern relates to the fact that many horse loggers and other small operators are also farmers. The time limitation on some licences can be very difficult to abide by when farm operations require prior attention, especially in spring.

Other Harvests - The private harvest in 1993 was 131 785 m^3. However, this is expected to decline sharply in the near future as the private timber base is liquidated. The Lakes Forest District Office has estimated that the average annual private harvest between 1994 and 1999 will be approximately 20 000 m^3.

Smaller Manufacturers

Burnslake Specialty Wood - This Burns Lake operation consists of a remanufacturing plant built in 1992. The company, which holds a small business Timber Sale Licence, is a joint venture between Babine Forest Products (55 percent interest) and the BLNDC (45 percent). The annual harvest of about 90 000 m^3 is first processed by Babine Forest

27 Based on a survey of SBFEP operators completed for this study.

Products and then remanufactured at Burnslake Specialty Wood. The mill employs 62 full-time personnel, 23 of which are aboriginal [Council of Forest Industries March 1994].

Francois Lake Woodworking - This value-added operation holds a Category 2 licence with an annual harvest of approximately 20 000 m^3. The company employees 22 people at the mill and a further three in harvesting. The company expects to hire four more individuals in the next six months. Of the harvested wood, most is traded with other mills, both inside and outside the TSA.

Boo Flat Lumber - Boo Flat is a small mill which saws about 5 000 m^3/year of timber and employs five people. Harvesting provides about two jobs and supplies an additional 7 500 m^3 of fibre to Babine Forest Products annually.

Ootsa Lake Sawmill - Ootsa Lake Sawmill has an annual input capacity of 15 000 m^3 but in recent years has only been sawing about 3 000 m^3. It produces value-added and dimension lumber for the Japanese market and car decking for Canadian National Railway. The mill provides employment for between one and two workers. Harvesting by the company supplies the mill and Babine Forest Products.

Sheraton Custom Milling - This custom sawmill has an annual input capacity of over 30 000 m^3 and has been operating at approximately 50 percent capacity. The mill employs about 10 people.

Supporting Business

Its long local history and pervasiveness through the region has made the forest industry into a major purchaser of supplies and services from local businesses. Over the years, many local operations which anchor their businesses on forest industry buying have developed. They include companies which perform construction, road-building, road transport, machine shop service, vehicle repair, legal, and accounting services. Then there are the suppliers of tires, vehicle parts, construction materials, work clothes and many other items. The adverse effects on local businesses of forest industry strikes, or even the industry down-sizing since the early 80s, are conclusive evidence of the forest industry-supplier linkages. Even local consumer oriented businesses are directly tied to the forest industry through purchases by forest industry employees. The following examples highlight the forest industry's impact on local suppliers.

Kal Tire - Kal Tire is a national tire sales and service dealer. The Burns Lake outlet was established ten years ago and employs six people, usually rising to seven in the spring and summer. The manager estimates that approximately 80 percent of his business is from forestry companies and employees of these companies. He felt that there is no doubt that there would be a noticeable impact from any changes in harvest levels on his business.

Burns Lake Building Supply (Irly Bird Lumber) - This hardware and lumber retailer affiliated with the Irly Bird chain employs eight people that increases to 12 in the spring and summer. The business has been in Burns Lake for 10 years. The manager estimates that approximately 60 percent of his business is derived from the forestry industry and its employees. A change in the harvest levels would have somewhat of an effect on his business.

Burns Lake Automotive - Burns Lake Automotive is a wholesaler of automotive and industrial supplies. The company has been in business for 30 years and employs eight. Employment has been increasing recently. The manager estimates that 60 percent of business is derived from the forest industry while another 10 percent comes from employees of the forest companies. The company expects that business would be affected if there is a change in the harvest level.

Ministry of Forests

The Ministry's Lakes District Office employment was estimated as 55 person-years for fiscal 1993-94. This employment would be in addition to the estimated industry employment shown in Table 4-1. The government employment is not assumed to be a direct function of the AAC's size. Although the TSA's timber harvest will affect government activity to some extent, the majority of Ministry of Forests' employment is forest management related, not harvest related.

2.3.5. Recreation and Tourism[28]

The local tourism industry is based on part-time/seasonal ventures that capitalize on the area's natural resources. A number of small resorts, campsites and related businesses generate a small but significant amount of employment and income. Burns Lake is considered the "Gateway to Tweedsmuir Provincial Park", the second largest park in BC. Tourism is dominated by fishing, boating on the numerous lakes, guided hunting and, the "rubber tire" trade, largely enroute to and from Alaska. Tourism supports about nine percent of the total employment in the TSA. Table 2-13 contains a list of tourism facilities in the Lakes District.

Outdoor recreation is a driving force behind tourism and provides a high quality of life to local residents. Opportunities exist for a full range of outdoor activities and according to 1989 figures for northwestern BC, 27 percent of resident travellers and 59 percent of non-resident travellers had a trip purpose that was natural resource based [Ministry of Forests 1994]. According to local tourism stakeholders, visual quality of the landscape is a significant concern among visitors who have travelled to this area for an outdoor experience. Although no statistics of the immediate area exist, fishing, boating and hunting are the major outdoor tourism activities.

28 Recreation refers to a range of outdoor activities undertaken either by a resident of the area, or a non-resident. Non-resident visitors are commonly referred to as tourists.

Table 2-13: Tourism Facilities in the Burns Lake Trading Area	
Facility	**Number**
Restaurants	10
Motels/Hotels	5
Family Resorts	6
Small Private Campsites	5
Guide Outfitters	11
Provincial Park Campsites	2
BC Forest Service Campsites	45
Golf Courses	3
Source: Village of Burns Lake, 1989	

Park Visitation Trends

In the Lakes TSA, low population density and remoteness lead to a relatively modest use of provincial parks when compared to lower mainland visitation figures. Fishing is the primary activity with most parks on lakesides with boat launches. Forests provide a fundamental backdrop to park activities which in turn support a variety of businesses and their employment.

The visitation levels for provincial parks in and around the Lakes TSA appear in Table 2-14. They provide an indicator of demand within the region for the types of recreation experiences found in these parks. Total 1993 visitation was approximately 2 700 party days, down 16.1 percent from 1992. Between 1989 and 1992, visits to all BC provincial parks[29] increased by 12.0 percent, whereas Lakes TSA parks visitation fell by 19.0 percent.

Table 2-14: Visits to Provincial Parks in the Lakes TSA (party days)						
	1994	1993	1992	1991	1990	1989
Ethel F. Wilson (campground)	133	143	255	222	410	387
Ethel F. Wilson (day use)	354	440	519	533	729	402
Pendleton Bay (campground)	408	350	753	671	508	662
Pendleton Bay (day use)	2 706	1 223	1 077	1 530	2 502	1 797
Tweedsmuir North (backcountry)	n/a	399	244	193	200	n/a
Wistaria (day use)	n/a	199	435	319	90	506
Source: BC Parks.						

29 Comparable data for BC Parks as a whole is available only up to 1992.

Explanations for the declining visitation include the following.

- Pendleton Bay and E.F Wilson Provincial Parks recently implemented a user fee which tends to cause an initial reduction in visitation. Additionally, some of the earlier estimates were described as overly optimistic, while more recent figures are believed to be accurate.

- Visitation to Wistaria Provincial Park declined as visitors began shifting to the newer and nearby Andrews Bay (outside the Lakes TSA) which provides superior access to Tweedsmuir Provincial Park lakes.

Visitors are predominantly from within the region with Americans forming the second largest group. Future visitation will be tied to the population growth in the region as well as to fluctuating fishing and weather conditions.

Forest Recreation Site Visitation Trends

Table 2-15 shows usage at the 28 Ministry of Forests recreation sites in the Lakes TSA during 1991/92. Although a recreation site breakdown is not available for 1993/94, total visitation has increased to 21 401 user days, an increase of 10 percent over two years. The Ministry also maintains three hiking trails and recreational use occurs at a number of unofficial sites, for which data is not available.

Table 2-15: High Season Visitation at Ministry of Forests Recreation Sites, 1991/92

Recreation Site	User Days	Recreation Site	User Days
Augier	1 990	Knapp	551
Pinkut	1 772	Co-op	509
South Binta	1 719	Lund	330
Maxan	1 599	Agate Point	263
Uncha	1 544	Eagle Creek	235
Takysie Lake (A)	1 517	Takysie Lake (B)	224
Indian Bay	1 186	Eastern Lake	218
Taltapin	990	Trout Lake	161
East Noralee	841	Ootsa Landing	130
Government Point	784	Division	116
North Binta	703	Mollice	49
West Noralee	689	Moose	22
West Francois	648	Richmond	29
Colleymount	627	Guyishton	9
		TOTAL	19 456

Source: BC Ministry of Forests, 1994

In addition to the more intense use of the forest on trails and at sites, it is important to note that there are an estimated 1.7 million plus user days of viewing the forest[30] and a large amount of dispersed use occurs on forested Crown land, mainly involving hunters.

Hunting Trends

Hunting is closely tied to wildlife habitat, so forest harvesting can have a direct impact on this activity. Table 2-16 provides hunter effort data for major game species in the Lakes TSA from 1988 to 1993. Hunting activity, as measured by hunter days, is very high in the region, ranging from a high of 29 200 in 1992 to a low of 23 757 in 1993.

Table 2-16: Hunter Days for Major Game Species in the Lakes TSA

Game	1988	1989	1990	1991	1992	1993
Mule Deer						
Resident	6 756	8 805	7 945	8 934	9 147	7 219
Non-Resident	0	0	0	0	0	0
Total	6 756	8 805	7 945	8 934	9 147	7 219
Goat						
Resident	24	61	56	105	29	26
Non-Resident	0	10	9	38	3	3
Total	24	71	65	143	32	29
Moose						
Resident	14 360	14 269	15 634	15 078	17 262	12 935
Non-Resident	1 227	1 104	1 158	1 297	2 113	1 120
Total	15 587	15 373	16 792	16 375	19 375	14 055
Black Bear						
Resident	1 638	2 063	1 574	1 663	1 684	1 506
Non-Resident	577	701	530	753	520	651
Total	2 215	2 764	2 104	2 416	2 204	2 157
Grizzly Bear						
Resident	143	188	198	277	243	226
Non-Resident	86	123	65	88	96	44
Total	229	311	263	365	339	270
All Big Game						
Resident	22 921	25 386	25 407	26 057	28 365	21 912
Non-Resident	1 890	1 938	1 762	2 176	2 732	1 818
Total	24 811	28 423	27 169	27 731	29 200	23 757

Source: BC Ministry of Environment

The most significant big game species is the moose. Another important figure is the size of the non-resident hunter effort, representing 8.3 percent of total hunter effort in 1993.

30 Viewing Use = (Population residing, travelling or working within view of forest) x (Days in a year that forest is visible) x (Proportion of population with a lifestyle for viewing forests).

Non-resident hunting is a tourism activity often requiring guides (in the case of non-Canadian hunters) and the purchase of other goods and services that provide a significant economic benefit.

Fourteen guide-outfitting territories are in or partially within the Lakes TSA, while an estimated 11 active guides operate out of the TSA. In 1989, the total economic impact of guide-outfitting in the northwest section of the province, where there are 65 active guides, was $8.1 million and 170 jobs [DPA Group Inc. 1989]. Roughly 10 percent of this activity is attributable to the Lakes TSA. Approximately 81 percent of northwestern BC guide-outfitters clients are from the U.S. [Ministry of Forests 1994]. Outfitters operate within the area on a part-time basis supplementing their income from other sources such as ranching or forestry.

Guide-outfitting is directly impacted by forestry in a number of ways. On the one hand, certain species which thrive on the variety of landscapes created by harvesting would increase in population and therefore increase opportunities for hunting. On the other hand, guided hunters are looking for untouched wilderness for hunting where any sense of development can severely impair the hunting experience. Remote wilderness is consistently among the most important factors for both satisfaction with the product and reason for selecting BC as a destination. Because word-of-mouth is the strongest form of advertising for guides [DPA Group Inc. 1989], these experiences can have immediate impacts. Logging roads through a guide's area and a general shrinking of pockets of wilderness reduce the wilderness experience, reduce wildlife habitat and also increase local hunter access, leading to increased overall hunting pressure. Guides recognize the importance of communication with the Ministry of Forests and with forestry companies, allowing some mitigation of the effects of development.

Table 2-17: Number of Hunters for Small Game Species in the Lakes TSA

Game	1988	1989	1990	1991	1992	1993
Blue Grouse	99	295	116	126	235	109
Spruce Grouse	495	888	834	640	541	545
Ruffed Grouse	520	1 118	859	694	632	497
Sharp-Tailed Grouse	34	206	80	0	0	0
Goose	83	137	69	115	274	97
Duck	89	101	94	61	235	71
Ptarmigan	68	137	122	56	204	53
TOTAL	1 305	1 627	2 105	1 577	1 847	1 275

Source: BC Ministry of Environment

Table 2-17 provides the number of hunters of small game species in the Lakes TSA from 1988 to 1993. Hunter effort is not available for these species. It is difficult to suggest any sort of trend with this data due to the high variance from year to year with the number of

hunters ranging from 1 275 to 2 105. These totals should also be used with caution as there is a potential for double counting of hunters pursuing more than one species.

2.3.6. Trapping

There are approximately 111 official traplines located within the Lakes TSA. Most lines are registered to one owner with some averaging five or six people [pers. comm., John Gerow]. This would suggest that the number of trappers is well into the hundreds, although the actual number of active trappers is not readily available nor is the breakdown between aboriginal and non-aboriginal trappers. Trapping within the Lakes TSA has been a traditional activity for aboriginal residents for many years and has important cultural significance. It is difficult to quantify the activity, but its importance and the impacts of the forestry industry have been stressed numerous times by the aboriginal community.

Table 2-18 provides total annual harvest for all the traplines located in the TSA. Harvests vary from year to year and are closely influenced by fur prices and weather conditions [pers. comm., Tom Smith]. Marten is by far the most trapped animal with the number trapped ranging roughly between five to 10 times greater than the second most trapped animal, the squirrel.

Table 2-18: Wild Fur Harvest from Traplines in the Lakes TSA, 1988 - 1993

Year	Total Harvest
1993	1 765
1992	2 590
1991	3 640
1990	2 205
1989	2 550
1988	3 464

Source: Ministry of Environment, 1995

The BC Trappers Association (BCTA) has developed a Forest Management Policy [undated] based on the premise that management practices that promote biological diversity will not only maintain or enhance trapping opportunities, but will similarly enhance or maintain other resource values such as water, fish, range, recreation and timber. More specifically, the BCTA advocates that forestry development plans include input from directly impacted trappers and be modified as required, and that trapper's rights should be recognized as legal rights allowing participation in management decisions, access to traplines, and compensation for forest industry-caused losses on trapline equipment, improvements and facilities.

2.3.7 Ranching

Agriculture supports about six percent of the employment in the TSA. Due to a very short growing season, agriculture has been virtually restricted to raising livestock, predominantly beef. Generally, ranchers operate on a part-time basis and supplement their income with other employment, mainly forestry.

Total capacity of the Lakes Stock Range is estimated to be over 20 000 animal unit months[31] (AUMs). Available crown range is allocated based on available forage, ranch haybase[32], proximity to ranch plus considerations addressing impact of range use on other identified resource values. In 1993, 8 500 AUMs of forage were authorized for use by livestock and 8 000 AUMs were actually consumed by 4 000 head of cattle and horses.

Recently, experiments examining cattle grazing as a silvicultural treatment have been attempted. The purpose of the experiments was to determine if grazing could be used to manage vegetation without causing excessive damage to the seedlings and young trees. Clearcut areas could provide good rangeland and instead of paying grazing fees, ranchers could be providing a service for a fee. Results, although in the very early stages, appear to be positive [pers. comm., Harold Kerr].

2.4. First Nations

Six First Nations have reserve lands and traditional territory in the Lakes TSA.

- The Nee-Tahi-Buhn Band (NTBB) has reserves and traditional territory within the Lakes TSA. Their traditional territory basically includes the southern drainages of Francois Lake. NTBB is affiliated with the Wet'suwet'en Tribal Council.
- The Skin Tyee Band (STB) has all its reserve land and traditional territory within the Lakes TSA. The traditional territory covers the southern drainages of Francois Lake. At present the Skin Tyee Band is considered part of the Nee-Tahi-Buhn Band but is undergoing efforts to be recognized as an independent band.
- The Burns Lake Band has all of its reserve lands and traditional territory in the Lakes TSA. Their traditional territory includes the area immediately around Burns Lake from Tchesinkut Lake in the south to areas just south of Pinkut and Taltapin Lakes in the north. It is a member band of the Carrier-Sekani Tribal Council (CSTC).
- The Broman Lake Band, also a member band of the CSTC, has reserve land within the TSA and has traditional territory in the central areas of the TSA, north from the shores of Francois Lake to the northern reaches of the Nechako drainage.
- The Cheslatta Carrier Nation Band is an affiliate of the CSTC. This band has reserve land and traditional territories within the TSA. Their claim surrounds Cheslatta, Ootsa and Tetachuk Lakes in the southern portion of the TSA.

31 One animal unit month is equivalent to the amount of forage required by one adult cow /horse for one month. Sheep forage requirements are one quarter of this amount.

32 The ranch haybase is a measure of the carrying capacity of the ranch.

- The Lake Babine Band is an independent band with reserve land and territories in the Lakes TSA. Their traditional territory is in the most northerly portion of the TSA and encompasses the drainages into Babine Lake. Lake Babine is the largest band in the TSA in terms of population.

Membership and population data for these First Nations is shown in Table 2-19.

Table 2-19: Regional Tribal Councils, their Member Bands and Independent Bands with Traditional Territory in the Lakes TSA

Organization[33]	Total Population	On-Reserve Population	Head Office
Wet'suwet'en Tribal Council[34]			Hazelton
Nee-Tahi-Buhn Band	65	23	Burns Lake
Carrier-Sekani Tribal Council[35]			Prince George
Burns Lake Band	73	26	Burns Lake
Broman Lake Band	139	56	Burns Lake
Cheslatta Carrier Nation Band	210	85	Burns Lake
Independent Bands			
Skin Tyee Band	117	35	Burns Lake
Lake Babine Band	1 596	1 057	Burns Lake

Source: Indian and Northern Affairs Canada

2.4.1. Treaty Negotiations

The British Columbia Treaty Commission facilitates the treaty process in BC. The Commission was appointed under an agreement signed by the First Nations Summit and the governments of Canada and British Columbia in September, 1992. On December 15, 1993, the Treaty Commission began accepting statements of intent to negotiate treaties from aboriginal groups. The filing is the first step in a six-stage process designed to settle long-standing land and resource related issues in British Columbia where few treaties have been signed with First Nations. There is no timetable for concluding the negotiations process.

At the time of this report's writing, all recognized bands in the Lakes TSA are party to statements of intent. The Lake Babine Band has filed an individual claim. Cheslatta, Burns Lake and Broman Lake bands are part of the Carrier Sekani Tribal Council claim, while Nee-Tahi-Buhn is part of the Wet'suwet'en claim. The Skin Tyee band is seeking independence from the Nee-Tahi-Buhn and Wet'suwet'en organizations to settle land claims individually. Settlement of these claims will have a major impact on First Nations,

---

33 Tribal councils are administrative vehicles with varying degrees of authority. The bands are the First Nations vested with political and cultural responsibilities and duties.

34 Only those member bands within the Lakes TSA are listed.

35 Only those member bands within the Lakes TSA are listed.

their relations with other Canadians and the forest industry. The impact of the timber supply review process on land claims is a matter of some concern to First Nations.

2.4.2. Employment

In 1991, the unemployment rate for aboriginal people in BC was 28.2 percent. However, Human Resources Development Canada has estimated that the participation rate of aboriginal people is lower than for the population as a whole, and that the actual unemployment situation is in fact worse than the official rate.

Unemployment among aboriginal people is consistently higher than it is for the population as a whole. In 1991, 9.9 percent of the provincial population was unemployed. Lower education levels, which may confine aboriginal people to low-paying, low-skilled jobs, are partly to blame for this situation. Many other reasons also play a part: a lack of on-reserve economic development; a preference among some aboriginal people for working on-reserve; a lack of equity investment capital; and the general issue of the exclusion of aboriginal peoples from the mainstream economy.

Employment among aboriginal people in BC is clustered in the public administration and resource sectors. While fishing dominates the latter, forestry also plays a significant role. In fact, aboriginal people in BC are more dependent on forestry and wood manufacturing than the overall population [Employment and Immigration Canada December 1991].

2.4.3. Economic Development

The industrial job distribution pattern described above for aboriginal people has some serious implications. Both the public administration and resource sectors are either static or in decline in terms of employment. At the same time, aboriginal people are less involved in those sectors which are experiencing the greatest growth (e.g. services). A continuing erosion of the forest job base can be expected to adversely affect the employment levels and job prospects of aboriginal people in the region. However, there are several economic development initiatives taking place among the various councils and bands.

The Burns Lake Native Development Corporation (BLNDC) represents the Lake Babine, Cheslatta, Nee-Tahi-Buhn, Burns Lake and Broman Lake Bands. Its mandate is to create, develop and increase incomes, business opportunities, employment and other socio-economic benefits for aboriginal people. BLNDC was started in 1974 as a non-profit, non-government funded organization serving the needs of and owned by aboriginal communities in the Lakes District. The company provides business advisory services and debt and equity financing for the creation and development of new enterprises. The companies portfolio includes large forestry-based companies as discussed below to small home based businesses and also includes other sectors such as services, aquaculture and tourism.

2.4.4. Aboriginal Forestry Activity

Obtaining forest tenures is of critical importance for First Nations. Tenure provides more assurance for employment in silviculture, forestry harvesting and perhaps processing. The BLNDC estimates that up to 95 percent of aboriginal employment in the Lakes District is forestry-related and the BLNDC is the driving force behind aboriginal forestry initiatives. The following summarizes some of their activities in the Lakes TSA.

- The Burns Lake Native Development Corporation has a 10 percent interest in Babine Forest Products Company and has a joint venture with Babine Forest Products in Burnslake Specialty Wood Ltd[36]. Babine Forest Products has 75 aboriginal employees out of a workforce of 250 and Burnslake Specialty Wood Ltd. has 23 aboriginal employees out of 52 [Council of Forest Industries March 1994]. Burnslake Specialty Wood Ltd. holds a Timber Sale Licence for 900 000 m^3 over 10 years in the Lakes TSA.

- Burns Lake Native Logging, wholly-owned by BLNDC, is a well established logging contractor that has been in business since 1976. The company employs 13 people of which nine are aboriginal [Council of Forest Industries March 1994]. They perform contract logging predominantly for Babine Forest Products and Burnslake Specialty Wood.

- The BLNDC owns a subsidiary called Yin Waghunlee Silviculture Corporation that began operations in 1993 and employs 35 aboriginal workers. The company anticipates doubling in size over the next year. BLNDC is also starting a high lead logging company which would create four jobs. A small round log processing operation and tertiary value added operation are also being explored.

Forests and other natural resources are sacred to aboriginal people as they are viewed as being part of the inter-connected relationship between land, animals, humans and the spirit world. To aboriginal people, environment includes all life forms and natural features in the area and all features are viewed as equally important. In addition to this general desire to protect the environment, aboriginal peoples have some specific concerns that affect them economically and culturally. These concerns include trapping and cultural/archaeological sites.

Trapping has been a traditional activity and still occurs on territorial land. It is often the trapping areas that define traditional territories of aboriginal bands and they play a role in the social structure of aboriginal society. Additionally, there is an economic benefit to the bands from the trapping lines. Protection of the traplines is of great importance. Specific issues are the damage to traplines from logging and road-building, and the damage to furbearer habitat. Aboriginal groups feel that there is not enough consultation from the forestry industry concerning the preservation of these assets.

---

36 Please see Section 3 for details on these companies

The protection of cultural/archaeological sites is also of great importance to the local bands. One of the problems with this issue is the lack of complete information regarding these sites. The information has not been satisfactorily compiled and archaeological sites are still being discovered. Aboriginal groups believe that this issue must be addressed before proper planning can take place.

2.4.5. Aboriginal Organization Profiles

Nee-Tahi-Buhn Band

The Nee-Tahi-Buhn Band has four reserves in the TSA (excluding Skin Tyee reserves). The Band occupies a small reserve community of 58 people, 60 km south of Burns Lake on Francois Lake, near Southbank that is accessible by gravel road, air or water. BC Hydro and BC Tel are available, water is drawn from the lake and sewer disposal consists of septic tank or lagoons. The Southbank volunteer fire department provides fire protection. Other on-reserve developments include a band office, a community hall, a wood shop and a fisheries research station. Private or band owned businesses include forestry related activities, fishing and tourism and the band is represented by the BLNDC.

Burns Lake Band

The Burns Lake Band has four reserves in the TSA on a total of 164 hectares with a community of 23 on the Burns Lake reserve near Burns Lake Village. The community is accessible by road, air or water. BC Hydro and BC Tel are available and water and sewer are connected to the Burns Lake system. The Village of Burns Lake provides fire protection. On-reserve developments include a band office. Forestry is the main source of employment and income. Other activities include motel operations, numerous leaseholds and participation in the BLNDC. Unemployment is estimated to be approximately 30 percent [pers. comm., Wesley Sam]

Broman Lake Band

This Band has 11 reserves on a total of 620 hectares of which seven reserves are within TSA boundaries. There is no fire protection and the community is marginally accessible by road. BC Hydro and BC Tel are available, water is drawn from community wells and sewerage is handled by septic tank and a field. On-reserve developments include a band office and a community centre. Forestry is the main source of employment and income. The Band also participates in the BLNDC.

Cheslatta Carrier Nation Band

This Band has 15 reserves on a total of 1 403 hectares of which eight reserves are within TSA boundaries. The community is accessible by road and fire protection is provided by the volunteer Southbank fire department. BC Hydro and BC Tel are available, water is

drawn from community wells and a creek, and sewer includes a sanitary main and five lagoons. On-reserve developments include a band office, a workshop and a small recreation hall. Forestry and trapping are the main sources of employment and income. The Band is a partner in BLNDC.

Babine Lake Band

This independent band has 24 reserves of which five are within the Lakes TSA boundaries. Most of the 1 596 members reside on the Woyenne Indian Reserve which is adjacent to the Village of Burns Lake. A total of 1 057 live on reserve. The community is accessible by gravel road, air and water, and is serviced by BC Tel and BC Hydro. Fire protection is provided by Burns Lake. Developments on the reserve include a community hall, band office, school, clinic, workshop and a recreation building. The band as a whole has employment through Babine Forest Products, fishing guide tours, the Fort Babine Fish Hatchery, logging and a band-owned construction company. The Band is a partner in the BLNDC.

Skin Tyee Band

The Skin Tyee has eight reserves within the TSA.

3.0 TIMBER SUPPLY SITUATION

3.1. Introduction

Three harvest forecasts from the Lakes TSA Timber Supply Analysis [1995] are examined in this socio-economic assessment. These forecasts represent possible harvest flow patterns given current land base and forest management practices[37] in the Lakes TSA. The forecasts were chosen to illustrate a range of social, environmental, and economic implications associated with different harvest levels. **The forecasts are neither meant to suggest a preferred AAC level nor do they represent the only options that could be considered in the final AAC determination.**

3.2. Current Forest Management Guidelines

The Interim Regional Timber Harvesting Guidelines for the Interior Portion of the Prince Rupert Forest Region [1992] (that has been modified for the Lakes Forest District) guide forest management practices. Where no specific management objective is delegated to the harvestable land base, Integrated Resource Management guidelines are applied. This management zone accounts for 63 percent of the harvestable land base and includes guidelines such as: a minimum harvestable age[38]; harvested stands must reach a green-up height of three metres before adjacent stands can be harvested; and, a maximum of 33 percent of an area can be less than three metres in height.

Six other management zones, divided into resource emphasis groupings, have been set aside for varying management practices to meet their specific needs. These zones generally have guidelines that are more demanding than those noted above[39]. The management zones are as follows:

- Sutherland Valley - one percent of the timber harvesting land base;
- Riparian habitat - three percent;
- Caribou corridor - four percent;
- Visual retention - four percent;
- Partial visual retention - 20 percent; and,
- Moose and deer winter range - five percent.

These guidelines do not take into account any changes to forest management as a result of the Forest Practices Code, ongoing LRMPs and LRUPs, or the PAS.

---

37 Current management practices are assumed in the timber supply analysis. These cover many but not all practices identified in the new Forest Practices Code. Timber supply estimates based on new forest management rules will be developed in the next cycle of TSA Timber Supply Reviews, approximately five years hence.

38 Varying minimum harvesting ages are applied to each analysis unit. An analysis unit is defined by tree species, site quality and silviculture prescription. Please refer to the Lakes TSA Timber Supply Analysis [1995] for further details.

39 The Lakes TSA Timber Supply Analysis [1995] provides specific management practices for each of these zones.

3.3. Current AAC

The current AAC for the Lakes TSA is 1 500 000 m^3/year, set by the Chief Forester in 1982. This level was reconfirmed in 1987 and 1992. The apportionment is shown in Table 3-1.

Table 3-1: Current AAC Apportionment, Lakes TSA, 1993

	m^3/year	% of AAC
Forest Licences, Replaceable	1 015 724	67.7%
Woodlot Licences	21 098	1.4
SBFEP any category section 16	53 610	3.6
SBFEP Category 1 (sec. 16)	169 980	11.3
SBFEP Category 2 (sec. 16)	74 530	5.0
SBFEP Bid Proposals (sec 16.1)	140 819	9.4
SBFEP TSL (major) <= 10 000	2 003	0.1
SBFEP other	7 236	0.5
Forest Service Reserve	15 000	1.0
Total Approved Allowable Annual Cut	1 500 000	100.0%

The total area for the entire Lakes TSA is 1 123 667 hectares. After accounting for non-Crown land, non-forest land, and various reductions to the productive forest area, the long-run timber harvesting land base is 634 487 hectares (56.5 percent of total land base). See Appendix 6 for a complete breakdown of the land base.

3.4. Current TSA Forest Industry Operations

Information furnished by major licensees and small business operators (Table 3-2) indicates that 64.6 percent of current harvest levels is processed within the TSA[40]. The clear majority, 95.8 percent, of the TSA's timber is manufactured into lumber. Of this lumber, two thirds is processed by mills inside the TSA while the remaining one third goes to mills in neighbouring TSAs. Pulp and paper manufacturing accounts for 2.5 percent of TSA wood, half of which is chipped in the region before heading to coastal mills. The remaining 1.7 percent of wood is used for "other processing ", primarily pole and post manufacture within the TSA.

The wood flow information (Table 3-2) is based on licensee information, but not all of the licensees are integrated companies owning processing facilities. The majority of the small business operators are market loggers who distribute their wood through a variety of channels. The movement of logs to their final processing point can be quite complex with

40 Twelve established licensees and two small business operators were surveyed. Collectively, the survey respondents accounted for approximately 90 percent of the total Lakes TSA AAC in 1993 and 100 percent of non-SBFEP licensees.

private trades and sales agreements. As a result, licensees do not always know precisely where their harvest is eventually processed.

Table 3-2: Lakes TSA Wood Flows, 1993

Timber Use	Within TSA	Outside TSA	Total
Lumber	62.3%	33.5%	95.8%
Other Processing	1.2	0.5	1.7
Pulp and Paper	1.1[41]	1.4	2.5
Export	0.0	0.0	0.0
Total	64.6%	35.4%	100.0%

3.4.1. Employment Attributable to Lakes TSA Wood

Census labour force information for the region was reviewed in Section 2.2. The census data shows total industry employment in the Lakes TSA was supported not only by Lakes TSA timber but by timber from other sources as well. Direct harvesting employment and processing employment for major licensees in the Lakes TSA was discussed in Section 2.5. In terms of the total Lakes TSA AAC, direct employment in harvesting and silviculture is approximately 450 person-years[42] (PYs). This does not include additional employment related to the cut of private wood outside of the AAC. Lakes TSA wood is the basis for another 359 PYs at numerous processing facilities (primarily sawmills) in the region. Total regional forest sector employment attributable to the Lakes TSA AAC is 809 PYs. Outside of the region, Lakes TSA wood supports another 355 PYs of processing jobs, primarily in pulpmills and sawmills in neighbouring TSAs. Therefore, total provincial direct employment attributable to the Lakes TSA AAC is 1 164 PYs.

Indirect/induced employment from Lakes TSA AAC for the region is 370 PYs which leads to a total of 1 179 direct and indirect/induced PYs for the TSA. Provincially, indirect/induced PYs amount to 1 746 making total direct and indirect/induced jobs attributable to Lakes TSA wood equal to 2 910 PYs.

These estimates do not include employment related to the harvest from outside of the TSA that is processed by mills within the Lakes TSA. Approximately four percent of the timber processed within the TSA boundaries is harvested outside the TSA and nine percent is private wood.

41 In this case, pulp and paper includes chipping only.

42 This employment data is based on a survey of Lakes TSA licensees and the methodology is explained in Appendix 7.

3.5. Description of Harvest Scenarios

The three harvest scenarios examined in this report are shown in Table 3-3. The harvest levels apply to the beginning of each decade and are assumed to be the same for each year of the decade. The timber supply analysis indicates that the current AAC cannot be maintained indefinitely, given current management practices. These scenarios do not represent AAC recommendations, rather they act as a focus for discussion of economic, social and environmental issues related to timber supply

3.5.1. Scenario One

Scenario One is the base harvest forecast from the Timber Supply Analysis report [1995]. It begins with a maximum allowable harvest of 1 500 000 m^3/year for the first seven decades, unchanged from the current AAC. The harvest declines by 10 percent at the beginning of decade eight and a further three percent in decade nine. Thereafter, the harvest is steady at 1 310 000 m^3/year for eight decades. This level is 9.1 percent below the long-run harvest level. In decade 18, there is an increase of 10 percent before the long-run harvest level (LRHL) of 1 441 000 m^3/year is reached. The long-run harvest level is a 3.9 percent reduction below the current AAC.

3.5.2. Scenario Two

Scenario Two considers the implications of raising harvest levels above the current AAC. It begins with a maximum allowable harvest of 1 650 000 m^3/year for the first five decades. The harvest then declines by nine percent in decade five to 1 500 000 m^3/year. In decade six, the harvest level drops by nine percent and drops again in decade seven by three percent to 1 310 000 m^3/year. The harvest remains at this level for 10 decades. This level is 9.1 percent below the LRHL. In decade 18, there is an increase of 10 percent and the LRHL of 1 441 000 m^3/year is reached. As with Scenario One, the long-run harvest level is a 3.9 percent reduction below the current AAC.

3.5.3. Scenario Three

Scenario Three presents the alternative of reducing the harvest level quickly. It begins with a maximum allowable harvest of 1 441 000 m^3/year for the first decade, 3.9 percent below the current AAC. This level is maintained for a total of 13 decades. At decade 14, the harvest level begins to fluctuate until the LRHL of 1 441 000 m^3/year is reached in year 180.

Table 3-3: Harvest Flow Forecasts
('000 m^3/year)

	Scenario One			Scenario Two			Scenario Three		
Harvest	Harvest	Change		Harvest	Change		Harvest	Change	
Period	'000 m^3	'000 m^3	%	'000 m^3	'000 m^3	%	'000 m^3	'000 m^3	%
Current	1 500			1 500			1 500		
0	1 500	0	0	1 650	150	10	1 441	-59	-4
10-49	1 500	0	0	1 650	0	0	1 441	0	0
50	1 500	0	0	1 500	-150	-9	1 441	0	0
60	1 500	0	0	1 350	-150	-10	1 441	0	0
70	1 350	-150	-10	1 310	-40	-3	1 441	0	0
80-129	1 310	-40	-3	1 310	0	0	1 441	0	0
130	1 310	0	0	1 310	0	0	1 337	-104	-7
140	1 310	0	0	1 310	0	0	1 341	4	0.3
150	1 310	0	0	1 310	0	0	1 288	-53	-4
160	1 310	0	0	1 310	0	0	1 363	75	6
170	1 441	131	10	1 441	131	10	1 365	2	0.1
180	1 441	0	0	1 441	0	0	1 441	76	6

4.0 SCENARIO ONE IMPACT ANALYSIS

This section describes the economic, environmental, community and First Nations impacts in the TSA and the province resulting from the harvest forecast identified in Scenario One[43].

4.1. TSA Impacts

4.1.1. Economic Development

Forestry employment and employment income impacts of Scenario One harvest levels are shown in Table 4-1. In Scenario One, direct forest sector employment in the TSA would remain unchanged for 70 years. In the eighth decade, direct forest sector employment would decline by 81 PYs[44]. There would be a further 37 PYs of associated indirect/induced jobs lost[45], leading to a total decline of 118 jobs. The corresponding direct and indirect/induced employment income losses would be $2.58 million and $0.86 million, respectively. There would then be another decline in year 80 resulting in a loss of 32 PYs. The corresponding total employment income loss would be $0.95 million. At this stage, total cumulative job losses from current levels would be 150 PYs and total cumulative employment income losses would be $4.39 million. No further changes would occur for 90 years.

Coefficients reflecting jobs per cubic metre of timber harvested, estimated from a survey of licensees, are the backbone of the impact estimates. The full methodology is presented in Appendix 7. The employment coefficients presume a linear relationship between harvest level and jobs, so employment changes parallel harvest level changes. While the linear relationship provides a reasonable estimate, in reality, employment changes would probably occur irregularly and depend on other factors such as:

- Increased mechanization, which could lead to job loss;
- Implementation of incremental silviculture treatment (e.g. pruning and fertilizing).

---

43 This study focuses on the Lakes TSA harvest and not on all aspects of the region's forest industry. Private timber from the TSA is not factored into the analysis because it was not included in the Lakes TSA timber supply. Similarly, employment derived from wood from outside the TSA and processed by the region's forest industry is not considered.

44 The job loss is projected to occur in the first year of the decade. Thereafter, the employment level is projected at the same level as in the first year of the decade.

45 Indirect jobs include employment at companies supplying services to the forest industry, such as road building, machine repair and maintenance, engineering, etc., and induced jobs include employment in businesses which provide consumer goods and services to employees of the forest industry and their suppliers.

Table 4-1: Scenario One - TSA Economic Impacts							
	Harvest	Employment (PY/Year)			Employment Income (1993 Millions/Year)		
Year	'000 m^3/ year	Direct[46]	Indirect/ Induced[47]	Total	Direct[48]	Indirect/ Induced[49]	Total
Current	1 500	809	370	1 179	$25.83	$8.64	$34.47
0	1 500	809	370	1 179	25.83	8.64	34.47
10-49	1 500	809	370	1 179	25.83	8.64	34.47
50	1 500	809	370	1 179	25.83	8.64	34.47
60	1 500	809	370	1 179	25.83	8.64	34.47
70	1 350	728	333	1 061	23.25	7.78	31.03
80-129	1 310	706	323	1 029	22.54	7.54	30.08
130	1 310	706	323	1 029	22.54	7.54	30.08
140	1 310	706	323	1 029	22.54	7.54	30.08
150	1 310	706	323	1 029	22.54	7.54	30.08
160	1 310	706	323	1 029	22.54	7.54	30.08
170	1 441	777	355	1 132	24.81	8.29	33.10
180	1 441	777	355	1 132	24.81	8.29	33.10

Integrated resource management is a fundamental precept underlying all the harvest flows. However, different harvest levels are likely to have varying impacts on tourism, outdoor recreation, trapping and ranching activities. The intent of this assessment is to compare the impact of the Lakes TSA timber harvest flows and not to project overall sectoral growth. Projections for employment derived from local resident and tourist-driven outdoor recreation activities, ranching and trapping are not included in this report. Appendix 7 provides a more detailed discussion of the issue of tourism and changes in the Lakes TSA timber harvest.

4.1.2. Community Impacts

There would be no community impacts in the short and medium-term as there are no reductions in the AAC until year 70.

46 The estimated co-efficient for the TSA is .54 PY per 1 000 m^3. This includes harvesting, silviculture, and processing employment. See Appendix 7.

47 Indirect and induced employment for the region is based on a regional multiplier of 1.46. See Appendix 7.

48 The average 1993 annual after-tax income for a regional forest industry employee is $31 933. See Appendix 7.

49 Indirect and induced employment income for the region is derived using an average annual after-tax income of $23 350 for B.C. See Appendix 7.

4.1.3. First Nations Impacts

Impact statements are shown here only where approval was obtained by the affected band. Research efforts for this study included face-to-face meetings with representatives of Burns Lake, Broman Lake, Lake Babine and Skin Tyee bands (Nee-Tahi-Buhn Band and Cheslatta Carrier Nation Band declined to meet). Impact statements were obtained and numerous follow-up telephone and facsimile calls were made to confirm meaning, form and content of the statements as they were to appear in this report. In the end, the consultants were able to obtain approval only from the Burns Lake Band to publish their impact statement. Other First Nations impacts included in this report are based upon general discussion with interested parties.

Burns Lake Band - As the Burns Lake Band has little employment in the forestry industry and there is no reduction in the harvest level for 70 years, there would be no direct impact on employment.

Conflicting resource uses in traditional territories is also of concern to the Burns Lake Band. Specifically, the impact of past harvesting practices on trapping and traplines, the fisheries resource, and cultural/historical values is seen as critical. Trapping in particular is both culturally and economically important and is often considered to be in direct conflict with harvesting. The band is concerned with the destruction of wildlife habitat, traplines and trapline facilities by the forestry industry and feel that unchanged harvest levels would likely continue to impact this activity. Deer and moose habitat was also noted by the band as being a concern and with no changes in harvest levels, they felt that these concerns would not be fully addressed. This is one area where co-management initiatives could prove beneficial, such as discussed in a Forest Planning Workshop [1993] conducted by the Lakes Forest District. Issues of First Nations' concern that arose out of this workshop included insufficient opportunity for consultation during Five Year Plan reviews and incompatibility of geographic information between forestry companies and First Nations leading to a lack of understanding. Additionally, incomplete information of both cultural/historical sites and traplines exacerbates the problems.

Other Bands - All the bands have registered an intent to negotiate a land claim through the BC Treaty Commission process and some initial discussions have ensued. The bands sees treaty negotiations and forest resource management goals as being closely linked.

4.2. Provincial Impacts

4.2.1. Economic Impacts

Estimates of province-wide job and employment income impacts associated with Scenario One timber harvest levels appear in Table 4-2. The current direct provincial employment supported by Lakes TSA wood consists of the following:

Table 4-2: Scenario One - Provincial Economic Impacts

	Harvest	Employment (PY/Year)			Employment Income (1993 Millions/Year)		
Year	'000 m^3/ year	Direct[50]	Indirect/ Induced[51]	Total	Direct[52]	Indirect/ Induced[53]	Total
Current	1500	1 164	1 746	2 910	37.59	40.77	78.36
0	1500	1 164	1 746	2 910	37.59	40.77	78.36
10-49	1500	1 164	1 746	2 910	37.59	40.77	78.36
50	1500	1 164	1 746	2 910	37.59	40.77	78.36
60	1500	1 164	1 746	2 910	37.59	40.77	78.36
70	1350	1 047	1 571	2 618	33.82	36.69	70.51
80-129	1310	1 016	1 524	2 540	32.81	35.58	68.39
130	1310	1 016	1 524	2 540	32.81	35.58	68.39
140	1310	1 016	1 524	2 540	32.81	35.58	68.39
150	1310	1 016	1 524	2 540	32.81	35.58	68.39
160	1310	1 016	1 524	2 540	32.81	35.58	68.39
170	1441	1 118	1 677	2 795	36.11	39.16	75.27
180	1441	1 118	1 677	2 795	36.11	39.16	75.27

- Direct employment of 809 PYs in the Lakes TSA from silviculture, harvesting and processing activities;
- Direct employment of 167 PYs from processing Lakes TSA sawlogs outside the TSA;
- Direct employment of 188 PYs from processing Lakes TSA fibre into pulp and paper outside of the TSA. Eight of these PYs result from the chipping and pulping of pulplogs. The other 180 PYs come from the manufacture of pulp and paper using chip

50 The estimated co-efficient for the province is .78 PY per 1 000 m^3. This includes harvesting, silviculture, and processing employment. See Appendix 7.

51 Indirect and induced employment for the province was based on the Ministry of Forests' multiplier of 2.50. See Appendix 7.

52 The average 1993 annual after-tax income for a provincial forest industry employee processing Lakes TSA wood is $33 136. The income is higher than the regional forest worker income owing to the presence of higher-income pulp and paper jobs created from wood residue and a lack of lower-income silviculture employment that is only accounted for in the TSA. See Appendix 7.

53 Indirect and induced employment income for the province was also based on the $23 350 average income used to assess regional indirect and induced employment income. See Appendix 7.

and sawdust residue generated by processing Lakes sawlogs, peelers, and other wood in mills within and outside of the region.

Total current direct provincial employment attributable to harvesting Lakes TSA timber is estimated as 1 164 PYs.

In Scenario One, both direct and indirect/induced forest sector employment in the province would remain unchanged for 70 years. In the eighth decade, direct forest sector employment would fall off by 117 PYs[54]. There would be a further 175 PYs of associated indirect/induced jobs lost[55], leading to a total decline of 292 PYs. The corresponding direct and indirect/induced employment income losses would be $3.77 million and $4.08 million, respectively. There would then be another decline in the following decade resulting in 78 PYs of total job losses. The corresponding total employment income loss would be $2.12 million. At this stage, total cumulative job losses from current levels would be 370 PYs and total cumulative employment income losses would be $9.97 million. No further changes would occur for 90 years.

4.2.2. Environmental Impacts

The environmental impacts discussed here stem from activities on the timber harvesting land base in the Lakes TSA, which constitutes 56.5 percent of the TSA's total land base or 73.3 percent of the forested land base. Forty-three percent of the TSA land base cannot be harvested for one reason or another as shown in Appendix 6.

Wildlife - In Scenario One the percentage of the land-base occupied by stands older than 100 years would decline from 69 percent at present to approximately 30 percent in 200 years. The conversion of old growth stands into stands of earlier seral stages managed on shorter rotations would result in reduced habitat for species dependent on old growth stands for part or all of their life cycles. Examples of such species are marten, grizzly bear, brown creeper, pileated woodpecker, and the occipeters (forest hunting raptors) including the goshawk, Coopers hawk and sharp shinned hawk. The reduction in the proportion of older forest and small dispersed block harvesting would likely increase the fragmentation of large contiguous areas of mature and old growth forests into smaller, isolated patches. This would have an impact on species which require extensive undisturbed tracts of mature forest. The woodland caribou is an important example of such a species (see comments on caribou winter range below); however, few other species requiring extensive mature and old forests are present in the Lakes Forest District.

The subsequent increase in younger forests would potentially result in increases in habitat for species that depend on disturbed and early seral stage forests such as moose, deer,

---

54 The job loss is projected to occur in the first year of the decade. Thereafter, the employment level is projected at the same level as in the first year of the decade.

55 The indirect jobs include employment at companies supplying services to the forest industry, such as road building, machine repair and maintenance, engineering, etc., and in businesses which provide consumer goods and services to employees of the forest industry and their suppliers.

black bear, and many small mammals. The quality of these early seral habitats would be highly conditional on the continuing availability of mature forest stands of all forest types throughout the landscape and the presence of a wide range of old growth attributes in younger stands (coarse woody debris, snags, island remnants).

Caribou is a species of considerable management concern in the Lakes Forest District. The Tweedsmuir-Entiako herd is one of the few left in south and central BC and is therefore of provincial importance. The size of the herd is thought to be declining [Chichowski and Banner 1993]. The maintenance of the winter range for this herd, located south of Tetachuck Lake, which is critical for the survival of the herd, was not included in the harvesting constraints for Scenario One. During winter, caribou select mature forested habitats and forage primarily on terrestrial lichens, although they also feed on arboreal lichens when snow depth or hardness impedes digging. These lichens are slow growing, associated with late successional stages, and are highly susceptible to mechanical damage. Logging is incompatible with maintenance of dry lichen forest habitat. Harvesting operations also increase access and improve moose habitat which would result in altered predator prey relationships and increased predator pressure on caribou. For the above reasons BC Environment believes that no harvesting should occur in the portion of the Lakes TSA south of Tetachuck Lake and Euchu Reach in accordance with the recommendations of Chichowski and Banner [1993]. An additional concern is that the harvesting constraints proposed for the Chelaslie caribou migration corridor, while possibly adequate for maintaining migration habitat, do not recognize the recently understood value of the area as additional winter range. As Scenario One does not include land base exclusions or constraints to protect lichen sites and predator prey relationships in identified caribou winter range, its impact on the Tweedsmuir-Entiako herd would be very significant.

The harvest level in Scenario One would see road access increasing into presently unroaded portions of the TSA. Improved access would increase hunting pressures in these areas. For Grizzly bear, hunter access is a more critical issue than loss of old growth habitat. The relatively low population numbers of Grizzly bear in the TSA and reported population declines in nearby districts (e.g. Prince George TSA) indicate a risk of negative impact on Grizzly bear.

Fisheries - Forest practices impact fish habitat in many ways. Most disturbances interact with others and, as a result, the determination of the causal mechanisms for habitat degradation is often difficult to determine. Direct damage can include bank destabilization, the removal of stream side vegetation and debris jams. Improved access to lakes that are presently unaccessed increases the risk of loss of large sized trout in these lakes and the subsequent alteration of the lakes' faunal balance and diversity. This risk can be reduced through the implementation of special management areas around identified unaccessed lakes. Current measures to protect streamside and lakeshore habitats from these impacts are outlined in the Interim Timber Harvesting Guidelines for the Interior Portion of thePrince Rupert Forest Region [1992] and in the Forest Practices Code.

Other, more indirect, forms of logging related disturbance include the alteration of hydrological processes and changes to water quality. Hydrological processes are complex, however it is generally agreed that forest cover moderates flow regimes. Maximum and minimum flows are exacerbated when too much forest cover within a given drainage is removed. The erosion associated with high flows degrades fish habitat and increases sedimentation. Conversely, low flows prevent fish from using what would otherwise be good habitat and contributes to elevated water temperatures. A Watershed Assessment Procedure (WAP), that the Ministry of Forests developed, is used to calculate the acceptable rate of harvest for individual watersheds. Harvest rates will depend on past and proposed development, a terrain analysis, and the water and fisheries values of the system. In essence the timber production within each watershed should be sustainable and water related values should be protected.

Changes in water quality are often a function of altered flow regimes, however they are also caused by forest practices that expose erodable materials. This ranges from the surface erosion of forest roads to mass wasting events caused by logging or road building in unstable terrain. Although there are techniques for minimizing the severity and risk of such incidents, forest practices inevitably elevate the transport of sediment and other materials into water bodies. The long-term impacts on the water quality associated with forest harvesting is not well understood, although some practices such as clearcutting are known to reduce long-term large organic debris (LOD)[56] recruitment. Impacts from reduced LOD availability would be realized much later than hydrology and sedimentary impacts since existing LOD would continue to function for some time after harvesting.

The protection of fish habitat is vital to the maintenance of fish stocks within the Lakes TSA so fisheries managers continue to stress the importance of adequate habitat protection. They rank maintaining wild, indigenous fish populations or stocks, regardless of whether they contribute to a sport or commercial fishery, as highest in importance.

4.2.3. Government Revenue Impacts

Total provincial government revenue impacts appear in Table 4.3. All assumptions are discussed in Appendix 7. The present AAC generates an estimated $65.06 million in annual provincial government revenues. In Scenario One, the first harvest reduction in decade eight results in annual loss of $6.51 million in revenue. The reduction in decade nine results in a loss of $1.73 million annually. No further changes would occur for 90 years.

Policy changes announced in April, 1994 as part of the Forest Renewal Plan will result in significantly higher stumpage revenues if the increase in lumber prices which occurred in 1993 represents a structural shift in the market. The revenue estimates herein are based

[56] L.O.D. provides habitat complexity, maintains channel stability, provides escape cover and resting areas, and is an indirect source of fish food organisms.

on the 1994 billed stumpage and to a large extent reflect higher rates introduced in April 1994.

Total federal government revenue impacts also appear in Table 4.3. The present AAC generates an estimated $18.64 million in annual federal government revenues. In Scenario One, the first harvest reduction in decade eight results in annual loss of $1.87 million in revenue. The reduction in decade nine results in an annual loss of $0.50 million annually. No further changes would occur for 90 years.

Table 4-3: Scenario One - Government Revenue Impacts
($1993 millions/Year)

Year	Provincial				Total Federal Taxes[60]
	Resource Revenues[57]	Personal Income Tax[58]	Other Taxes[59]	Total	
Current	49.53	8.25	7.28	65.06	18.64
0	49.53	8.25	7.28	65.06	18.64
10-49	49.53	8.25	7.28	65.06	18.64
50	49.53	8.25	7.28	65.06	18.64
60	49.53	8.25	7.28	65.06	18.64
70	44.58	7.42	6.55	58.55	16.77
80-129	43.26	7.20	6.36	56.82	16.27
130	43.26	7.20	6.36	56.82	16.27
140	43.26	7.20	6.36	56.82	16.27
150	43.26	7.20	6.36	56.82	16.27
160	43.26	7.20	6.36	56.82	16.27
170	47.58	7.92	6.99	62.49	17.90
180	47.58	7.92	6.99	62.49	17.90

57 Includes stumpage and other rents and revenues.
58 Includes provincial share of taxes on direct, indirect, and induced employment income.
59 Includes logging, corporate income, corporate capital, sales, property and electricity taxes.
60 Includes corporate income tax, personal income tax, excise tax and withholding tax.

5.0 ALTERNATIVE SCENARIOS

5.1. Timber Supply

Scenario One showed no harvest decrease from the present AAC level over the initial 70 years. Two other harvest scenarios were selected to illustrate alternative a range of paths for reaching the long-run harvest level (LRHL). They are sufficiently different from Scenario One to have identifiably different impacts over the long planning horizon of the harvest forecast.

The distinguishing feature of Scenario Two is that the harvest level is increased to 1 650 000 m^3/year for the first five decades. To reach the LRHL in the same time frame as Scenario One, the harvest must decline by 20 percent over the subsequent three decades and stay at the 1 310 000 m^3/year level until decade 18 when the LRHL is reached. An increased harvest level now would mean a greater adjustment further down the road.

To show a different approach, harvest levels under Scenario Three are reduced immediately. Harvest levels drop four percent from the current level in decade zero to 1 441 000 m^3/year, and continue at this level for 130 years.

The three scenarios are graphically compared in Figure 5.1.

5.2. TSA Alternative Scenario Impacts

5.2.1. Economic Development

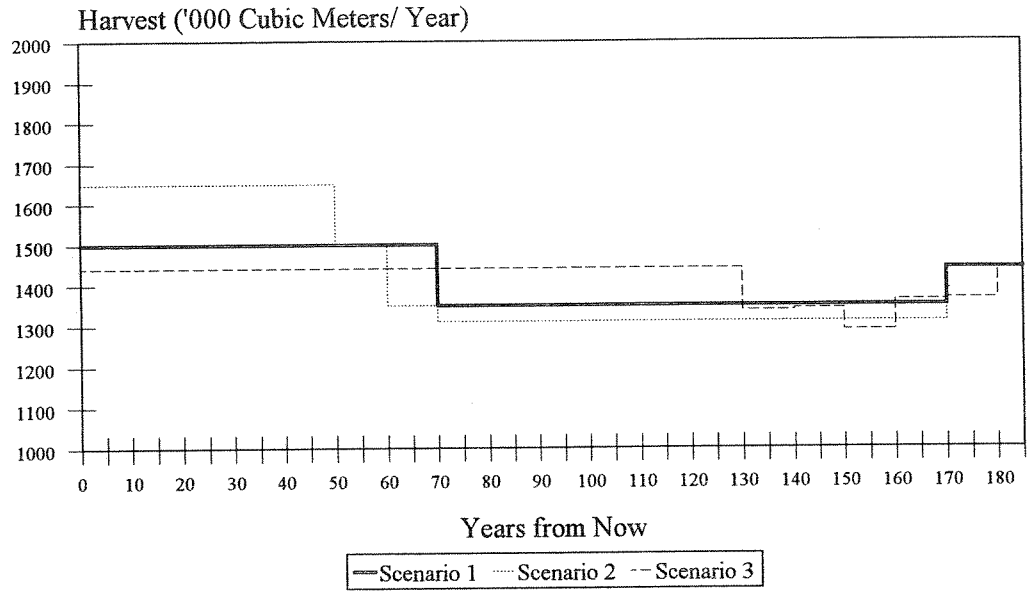
Quantitative estimates of the employment and employment income impacts of Scenario Two and 3 are shown in Appendix 8.

Scenario Two - In Scenario Two, there would be an increase in employment immediately. Direct forest sector employment in the TSA would rise by 80 person-years above present employment levels. There would be a further increase of 36 PYs of associated indirect/induced jobs, leading to a total increase of 116 jobs. The corresponding direct and indirect/induced employment income gains would be $2.56 million and $0.84 million, respectively. No further changes would occur for 50 years when the harvest level decreases for three decades running. This would lead to job total losses of 116, 118 and 32 PYs for decades six, seven and eight, respectively. Total income losses would be $3.40 million, $3.44 million and $0.95 million, respectively. By decade eight, total cumulative job losses from current levels would be 150 and total cumulative income losses would be $4.39 million. No further changes would occur for 100 years.

Compared to Scenario One, Scenario Two shows job gains over the first 50 year periods that are offset by job losses in the longer-term.

Figure 5-1

Lakes TSA Harvest Scenarios



Source: Ministry of Forests

The above TSA economic impact estimates are made under the assumption that the additional availability of timber would follow existing patterns of distribution to the various mills (both inside and outside the TSA) that currently process the Lakes TSA fibre. Increased harvest levels are not necessarily allocated proportionately to the licensees and as such, the distribution of fibre could be significantly different and manufacturing employment could be more or less than estimated. For example, if a larger proportion of the timber harvest goes to a licensee with a "value-added" operation then more jobs would be created than estimated. On the other hand, a larger proportion could go to a licensee with manufacturing operations outsides the TSA and therefore, some of the new manufacturing jobs would correspondingly accrue outside of the TSA. An additional possibility is that incremental TSA fibre merely replaces fibre obtained from outside the region (e.g. from the Yukon or Alaska) resulting in a lower gain in manufacturing employment.

Scenario Three - In Scenario Three, direct forest sector employment in the TSA would immediately decrease by 32 person-years below present employment levels. There would be a further decrease of 15 PYs of associated indirect/induced jobs, leading to a total decrease of 47 PYs. The corresponding direct and indirect/induced employment income losses would be $1.02 million and $0.35 million, respectively, for a total of $1.37 million. No further changes would occur for 130 years.

Compared to Scenarios 1 and 2, Scenario Three shows the earliest drop in harvest levels and employment. This Scenario is also more constant than the other scenarios with the harvest level remaining unchanged for 130 years.

Any decline in the TSA's AAC would likely be distributed proportionately to all licensees. One company and its employees would not be expected to bear the entire burden. A change to the AAC might require a revision of licensee chart areas so the impact could include both a harvest reduction and a move of operations.

Workers who lose their jobs may find alternative employment locally or elsewhere. There may be a possibility of employment in the value-added manufacturing part of the forest industry. The estimated job impacts should be interpreted as a short-term potential impact; in the longer-term, many unemployed are likely to find work elsewhere. The qualifications to the analysis are more fully discussed in Appendix 1.

The three harvest flows are likely to have similar tourism and outdoor recreation economic impacts over the long 200 year planning horizon. This does not mean that they would not have an impact in these areas, only that they are projected to have similar impacts over the long planning horizon. Approximately the same amount of wood would be harvested for each case over the planning term. Each is subject to the same set of visual quality objectives, habitat management guidelines, and area planning conventions, such as the Entiako LRUP. Therefore, a projection for employment derived from tourist-driven outdoor recreation activity is not included in this report. The goal in this study is to help readers weigh the relative merits of the scenarios, not to project overall sectoral growth. Appendix 7 provides a more detailed discussion of the issue of tourism and changes in the Lakes TSA timber harvest.

5.2.2. Community Impacts

Scenario Two - As noted under Scenario Two economic impacts in the Lakes TSA, it is difficult to judge where the employment benefits from an increased AAC would accrue as it is not known how the additional 150 000 m^3/year would be allocated. Similarly, community impacts would be difficult to assess. It is likely that Burns Lake would gain a majority of the 80 PYs of new forestry employment and 36 PYs of new indirect/induced employment and most of the remainder would accrue to the smaller communities in the TSA.

Population

The addition of 116 PYs of employment, representing four percent of the 1991 total labour force (BC Stats 1994) would probably not appreciably affect population over and above the growth that is expected to occur in the TSA (See Table 2-3).

Local Government

Property tax revenues are a principal indicator of the impact of timber harvests on local government. An increase in the harvest level may, depending on the allocation of the AAC, reduce the possibility of a smaller mill closing down and may increase the possibility of a new small mill being created. This could have a positive impact on revenues to the local government. Residential property values are unlikely to be affected by the forest industry workforce increases.

Social Health

If the new jobs created are filled by those currently unemployed in the TSA there would be a positive social benefit. The negative aspects of unemployment are described under the community impacts of Scenario Three and it can be assumed that any reduction in unemployment and associated reliance on social assistance would reduce these impacts.

Social Infrastructure

Any reduction on unemployment that may occur as a result of increased harvest levels would reduce pressure on the social infrastructure.

Scenario Three - Under Scenario Three, the communities in the Lakes TSA would face impacts immediately. Based on the survey of licensees, approximately 80 percent of TSA harvesting personnel reside in and around Burns Lake and at least a similar proportion of manufacturing employees reside in this community. Burns Lake would be the focal point of community impacts.

Population

Burns Lake has experienced a recent population decline. Technology improvements in the TSA's mills has led to significant reduction in employment in recent years and has likely been the leading cause of out-migration of younger mobile individuals and families from Burns Lake. A reduction in the AAC may have a small impact on population numbers in the short-term. However, as the profile of the population has aged and as past layoffs of low seniority individuals have tended to raise the average age of forestry employees, those remaining in Burns Lake are probably less mobile and less likely to move on than was the case in the 1980s. In the long-term, BC's growing population, the possibility of mitigation measures through intensive silviculture and, perhaps, additional value-added wood businesses could offset potential population losses arising from AAC reductions.

Local Government

A harvest reduction can result in less tax revenues flowing to local government, mainly from lower property values. Ultimately it could affect a community's ability to support infrastructure and service needs.

Scenario Three would probably not result in a major mill closure in the short-term as the reductions are moderate and local mills are operating at over 80 percent of capacity. Nonetheless, this fact does not necessarily protect them in the long-term as there could be both wood shortages and higher prices in the future, with the trend toward declining AACs throughout the province, affecting the competitiveness of the industry on an international level.

The smaller mills (Burnslake Specialty Wood, Francois Lake Woodworking, Ootsa Lake Sawmill, Sheraton Custom Milling and Boo Flat Lumber) rely heavily on Lakes TSA fibre; they are operating at between 20 to 75 percent of capacity. It is possible that one of these mills could close as a result of AAC reductions. Higher prices for wood input, the result of North American trends, are perhaps a more important factor.

From the perspective of property tax revenues, the problem of a closure would be one of the timing of the replacement of the lost tax revenue. There would be a gap between when a mill closed and growth, if any, to replace the lost mill tax revenue. Residential property values are unlikely to be negatively affected by the forest industry workforce reductions.

Social Health

There have been several sociological studies of resource industry lay-offs. A clear issue in this research is that the emotional impacts of job losses are of great significance [CORE 1994; Lee 1991]. Job loss dramatically and permanently alters the lives of long-time workers. Displaced forest industry workers differ from typical social service clients in that they have a stable work history in an industry with relatively good wage levels. They suffer emotionally and in some instances they do not qualify for social assistance programs because of their accumulated property [CORE 1994].

Dr. Katherine Carlson [CORE 1994], in a study of U.S. Pacific Northwest forest workers, found that all family members experienced strong emotional impacts. When questioned about the stress of dislocation, 38 percent stated that relations with those nearest them became somewhat more difficult and unhappy and seven percent reported that these relationships became very difficult and unhappy. According to a recent U.S. Government report, children can be especially affected [CORE 1994]. The report found that there can be serious and lasting effects on children in forestry dependent communities where they are physically harmed through poverty and parental abuse or neglect and psychologically harmed through family and community disintegration. The overall stresses on family life can result in physical and substance abuse, divorce and juvenile delinquency. The Burns Lake RCMP detachment [pers. comm., Corporal Tapp] suggested, based on observing community changes during local labour upheavals, that a noticeable increase in crimes or events requiring police involvement could result from increased unemployment.

The social and health indicators discussed in Section 2.2 showed that the TSA, in general, has relatively stable social health. But unemployment levels are above the provincial average and it is feared that the fast growing service sector, especially government service,

which contributed to job growth in the last decade as forest jobs have declined, may themselves be stabilizing and therefore unable to pick up the slack in the future. Residents directly affected by forest industry lay-offs would be open to considerable upheaval in their lives causing some strain on the social well-being of the community.

Physical and Social Infrastructure

On April 13, 1994 Premier Mike Harcourt announced the BC Government's Forest Renewal Plan [BC Government 1994]. All of its five goals relate to sustaining jobs and communities, but two directly address these concerns. They are:

- to ensure the continued availability of good forest jobs; and,
- to ensure the long-term stability of communities that rely on the forests

The plan's centrepiece is an increase in stumpage rates, which is projected to bring an additional $2.25 billion into the BC Treasury over the next five years. An estimated $400 million will be spent annually within the plan plus $50 million will be used to finance new forest management initiatives. The plan is comprehensive and touches upon the wide range of forest-related matters which are at issue.

- Almost half of the funds will be directed to silviculture.
- The BC Government will invest in companies producing value-added wood products.
- A new Forest Sector Skills Council will guide an expansion of programs to improve the skills of forest industry workers.
- Communities will receive assistance for planning and accomplishing the diversification of their economies.
- Each Forest Renewal Plan will include specific initiatives for First Nations.

The BC Government has created a new Crown agency, Forest Renewal BC, to manage and direct this spending. It will help alleviate the economic impact from job losses associated with harvest reductions. Specific announcements about spending priorities and locations are forthcoming.

There are other initiatives of a general mitigative nature that some individuals and communities can access to soften the negative economic impacts of timber harvest reductions. A laid-off forest worker may apply for benefits of the various general employment development programs which are largely delivered or funded by the Federal Government. They include the Fee Payer and Full Sponsorship Programs under Section 26 of the Unemployment Insurance Act, which permit a qualified unemployment insurance (UI) claimant to attend education classes. The nearest Canada Human Resources Development office is in Houston while major employment programs are administered out of larger centres such as Prince George.

The Nadina Community Futures Society based in Houston (but available to Lakes TSA residents) oversees the Self Employment Assistance Option program whereby individuals on U.I.C. or social assistance can, with the provision of a business plan, qualify to

maintain their benefits for up to a year while pursuing self-employment opportunities. The Nadina Community Futures has assisted seven new businesses in Burns Lake since incorporation in December 1993 [Nadina Community Futures August 1994].

CORE's land use plan for Vancouver Island [1994] analyzed the recent experience of laid-off forest industry workers to estimate the short-term burden they impose on social services. The findings are summarized in Table 5-1. The study also made predictions on the longer-term effects of lay-offs. An estimated 16 percent of displaced workers would eventually be employed in other forest industry jobs, 36 percent would find employment in other industries, 22 percent would either become self-employed or rely on spousal or other income, 10 percent would retire, 12 percent would rely on occasional jobs and UI and four percent would rely on income assistance. An earlier study that tracked laid-off BC forest workers between 1978 and 1985 [CORE 1994] found that workers who gained employment in other industries saw income reduced by 33 percent.

Table 5-1: Projected Impact of Forestry Worker Lay Offs on Social Services over First Two Years

Expected Program Utilized	Expected Per Cent Utilization	Estimated Case-Months per 100 Laid Off Workers	Program Costs per 100 Laid Off Workers
None	17.7%	0	$0
Unemployment Insurance (UI)	69.4	303	575 700
Income Assistance (IA)	5.4	52	49 400
Both UI and IA	7.5	59 (UI) 74 (AI)	112 100 70 300
Total	100.0%		$807 500

Source: CORE, 1994

The Carlson study found that older workers and those with less education were likely to experience the longest periods of unemployment. Re-employment was typically in lower paying and less stable jobs. Carlson also concluded that displaced workers from rural areas tended to find lower paying jobs than those from urban areas. Few workers, in general, left to look for work elsewhere and few became involved in retraining.

Based on the above tracking studies, older or less educated forest workers in Burns Lake would have the greatest difficulty in obtaining alternative employment. These individuals would be less likely to relocate and could become reliant on social assistance. Although the region has some growth prospects, it would be difficult for laid-off forest industry workers to move into service industry jobs. Skill mismatches, lower service sector incomes and lack of personal interest in service jobs would present barriers. Some workers already supplement their income with ranching or guiding but this is a relatively small number when compared to total forestry employment.

5.2.3. Aboriginal Impacts

Burns Lake Band - Under Scenario Two, the employment impacts would be similar to Scenario One impacts previously discussed as there is little employment of band members in the industry. However, the increase could have a positive impact on the band's investment in the Burns Lake Native Development Corporation (BLNDC). The BLNDC has ownership positions in Babine Forest Products and Burnslake Specialty Wood and full ownership of Burns Lake Native Logging, all of which have a significant reliance on TSA fibre. On the other hand, the band believes an increase in harvest levels would exacerbate the trapline problems and further deteriorate moose and deer habitat.

Conversely, the Scenario Three reduction in harvest level would have opposite impacts in the short-term.

Other Bands - As with the Burns Lake Band, other local bands have a strong economic interest in the forest industry through involvement with the Burns Lake Native Development Corporation. Some of these Bands also have members employed with TSA licensees. As such, the Scenario Two increase in the harvest level in the short-term would have a positive affect on the economic development of the Bands. On the other hand, the Scenario Three reduction in the AAC could be seen to be beneficial if it enhances First Nations' ability to achieve their own long-term resource management goals. First Nations feel a reduction in the area harvested now may mean a larger forestry resource in the future, by which time the First Nations hope to have a greater say in forestry management.

Finally, like many other forest industry participants, the local bands have some hope that the Forest Renewal Plan can provide jobs to replace those that might be lost because of a reduction in the AAC. However, there is still concern over the lack of program details.

5.3. Provincial Alternative Scenario Impacts

5.3.1. Economic Impacts

Employment and employment income impacts of Scenarios 2 and 3 are shown in Appendix 8.

Scenario Two - In Scenario Two, there would be an increase in employment immediately. Direct forest sector employment in the province would rise by 116 person-years, above present employment levels. There would be a further increase of 174 PYs of associated indirect/induced jobs, leading to a total increase of 290 PYs. The corresponding direct and indirect/induced employment income gains would be $3.76 million and $4.06 million, respectively. No further changes would occur for 50 years when the harvest level decreases for three decades running. This would lead to job total losses of 290, 292 and 78 PYs for decades six, seven and eight, respectively. Total income losses would be $7.82 million, $7.85 million and $2.12 million, respectively. By decade eight, total cumulative job losses from current levels would be 370 PYs and total cumulative income

losses from current levels would be $9.97 million. No further changes would occur for 100 years.

Compared to Scenario One, Scenario Two shows job gains over the first 50 years are offset by longer-term job losses. By decade nine, both scenarios are identical.

Scenario Three - In Scenario Three, direct forest sector employment in the province would immediately decrease by 46 person-years, below present employment levels. There would be a further decrease of 69 PYs of associated indirect/induced jobs, leading to a total decrease of 115 jobs. The corresponding direct and indirect/induced employment income losses would be $1.48 million and $1.61 million, respectively. No further changes would occur for 130 years.

Scenario Three reduces employment earlier than Scenarios 1 and 2 and then remains unchanged until year 130. It is also more constant than both Scenario One and 2, leading to smaller adjustments in employment levels in later years.

5.3.2. Environmental Impacts

The long-term environmental impacts of Scenarios 2 and 3 would be similar to Scenario One. All three scenarios envision the same long-term harvest levels and thus the same degree of change in the proportion of early to late seral stages. Scenario Two would result in the environmental impacts described for Scenario One occurring more quickly. The increased rate of conversion of old-growth stands into stands managed on a shorter rotation seen in Scenario Two could also result in a reduction in stands with old-growth characteristics being present during certain time intervals in the next 200 years. This would increase the negative impact on species dependent on old growth stands described in Scenario One. Conversely, the reduced rate of conversion to managed stands seen in Scenario Three would have a reduced negative impact on species dependent on old growth stands.

5.3.3. Government Revenues

Quantitative estimates of government revenue impacts of Scenarios 2 and 3 are shown in Appendix 8.

Scenario Two - The immediate increase in the harvest level increases provincial government annual revenue by $6.50 million. Decade six is the first of three consecutive declines of $6.50 million, $6.51 million and $1.73 million for decades six, seven and eight, respectively. No further changes would occur for 100 years.

The immediate increase in the harvest level increases federal government annual revenue by $1.86 million. Decade six is the first of three consecutive declines of $1.86 million, $1.87 million and $0.50 million for decades six, seven and eight, respectively. No further changes would occur for 100 years.

Scenario Three - In Scenario Three, annual provincial government revenues decrease immediately by $2.57 million. No further changes would occur for 130 years.

In Scenario Three, annual federal government revenues decrease immediately by $0.74 million. No further changes would occur for 130 years.

6.0 SUMMARY

6.1. TSA Impacts

The TSA level impacts of the three harvest flows are summarized in Table 6-1.

- In Scenario One, employment in the TSA would remain unchanged for 70 years. In the eighth decade, direct and indirect/induced employment would decline by 118 PYs. The corresponding direct and indirect/induced employment income losses would total $3.44 million. There would then be another decline in year 80 resulting in a loss of 32 PYs. The corresponding total employment income loss would be $0.95 million.

- In Scenario Two, there would be an increase in employment immediately. Direct and indirect/induced employment in the TSA would rise by 116 PYs. The corresponding direct and indirect/induced employment income gains would total $3.40 million. No further changes would occur for 50 years when the harvest level decreases for three decades running. This would lead to total job losses of 116, 118 and 32 PYs for decades six, seven and eight, respectively. Total income losses from current levels would be $3.40 million, $3.44 million and $0.95 million, respectively.

- In Scenario Three, direct and indirect/induced employment in the TSA would immediately decrease by 47 PYs. The corresponding direct and indirect/induced employment income losses would total $1.37 million.

- The three harvest flows are likely to have similar tourism and outdoor recreation economic impacts over the long 200 year timber planning horizon.

- There would be no community impacts in Scenario One in the short and medium-term as there are no reductions in the AAC until year 70. In Scenario Two, it is unlikely that population would be significantly affected, however, there should be some small but positive impacts on the social well-being of the TSA communities as employment opportunities expand.

- Under Scenario Three, job losses could have small effects on population numbers. In the long-term, BC's growing population and the possibility of mitigation measures should off-set population losses. Older or less educated forest workers would have the greatest difficulty in obtaining alternative employment, would be less likely to relocate and may become reliant on social assistance.

- Employment of First Nations people within the Lakes TSA who work in the forest industry would mirror the general economic impacts of the three scenarios. The impact of past harvesting practices on trapping and traplines, the fisheries resource, and cultural/historical values is seen as critical to First Nations. First Nations believe Scenario Two would further conflict with these resources while Scenario Three reductions may reduce these negative impacts.

Table 6-1: Summary of TSA Accounts

			Scenario One					Scenario Two					Scenario Three				
			Years from Present					Years from Present					Years from Present				
		Current	0	10	20	30	60	0	10	20	30	60	0	10	20	30	60
Harvest in '000 m^3		1 500	1 500	1 500	1 500	1 500	1 500	1 650	1 650	1 650	1 650	1 350	1 441	1 441	1 441	1 441	1 441
Economic Account																	
Employment	Direct	809	809	809	809	809	809	889	889	889	889	728	777	777	777	777	777
(PY/Year)	Indirect	370	370	370	370	370	370	406	406	406	406	333	355	355	355	355	355
	Total	1 179	1 179	1 179	1 179	1 179	1 179	1 295	1 295	1 295	1 295	1 061	1 132	1 132	1 132	1 132	1 132
Employment	Direct	25.83	25.83	25.83	25.83	25.83	25.83	28.39	28.39	28.39	28.39	23.25	24.81	24.81	24.81	24.81	24.81
Income ($1992	Indirect	8.64	8.64	8.64	8.64	8.64	8.64	9.48	9.48	9.48	9.48	7.78	8.29	8.29	8.29	8.29	8.29
Millions/Year)	Total	34.47	34.47	34.47	34.47	34.47	34.47	37.87	37.87	37.87	37.87	31.03	33.10	33.10	33.10	33.10	33.10
Community Account																	
Population			▪ no effect					▪ no effect					▪ small population decrease possible				
Local Government			▪ no effect					▪ minimal positive effect					▪ small effect in short to medium-term if small mill closes				
Social Fabric			▪ no effect					▪ minimal positive effect					▪ moderate strain immediately				
Aboriginal Account																	
Economic			▪ no forestry-related impacts ▪ continuing threat to traplines					▪ increase in short and medium-term forest jobs and income ▪ increased threat to traplines					▪ small forest job loss immediately ▪ reduced threat to traplines				
Cultural/Historical			▪ indeterminate					▪ indeterminate					▪ indeterminate				
Land Claims			▪ indeterminate					▪ indeterminate					▪ indeterminate				

6.2. Provincial Impacts

The provincial impacts of the three harvest flows are summarized in Table 6-2.

- In Scenario One, both direct and indirect/induced forest sector employment in the province would remain unchanged for 70 years. In the eighth decade, direct and indirect/induced employment would fall off by 292 PYs. The corresponding direct and indirect/induced employment income losses would total $7.85 million. There would then be another decline in the following decade resulting in 78 PYs of total job losses. The corresponding total employment income loss would be $2.12 million.

- In Scenario Two, there would be an increase in employment immediately. Direct and indirect/induced employment in the province would rise by 290 PYs. The corresponding direct and indirect/induced employment income gains would be $7.82 million. No further changes would occur for 50 years when the harvest level decreases for three decades running. This would lead to job total losses of 290, 292 and 78 PYs for decades six, seven and eight, respectively. Total income losses would be $7.82 million, $7.85 million and $2.12 million, respectively.

- In Scenario Three, direct and indirect/induced employment in the province would immediately decrease by 115 PYs. The corresponding direct and indirect/induced employment income losses would be $3.09 million.

- Populations of species dependent on old growth stands for part or all of their life cycles would be reduced. The consequent increase in early seral stage forests would potentially result in population increases of species that utilize such habitats. The impact on the Tweedsmuir-Entiako caribou herd would be significant ranging from sharp declines in herd size to possible extirpation of the herd. Overall biodiversity in the district would be expected to decline somewhat in all three scenarios.

- In Scenario One, the first harvest reduction in decade eight results in annual loss of $6.51 million in provincial government revenue. The reduction in decade nine results in a loss of $1.73 million annually. The immediate increase in the harvest level in Scenario Two increases annual revenue by $6.50 million. Decade six is the first of three consecutive declines of $6.50 million, $6.51 million and $1.73 million for decades six, seven and eight, respectively. In Scenario Three, annual provincial government revenues decrease immediately by $2.57 million.

Table 6-2: Summary of Provincial Accounts

			Scenario One					Scenario Two					Scenario Three				
			Years from Present					Years from Present					Years from Present				
		Current	0	10	20	30	60	0	10	20	30	60	0	10	20	30	60
Harvest in '000 m^3		1 500	1 500	1 500	1 500	1 500	1 500	1 650	1 650	1 650	1 650	1 350	1 441	1 441	1 441	1 441	1 441
Economic Account																	
Employment	Direct	1 164	1 164	1 164	1 164	1 164	1 164	1 280	1 280	1 280	1 280	1 047	1 118	1 118	1 118	1 118	1 118
(PY/Year)	Indirect	1 746	1 746	1 746	1 746	1 746	1 746	1 920	1 920	1 920	1 920	1 571	1 677	1 677	1 677	1 677	1 677
	Total	2 910	2 910	2 910	2 910	2 910	2 910	3 200	3 200	3 200	3 200	2 618	2 795	2 795	2 795	2 795	2 795
Employment	Direct	37.59	37.59	37.59	37.59	37.59	37.59	41.35	41.35	41.35	41.35	33.82	36.11	36.11	36.11	36.11	36.11
Income ($1993	Indirect	40.77	40.77	40.77	40.77	40.77	40.77	44.83	44.83	44.83	44.83	36.69	39.16	39.16	39.16	39.16	39.16
Millions/Year)	Total	78.36	78.36	78.36	78.36	78.36	78.36	86.18	86.18	86.18	86.18	70.51	75.27	75.27	75.27	75.27	75.27
Government Revenue Account ($1993 Millions/Year)																	
Provincial:																	
Stumpage and Rents		49.53	49.53	49.53	49.53	49.53	49.53	54.48	54.48	54.48	54.48	44.58	49.53	47.58	47.58	47.58	47.58
Personal Income Taxes		8.25	8.25	8.25	8.25	8.25	8.25	9.07	9.07	9.07	9.07	7.42	8.25	7.92	7.92	7.92	7.92
Other Taxes		7.28	7.28	7.28	7.28	7.28	7.28	8.01	8.01	8.01	8.01	6.55	7.28	6.99	6.99	6.99	6.99
Total		65.06	65.06	65.06	65.06	65.06	65.06	71.56	71.56	71.56	71.56	58.55	65.06	62.49	62.49	62.49	62.49
Federal		18.64	18.64	18.64	18.64	18.64	18.64	20.50	20.50	20.50	20.50	16.77	18.64	17.90	17.90	17.90	17.90
Environmental Account			▪ reduced populations of old growth dependent species ▪ increased population of early seral stage inhabitants ▪ decline in overall biodiversity ▪ sharp decline of Tweedsmuir-Entiako caribou herd					▪ fastest reduction to populations of old growth dependent species ▪ increased population of early seral stage inhabitants ▪ decline in overall biodiversity ▪ sharp decline of Tweedsmuir-Entiako caribou herd					▪ slowest reduction to populations of old growth dependent species ▪ increased population of early seral stage inhabitants ▪ decline in overall biodiversity ▪ sharp decline of Tweedsmuir-Entiako caribou herd					

6.3. TSA Issues

Major TSA issues and concerns include the following:

- developing an improved understanding of the economic trade-offs between long and short rotation cycles for lower quality second growth stands;
- reconciling the diverse demands of the Protected Area Strategy, tourism, aboriginal community, trapping and guiding communities and forest industry within the limited, operable timber harvesting land base of the Lakes TSA;
- in the face of a shrinking resource base, further identification and development of opportunities for greater First Nations involvement in management and use of forest resources;
- adjusting to higher prices for open market wood because of the expected lower TSA harvest levels throughout the province and recognizing their impact on marginal mill operations throughout the Lakes TSA;
- developing mitigation measures prior to harvest reductions;
- developing a better understanding of all forest resources, and accompanying socio-economic impact, that the various forest management initiatives (Timber Supply Review, PAS, Forest Practices Code, Forest Renewal Plan) could have.

APPENDIX 1

QUALIFICATIONS TO ANALYSIS

The primary objective of this analysis is to project the impacts which can be directly attributed to timber harvest scenarios. The quality of an analysis is a function of the skills of the analysts and the time and resources provided to undertake it. These socio-economic assessments of timber harvest scenarios are intended to provide a broad understanding of the fundamental economic, environmental, social and Aboriginal community issues associated with them and to stimulate reflection and discussion. Numerous stakeholders and audiences, including the province's Chief Forester, forest companies, environmental organizations, local government officials, and Aboriginal governments, use the assessments, which are neither founded nor prepared as definitive documents on the subject. The following qualifications should be kept in mind as readers interpret the analyses, but they should not be seen as invalidating the analysis. Every projection, no matter how comprehensive or well-founded it may be, must account for uncertainty. This analysis is based on recent historical experience and is undertaken by experienced analysts using widely accepted methods.

Recent Historical Data

Appendix 3 lists the study's data sources. It is standard practice to use recent historical data to project the future.

Methodologies

Multipliers are used to estimate the indirect and induced employment and income impacts. The multipliers used here are estimates only, but they are often based on sophisticated research. They provide the "best" available estimates of demand and inter-sectoral relationships.

The economic development account contains quantitative impact estimates. The other accounts contain qualitative judgements. The differing approach is required because of the lack of sufficient historical data and widely accepted methodologies for attributing social, environmental, and aboriginal impacts to timber harvest activity. The qualitative estimation methodologies used for these other accounts depend on professional opinion and insight and do not produce quantitative information. Readers should interpret the assessments as initial and broad-based; definitive conclusions would be dependent on further field study and research.

Influential Factors

The most closely scrutinized parts of these studies are the economic impact projections. The foundation for the projections is the employment per thousand cubic metre of harvested and processed timber. This historical relationship in the projections is assumed

not to vary over the long time horizon of this study. This assumption produces a linear relationship. The many factors which influence this relationship, however, including technology, input costs, and timber prices, will be different tomorrow. No attempt is made herein to forecast or predict changes in these variables or to include related sensitivity analyses. This analysis is not meant to assess all impacts over the 200 year planning horizon - instead, it is meant to assist short-term planning until the next analysis is conducted, probably in five or six years. It is therefore reasonable to keep key variables constant in order to ensure the validity of the analysis. Any subsequent dramatic changes in one or more of the variables may, however, give cause to revisit the analysis.

The timber harvest projections are based on the Ministry's computer modelling of the forest land base. Readers are directed to the Lakes TSA Timber Supply Analysis [1995] for information on its methodology. The timber harvest projections are dependent on key variables, including timber prices and technology, which closely influence the operable land base. Thus, as with the socio-economic analysis, the projections are subject to changing conditions and should also be viewed as short-term models.

Industry Activities

The analysis provides an estimate of harvesting, processing, silviculture, and government regulation employment and income attributable to the forest industry. It shows neither the impacts from the forest industry's capital investment, nor transportation of product to export shipment points nor wholesaling activities. They are not estimated because of the additional time and resources required to do so. Nevertheless, they are important corollaries of the forest economy. A 1991 study of the impact of a supply reduction throughout BC considered all industry activity and some results are shown in the following table:

Forest Industry's Share of BC's 1989 GDP

Component	% of 1989 GDP
Production for Final Demand	17
Forest Sector Investment	1
Transportation/Wholesale Activity	5
Intermediate Demand Production	2
Total	25

Source: BC Ministry of Finance 1991

APPENDIX 2

GLOSSARY

Allowable Annual Cut (AAC) — The volume of timber which may be cut each year from a forest management unit (e.g., a TSA), set by the Chief Forester in accordance with Section 7.0 of the Forest Act.

AAC Apportionment — The allocation by the Minister of the AAC for a TSA among timber tenures in accordance with Section 8.0 of the Forest Act.

Biodiversity — Biological Diversity. The diversity of plants, animals and other living organisms and their habitats measured by factors such as genetic variability, number of species, and variation in species composition.

Biogeoclimatic Zones — Areas which are defined by similar biological, physical and atmospheric characteristics.

Cut Block Adjacency — Integrated management guidelines restrict harvesting in areas adjacent to a cut block until that cut block has satisfied certain regeneration requirements (i.e., green-up requirements).

Constant (or Real) Dollar — The general inflationary effects are removed from the current value of a dollar.

Direct Activity — In an input-output model, income and employment impacts in the industry under study, in this case the forestry industry (i.e., harvesting, transportation, silviculture, and processing).

Economic Base Theory — In economic base theory, the basic or direct sector(s) is seen as the driving force in the local economy. The basic or direct sector is an industry or group of industries in a community or region which sells its output or services to buyers who live outside of them. It could be a forest industry which sells 2x4s, a hotel which caters to outside visitors or pension payments from Ottawa to local residents. The non-basic or indirect sector supplies goods and services to the direct sector and caters to the personal demands of employees of the direct and indirect sectors.

Ecosystem — Any complex of living organisms together with all the other biotic and abiotic (non-living) factors which affect them.

Environmentally Sensitive Area — Notable non-timber values, fragile or unstable soils, or areas that have problems in establishing a new stand or where timber harvesting may result in landslides.

Ecoprovince — An area of the earth's surface characterized by very broad ecological interactions between the four major environmental components of the ecosystem: air, water, land and biota.

Green-up Period	The time needed for a stand of trees to reach a desired condition (i.e., height) to ensure maintenance of water quality, wildlife habitat, soil stability or aesthetics. Green-up requirements refer to the desired conditions.
Indirect Activity	In an input-output model, spin-off income and employment effects from businesses which provide intermediate goods or services to the direct sector.
Induced Activity	In an input-output model, the economic activity created through the incomes of workers in the direct and indirect businesses, who spend their earnings on a broad range of consumption and investment goods and services.
Integrated Resource Guidelines	Guidelines requiring that forest management activities (such as harvesting, road building and silviculture treatments) be conducted in a special way to protect or enhance timber and non-timber forest resource values.
Long-run Harvest	Refers to timber harvesting levels whereby the volume of timber harvested in any given period can be replaced by a similar volume of regenerated stands within the same period.
Multiple Accounts Analysis	A method of socio-economic evaluation that accounts for both measurable and non-measurable benefits and costs, and compares the impacts of different objectives on several socio-economic features or accounts.
Multipliers	Coefficients which indicate the historical relationship between economic sectors and impact categories in an economic impact model. For example, a total employment multiplier of 2.5 for the forest industry indicates that there are 1.5 indirect/induced jobs attributable to 1 forest industry job.
Person-year (PY)	A standard measure of employment that takes into account part-time, seasonal, and over-time work. For example, if an employee works full-time six months, he or she will account for 0.5 PYs of employment. Using person-years allows different types of employment to be compared on a similar basis. In this report, 1 800 hours per year represents a person-year.
Protected Area	An area designated under the BC Protected Areas Strategy for protection in its current state, based on special physical and environmental qualities it may possess.
Riparian Zone	The stream bank and flood plain adjacent to streams or water bodies, with particular reference to the vegetation.
Timber Supply Area (TSA)	An integrated resource management unit established in accordance with Section 6.0 of the Forest Act.
Watershed	An area drained by a particular stream or river. A large watershed may contain several smaller watersheds.

APPENDIX 3

BIBLIOGRAPHY

B.C. Legislature, Select Standing Committee on Forests and Lands, 1st Report, 4th Session, 34th Parliament, June 27 1990.

B.C. Ministry of Environment, Park Data Handbook: 1992, March 1993.

B.C. Ministry of Forests, Ecosystems of British Columbia, February 1991.

B.C. Ministry of Forests, 92/93 Annual Report, 1994.

B.C. Ministry of Forests, The Economic Impacts of Timber Harvesting in British Columbia, June 1993.

B.C. Ministry of Forests, Lakes TSA Timber Supply Analysis, 1995.

B.C. Ministry of Forests, Major Primary Timber Processing Facilities in British Columbia 1991, Economics and Trade Branch, July 1992.

B.C. Ministry of Forests, Social and Economic Impact Assessment of Forest Land Management Options in British Columbia: Interim Evaluation Guidelines, 1992.

B.C. Ministry of Forests, Ecosystems of British Columbia, Special Report Series 6, February 1991.

B.C. Ministry of Forests, Modelling Incremental Silviculture Practices, undated.

B.C. Ministry of Forest, Lakes Forest District, Klaytahnkut, Tildesley Riparian Zone Timber Harvesting Guidelines, August 1990.

B.C. Ministry of Forests, Lakes Forest District, Lakes Timber Supply Area Plan, 1987.

B.C. Ministry of Forests, Lakes TSA Timber Supply Analysis Report, June 1985.

B.C. Ministry of Forests, Lakes Forest District, Lakes District Small Business Forest Enterprise Program 1993 Annual Report, 1994.

B.C. Ministry of Forests, Economics and Trade Branch, Bulkley Timber Supply Area Socio-Economic Analysis, August 1994.

B.C. Ministry of Forests, Lakes Forest District, Forest Planning Workshop, 1993.

B.C. Ministry of Forests, Lakes Forest District, Sutherland Local Resource Use Plan (draft), June 1990.

B.C. Ministry of Forests, Seasonal Movements, Habitat Use, and Winter Feeding Ecology of Woodland Caribou in West-Central British Columbia, Land Management Report Number 79, 1993.

B.C. Ministry of Forests, Prince Rupert Forest Region, Interim Regional Timber Harvesting Guidelines for the Interior Portion of the Prince Rupert Forest Region, Version II, May 1992.

B.C. Ministry of Forests and Forestry Canada (1989), A Socio-Economic Impact Analysis of Silviculture Employment Under the 1985-1990 Canada-British Columbia Forest Resource Development Agreement, FRDA Report 067.

B.C. Ministry of Health, Selected Vital Statistics and Health Status Indicators: Annual Report, Division of Vital Statistics, 1992 .

B.C. Ministry of Regional and Economic Development, Nechako Wood Residues: A Resource Opportunity, March 1990.

B.C. Ministry of Tourism, Tourism in British Columbia: Status Report, 1992.

B.C. Ministry of Tourism, The Economic Impact of Tourism Industries in British Columbia, 1992.

B.C. Treaty Commission, FACT SHEET, July 1993.

Central Statistics Branch, Average Tax Payments by Income Class for British Columbia, 1992.

Cichowski, Debrorah B. and Banner, Allen, Management Strategy and Options for the Tweedsmuir-Entiako Caribou Winter Range (draft), B.C. Ministry of Forests, August 1994.

Commission on Resources and Environment, Vancouver Island Land Use Plan, February 1994.

DPA Group Inc., Guide Outfitters of British Columbia: Opportunity Analysis, June 1989.

Employment and Immigration Canada, Labour Market Paper Natives, Economic Services Branch, December 1991.

Employment and Immigration Canada, 1991 Aboriginal Labour Force Data, Economic Services Branch, October 1993.

Entiako Local Resource Use Plan Working Group, Interim Entiako Land Use Report (draft), December 1993.

Fisheries and Oceans Canada, Stream Summary Catalogue, 1988.

H.A. Simons, Wood Production Strategies and the Implications for Silviculture in B.C., Ministry of Forests, September, 1994.

Horne, Garry and Powell, Charlotte, British Columbia Local Area Economic Dependencies and Impact Ratios, Ministry of Finance and Corporate Relations, February 1995.

Industrial Forestry Service Ltd., Caribou Migration Sites, Chelaslie Corridor, June 1993.

J.S. Peepre and Associates, Protected Area Strategy: Outdoor Recreation Supply Issues, Recreation Technical Committee, 1993.

Lakes Forest District Staff and Hunter, Barry W., Forest Planning Workshop, June 1993.

Lee, Robert G., Employee Transitions and Risks Following Timber Harvest Reductions: Preliminary Estimates and Suggested Methodology, Interior Lumber Manufacturers Association, March 1994.

Price Waterhouse, The Forest Industry in British Columbia, 1993.

Price Waterhouse, The Forest Industry in British Columbia, 1992.

Province of B.C., A Protected Areas Strategy For British Columbia, 1993.

Pearse, Peter, "Timber Rights and Forest Policy in B.C.", Report of the Royal Commission on Forest Resources, Vol.1, Victoria, 1976.

Smelser, D. Rodney, Severity of Unemployment Indicators in the B.C./Yukon Region, Human Resources Development Canada, December 1993.

Statistics Canada, Employment Income by Occupation - The Nation, 1991 Census.

Sutherland Local Resource Use Planning Team, Planning Team Summary Report (draft), July 1990 (updated May 1992).

U.S. Government, Report of the Forest Ecosystem Management Assessment Team, Appendix III-A, 1993.

APPENDIX 4

CONTACTS

Fred Ahrens, Francois Lake Woodworking
Stuart Berg, Guide Outfitter
Laura Bolster, Ministry of Forests
Tan Calhoun, Babine Forest Products
Dave Coffey, Ministry of Forests
Allison Coyne, Ministry of Forests, Economics and Trade Branch
Lynn Damant, B.C. Ministry of Environment, Fish and Wildlife Branch
Jim De Hart, B.C. Parks
Val Fehr, Burns Lake Chamber of Commerce
Bob Fowler, Ministry of Forests, Lakes Forest District
Miles Fuller, Guide Outfitter
John Gerow, Ministry of Forests
Ray Gerow, Burns Lake Native Development Corporation
Jeff Giesbrecht, SBFEP Operator
Sharon Hartwell, British Columbia Conservation Data Centre
Paul F. Haley, Ministry of Environment
Janet Harms, Burns Lake Automotive
Dave Hatler, B.C. Trappers Association
Gerry Herman, Burnslake Specialty Wood Products
Ann Hill, Human Resources Development Canada
Gunter Hoehne, Ministry of Forests
Alfred Horning, SBFEP Horse Logger
Helmut Hummell, SBFEP Operator
Harold Kerr, Bulkley Valley Cattlemans' Association
Karen Kirby, BC Stats
John Knelson, SBFEP Operator
Jacquie Lee, B.C. Conservation Data Centre
Ray Nelson, Human Resources Development Canada
Tom Olafson, Fraser Lake Sawmills
Mike O'Meara, SBFEP Operator
Jim Peebles, SBFEP Operator
Doug Rowland, SBFEP Operator and Mill Owner
John Redburn, Ministry of Forests, Lakes Forest District
Wesley Sam, Burns Lake Band
Donna Selbee, B.C. Parks
Kathy Simonds
Tom Smith, Ministry of Environment
Chris Southin, Human Resources Development Canada
John Stadt, B.C. Ministry of Environment
Corporal Tapp, RCMP, Burns Lake
Pat Tobin, Decker Lake Forest Products

Glen Watts, B.C. Ministry of Environment, Fish and Wildlife Branch
Henry Wiebe, SBFEP Operator and Mill Owner
Bruce Williams, I.W.A.
Spencer Woodland, Kal Tire
Ralph Yeo, Lakes Development Society

APPENDIX 5

LAKES TSA LICENSEE ALLOCATION

AAC Allocation by Licensee, Lakes TSA, 1994		
	m^3	% of AAC
Small Business Forest Enterprise Program	448 178	29.9%
Babine Forest Products Limited	431 518	28.7
West Fraser Sawmills Limited	367 194	24.5
Decker Lake Forest Products	137 478	9.2
Northwood Pulp and Timber Limited	56 450	3.8
L & M Lumber Limited	23 084	1.5
Forest Service Reserve	15 000	1.0
Woodlots	21 098	1.4
Total Approved Allowable Annual Cut	1 500 000	100.0%

APPENDIX 6

TIMBER HARVESTING LAND BASE IN THE LAKES TSA, 1995

Classification	Area (ha)	Area (ha)	% of Total Area
Total Land Base		1 123 667	100.0%
Not managed by BC Forest Service		86 280	7.7
Non-forest land		171 019	15.2
Total Productive Crown Forest		866 368	77.1
Reductions to Productive Crown Forest:			
Non-commercial Cover (NC)	3 727		0.4
Not Satisfactorily Restocked (NSR)	24 098		2.8
Environmentally Sensitive	42 267		4.9
Low Productivity	39 713		4.6
Deciduous	40 973		4.7
Non-merchantable Balsam/Pine	12 029		1.1
Insufficient Height in Balsam and Spruce Stands	4 352		0.4
Insufficient Height in Pine Stands	50 770		4.5
Existing Roads	12 764		1.1
Total Reduction	230 693	230 693	20.5
Timber Harvesting Land Base (Less Additions)		635 675	56.6
Additions:			
NSR Reduction	22 350		2.0
Total Additions		22 350	
Future Reductions for Roads	23 538		2.1
Total Reductions		23 538	
Future Timber Harvesting Land Base		634 487	73.2%

APPENDIX 7

METHODOLOGIES AND ISSUES

I. Economic Impact Methodology

The economy is a system of inter-related sectors. Any change in the final demand of a business or industry will induce a sequence of changes in production and employment in other sectors of the economy. There are three impact categories: direct; indirect; and induced. The direct impacts are changes in income and employment in those industries where final demand has changed. In this analysis, the focus is on the forest industry. Spending by producers of final goods and services generates demand for other firms further up the production chain, so any change in final forest industry demand will bring about further changes in output and employment among suppliers of intermediate goods. Successive rounds of changes will occur - taken in aggregate, these constitute the indirect impacts. Finally, additional economic activity will occur as the result of changes in spending by persons receiving income from industries subject to direct and indirect impacts. The successive changes in output and employment occurring through this channel constitute the induced impacts.

This study examines economic impacts of TSA timber at the TSA and province-wide levels[1]. The following table shows the key employment and income values which were used to estimate the forest industry impacts from altering the timber harvest.

Summary Table of Key Economic Impact Values in the Lakes TSA		
	TSA	Provincial
Harvesting Employment Coefficient (PYs/1 000 m^3)	.30	.30
Processing Employment Coefficient (PYs/1 000 m^3)	.24	.48
Total Employment Coefficient (PYs/1 000 m^3)	.54	.78
After-Tax Forest Wage	$31 933	$33 136
After-Tax Indirect Wage	$23 350	$23 350
Multiplier	1.46	2.50

A detailed explanation of the economic impact estimation methodology follows.

1 The focus of this study is on TSA timber. Lakes TSA processing operations also obtain wood input from elsewhere in BC. A critical examination of their future would require a wider view of the timber availability and price situations than is undertaken in this report.

TSA Impacts

Direct Employment

Employment estimates were based on licensee employee information. All information is expressed as a per 1 000 m^3 coefficient, which allows for a ready estimate of forest sector employment and income impacts based on timber harvest level changes.

Harvesting and Silviculture - Lakes TSA licensees were surveyed for three year average logging, silviculture and administration employment information relating to their licence quotas. The following companies provided employment information: Babine Forest Products Company, Decker Lake Forest Products, Northwood Pulp & Timber, West Fraser Sawmills, and L & M Lumber. Ten small business operators provided SBFEP employment estimates. Licensee respondents accounted for approximately 90 percent of the total Lakes AAC in 1993 and 100 percent of the non-SBFEP AAC.

Established licensees contract out significant amounts of quota harvest to small business operators. Many of these same operators also harvest their own quotas under the SBFEP. Consequently, we have not attempted to distinguish separate harvesting coefficients for SBFEP and non-SBFEP wood in the Lakes TSA.

The TSA harvesting (including logging, silviculture and administration) coefficient is estimated to be 0.30 PY per 1 000 m^3. All harvesting employment is assumed to accrue to the TSA.

Processing - The licensee survey provided processing employment information for the last three years. A sample of 7 mills throughout the region was obtained, representing approximately 970 000 m^3 of average annual consumption of Lakes TSA wood. According to wood flow information obtained from licensees, 64.6 percent of all wood from the TSA is processed in the TSA. Using actual mill employment in the TSA with estimates on the percentage of wood sourced from within the TSA, a processing coefficient for the TSA of 0.24 PY per 1 000 m^3 harvested was estimated.

The TSA coefficient for all processing and harvesting activities is estimated to be 0.54 PY per 1 000 m^3.

Direct Employment Income

Forest sector employment income was estimated using Statistics Canada 1991 Census data [Statistics Canada, Employment Income by Occupation 1993] adjusted to 1993 dollars by the BC Consumer Price Index. Harvesting employment income is estimated to be $46 094 in 1993. Silviculture employment income is estimated to be $39 891. Pulp and paper income and wood processing income are estimated to be $48 927 and $42 636, respectively in 1993. The weighted average income for study area forestry employment is $43 870.

Employment income is reported as after-tax in this report as an estimate of disposable income. Income tax deductions are included in government tax revenues. Based on the above harvesting, silviculture and processing incomes, a weighted average tax rate of 27.6 percent was derived from Ministry of Finance tax tables [Central Statistics Branch 1992]. The weighted average after-tax income for study area forestry workers is $31 933.

Indirect/Induced Employment

The BC Ministry of Finance and Corporate Relations has prepared economic base multipliers for all parts of BC except for the Lower Mainland [Horne and Powell 1995]. Economic base multipliers are calculated in a different fashion than input-output multipliers. The direct and indirect portions of the I/O approach are roughly equivalent to the basic portion. The induced portion of the I/O approach is roughly equivalent to the non-basic portion of the economic base multiplier. The economic base multiplier for the Burns Lake area is 1.46, based on a weighted average of logging (1.55) and other wood manufacturing (1.34) multipliers from 1991 data. The procedure for applying this multiplier is contained in the same paper.

Indirect/Induced Employment Income

Indirect employment income is obtained by multiplying the estimated indirect employment by an average annual after-tax income of $23 350 for BC in 1993. This wage was derived by applying an effective tax rate of 20.5 percent to Statistics Canada's average annual aggregate gross income for BC in 1993 of $29 385.

Provincial Impacts

Direct Employment

Thirty-five percent of Lakes TSA wood leaves the TSA for processing. According to licensee survey information, 1.4 percent is in the form of pulp logs headed to nearby pulp mills. Based on average employment information obtained from the Ministry of Forests concerning pulp mills in the Prince Rupert Forest Region, the pulp and paper processing coefficient for this wood is estimated to be 0.35 PY per 1 000 m^3. A significant volume of chip and sawdust residue is generated when non-pulp Lakes TSA wood is processed, primarily as lumber. Based on information provided by the Ministry of Forests Trade and Economics Branch, it is estimated that 40 percent of all TSA wood processed both inside and outside the region (excluding pulp wood, chips and log exports) ends up as chip and sawdust residue and is subsequently processed as pulp and paper outside the region. We have applied the above pulp and paper coefficient (less chipping) of 0.30 PY per 1 000 m^3 to these volumes.

Approximately 33.5 percent of Lakes TSA wood leaves the region for non-pulp processing. The survey for this analysis obtained information on the amount of wood leaving the region and employment information on the mills processing 82 percent of this

wood. This produced a processing coefficient of 0.33 PY per 1 000 m^3. We have applied this coefficient to these volumes.

The provincial coefficient for harvesting and processing Lakes TSA wood (inside and outside the TSA) is estimated to be 0.78 PY per 1 000 m^3.

According to our survey responses, no TSA logs are exported from BC.

Direct Income

Forest sector employment income was estimated using Statistics Canada 1991 Census data [Statistics Canada, Employment Income by Occupation 1993] adjusted to 1993 dollars by the BC Consumer Price Index. Harvesting employment income was estimated to be $46 094 in 1993. Silviculture employment income was estimated to be $39 891. Pulp and paper income and wood processing income were estimated to be $48 927 and $42 636, respectively in 1993. The weighted average income for provincial forestry employment is $45 968.

Employment income is reported as after-tax in this report. After tax income is a measure of disposable income. Income tax deductions are included in government revenue. Based on the above harvesting, silviculture and processing incomes, a weighted average tax rate of 27.8 percent was derived from Ministry of Finance tax tables [Central Statistics Branch 1992]. The weighted average after-tax income for provincial forest workers is $33 136.

Indirect/Induced Employment

Multiplying direct employment by the Ministry of Forests' forest sector multiplier of 2.50 provides an estimate of total employment[2]. Indirect and induced employment is the difference between the total and direct figures.

Indirect/Induced Income

Indirect employment income is obtained by multiplying the estimated indirect and induced employment by an average annual after-tax income of $23 350 for BC in 1993. This wage was derived by applying an effective tax rate of 20.5 percent to Statistics Canada's average annual aggregate gross income for BC in 1993 of $29 385.

II. Tourism Impact Issues

A change in timber harvest levels can have important implications for the businesses and employees who depend on tourism and outdoor recreation. Lakes TSA forests provide significant opportunities for people to enjoy the outdoors. There is no clearly defined

[2] The Ministry of Forests has selected the multiplier of 2.50 for the timber harvest impact assessments after reviewing the literature and considering the multipliers that various organizations have developed.

relationship between tourism/recreation employment and timber harvest. There is a relationship between outdoor related visits and recreation/tourism employment. If harvest level changes affect visitation, outdoor recreation and tourism related employment would change.

Tourism and recreation have somewhat unique product characteristics and production processes. The entire trip is the product, rather than just recreation sites and facilities. It involves the total experience, anticipation, travel and memories. Consumers combine the opportunities made available by nature, government and the private sector with their own knowledge, equipment, travel and technology to produce the trips. Tourists and recreationists would assess any perceived impacts from timber harvesting and decide whether or not to go forward with a trip.

In a general sense, each scenario would similarly affect outdoor recreation and tourism activity because they are subject to the same forest management practices, including Ministry of Forests Integrated Resources Management (IRM) guidelines. Specific protection for biodiversity, landscape views and habitat would prevail in the same fashion and in the same quantity for each scenario.

Timber harvesting can improve recreation access to backwoods areas through creation of logging roads. Over the longer-term, there would be no difference between scenarios regarding access.

One possible difference in recreation and tourism potential between the scenarios comes from the higher near-term harvest for Scenario 2 compared to Scenarios 1 and 3. The immediate 10 percent rise in harvest could make it more difficult to manage visual impacts from timber harvesting. Increased harvests would not necessarily degrade tourism features, but may create potential problems, such as reduced visits, associated with rapid changes to visual features caused by timber harvesting.

Tourism and outdoor recreation fall into the category of services whereas forest products are categorized as goods. There is an increasingly important debate about the importance of services as an engine of economic growth. Conventional growth models focus on exports and investment. The most commonly mentioned form of service-led growth takes place when a reduction in the prices of intermediate services leads to a reduction in the price of exports, which, in turn, leads to classic export-led growth. Tourism services in this context can be considered as the export of forest based experiences though the individual must enter the province to accept delivery of the experience.

Tourism services sold to non-residents can increase economic activity but recreation undertaken by residents does not do so, unless it replaces activity which would otherwise be consumed outside of the economy. Outdoor recreation by residents improves personal health and provides intellectual and emotional benefits but it does not raise the GDP.

There is another viewpoint which holds that it is not maximization of GDP, or output which is important but maximization of utility. This viewpoint holds that the "marketplace" decides, via individuals exercising personal discretion in their spending patterns. If residents want to purchase recreation and its benefits then they should be able to do so. As incomes change people will alter their pattern of purchases. If GDP is stagnant, residents will supposedly save more and reduce spending on non-essential final consumption items, such as recreation. From an analytical standpoint, the main difference between the two is what to measure: utility, or an indicator, such as jobs, GDP or income.

These two basic perspectives have important consequences for interpreting the economic impacts of the scenarios. This study does not attempt to compare utility impacts of the scenarios. It compares jobs and income impacts. Changes in the forest industry will add or subtract from overall economic well-being, measured through jobs and income, because it is a goods producing export sector. The situation is not as cut and dried for the outdoor recreation possibilities of the TSA's forests. As a service industry, outdoor recreation must be separated into its export and resident components each with different implications for the province's economy.

The spending of non-resident tourists for recreational activities in the TSA's forests could be included in an impact analysis but only the portion which comes because of the opportunities offered in the TSA's forests. If tourists would otherwise visit BC and spend similar amounts of money without using its forests, then the recreational activity would not be counted as a contributor to overall economic change.

Resident recreational activity occurs at some level regardless of changes in forest conditions. A timber harvesting induced change in forest conditions may cause some residents to pursue another activity elsewhere, but likely in the province. For example, instead of hiking in the forests, time and financial resources might go towards tennis. Since there is no change in spending, i.e. the money is either spent on hiking or tennis in BC, there is no change at the level of the overall economy. If residents visit Washington state to hike, then there is import substitution, i.e., the recreation experience is received outside of Canada and imported back into Canada, and a resulting decrease in the overall Canadian economy.

There is another important interpretation issue when outdoor recreation and tourism are a significant economic sector. The services of environmental resources used in the production of a visit or experience have either no price or a price which does not reflect a market value. Although the recreationist or tourist does not pay for them, they can often place a dollar value on what they would be willing to pay. There are a large number of academic studies on this issue. An example is the fishing experience, where an angler can accurately estimate what he or she would pay for a day of fishing, above the spending on bait, fuel, food, etc. Even though the angler does not pay for the environmental resources which combine to yield the fishing experience, it still has economic value. There are many other examples of services or goods which do not have market prices yet provide economic value. An economic impact study does not record something if there is no

spending. This situation leads to an understatement of the importance of recreation and tourism within the TSA or province.

III. First Nations Impact Methodology

Representatives of all First Nations with traditional territory in the Lakes TSA were asked to provide their perceptions of impacts arising from a change in the timber harvest. The Burns Lake Band chose to provide information while the others did not. The consultants collected information through a series of meetings and faxes and drafted the First Nations sections of the report.

IV. Government Revenues Impact Methodology

The same general approach is taken with this account as was done for the economic development account; historical government revenues per cubic metre of harvested timber are estimated. The recent historical averages are multiplied by the AAC volumes to indicate expected government revenues by decade. Provincial government revenues are grouped into three categories:

Resource Revenues - These include stumpage and rents. Average stumpage for 1994, for the Lakes TSA, is $33.02 per m^3. Other rents included in this figure are assumed to be $.25 per m^3 on non-SBFEP wood.

Policy changes announced in April, 1994 as part of the Forest Renewal Plan have resulted in significantly higher stumpage revenues and will continue only if the increase in lumber prices which occurred in 1993 represents a structural shift in the market.

Personal Income Taxes - Effective employment income tax rates are assumed to be 27.6 percent for regional forestry income, 27.8 percent for provincial forestry income, and 20.5 percent for other income, both regional and provincial; the provincial share of these is assumed to be one third.[3]

Other Taxes - A composite tax rate of $4.85 per m^3 is used to cover corporate, logging, property, sales, and electricity taxes [Price Waterhouse, 1992 and 1993]. This was based on a 1988-1993 industry average.

Federal government revenues have all been grouped into one category. A corporate tax rate of $1.163 per m^3, an excise tax rate of $0.163 per m^3 and a withholding tax rate of $0.10 per m^3 based on a 1988-1993 industry average [Price Waterhouse 1993 and 1994] is used to calculate a portion of the Federal revenue amount. The remainder is personal

---

3 The amount of personal income tax is difficult to project. Job losers will have lower incomes, at least for a short time. The majority will secure other work, but perhaps not in the forest industry. Assuming no income for job losers would be incorrect and bias scenarios with larger reductions in harvest. Further, there is the difficulty of making assumptions about BC government expenditures on behalf of forest industry workers to arrive at a net figure.

income tax which is assumed to be twice the provincial income tax amount as described above.

APPENDIX 8

IMPACT ANALYSIS - SCENARIOS 2 & 3

Scenario 2 - TSA Economic Impacts							
	Harvest	Employment (PY/Year)			Employment Income ($1993 Millions/Year)		
Year	'000 m^3/ year	Direct	Indirect/ Induced	Total	Direct	Indirect/ Induced	Total
Current	1 500	809	370	1 179	$25.83	$8.64	$34.47
0	1 650	889	406	1 295	28.39	9.48	37.87
10-49	1 650	889	406	1 295	28.39	9.48	37.87
50	1 500	809	370	1 179	25.83	8.64	34.47
60	1 350	728	333	1 061	23.25	7.78	31.03
70	1 310	706	323	1 029	22.54	7.54	30.08
80-129	1 310	706	323	1 029	22.54	7.54	30.08
130	1 310	706	323	1 029	22.54	7.54	30.08
140	1 310	706	323	1 029	22.54	7.54	30.08
150	1 310	706	323	1 029	22.54	7.54	30.08
160	1 310	706	323	1 029	22.54	7.54	30.08
170	1 441	777	355	1 132	24.81	8.29	33.10
180	1 441	777	355	1 132	24.81	8.29	33.10

Scenario 2 - Provincial Economic Impacts							
	Harvest	Employment (PY/Year)			Employment Income ($1993 Millions/Year)		
Year	'000 m^3/ year	Direct	Indirect/ Induced	Total	Direct	Indirect/ Induced	Total
Current	1500	1 164	1 746	2 910	$37.59	$40.77	$78.36
0	1650	1 280	1 920	3 200	41.35	44.83	86.18
10-49	1650	1 280	1 920	3 200	41.35	44.83	86.18
50	1500	1 164	1 746	2 910	37.59	40.77	78.36
60	1350	1 047	1 571	2 618	33.82	36.69	70.51
70	1310	1 016	1 524	2 540	32.81	35.58	68.39
80-129	1310	1 016	1 524	2 540	32.81	35.58	68.39
130	1310	1 016	1 524	2 540	32.81	35.58	68.39
140	1310	1 016	1 524	2 540	32.81	35.58	68.39
150	1310	1 016	1 524	2 540	32.81	35.58	68.39
160	1310	1 016	1 524	2 540	32.81	35.58	68.39
170	1441	1 118	1 677	2 795	36.11	39.16	75.27
180	1441	1 118	1 677	2 795	36.11	39.16	75.27

Scenario 2 - Government Revenue Impacts ($1993 millions/Year)					
	Provincial				
Year	Resource Revenues	Personal Income Tax	Other Taxes	Total	Total Federal Taxes
Current	$49.53	$8.25	$7.28	$65.06	$18.64
0	54.48	9.07	8.01	71.56	20.50
10-49	54.48	9.07	8.01	71.56	20.50
50	49.53	8.25	7.28	65.06	18.64
60	44.58	7.42	6.55	58.55	16.77
70	43.26	7.20	6.36	56.82	16.27
80-129	43.26	7.20	6.36	56.82	16.27
130	43.26	7.20	6.36	56.82	16.27
140	43.26	7.20	6.36	56.82	16.27
150	43.26	7.20	6.36	56.82	16.27
160	43.26	7.20	6.36	56.82	16.27
170	47.58	7.92	6.99	62.49	17.90
180	47.58	7.92	6.99	62.49	17.90

Scenario 3 - TSA Economic Impacts							
	Harvest	Employment (PY/Year)			Employment Income ($1993 Millions/Year)		
Year	'000 m^3/ year	Direct	Indirect/ Induced	Total	Direct	Indirect/ Induced	Total
Current	1 500	809	370	1 179	$25.83	$8.64	$34.47
0	1 441	777	355	1 132	24.81	8.29	33.10
10-49	1 441	777	355	1 132	24.81	8.29	33.10
50	1 441	777	355	1 132	24.81	8.29	33.10
60	1 441	777	355	1 132	24.81	8.29	33.10
70	1 441	777	355	1 132	24.81	8.29	33.10
80-129	1 441	777	355	1 132	24.81	8.29	33.10
130	1 337	721	329	1 050	23.02	7.68	30.70
140	1 341	723	330	1 053	23.09	7.71	30.80
150	1 288	694	317	1 011	22.16	7.40	29.56
160	1 363	735	336	1 071	23.47	7.85	31.32
170	1 365	736	336	1 072	23.50	7.85	31.35
180	1 441	777	355	1 132	24.81	8.29	33.10

Scenario 3 - Provincial Economic Impacts							
	Harvest	Employment (PY/Year)			Employment Income ($1993 Millions/Year)		
Year	'000 m^3/ year	Direct	Indirect/ Induced	Total	Direct	Indirect/ Induced	Total
Current	1500	1 164	1 746	2 910	$37.59	$40.77	$78.36
0	1441	1 118	1 677	2 795	36.11	39.16	75.27
10-49	1441	1 118	1 677	2 795	36.11	39.16	75.27
50	1441	1 118	1 677	2 795	36.11	39.16	75.27
60	1441	1 118	1 677	2 795	36.11	39.16	75.27
70	1441	1 118	1 677	2 795	36.11	39.16	75.27
80-129	1441	1 118	1 677	2 795	36.11	39.16	75.27
130	1337	1 037	1 556	2 593	33.49	36.33	69.82
140	1341	1 040	1 560	2 600	33.59	36.43	70.02
150	1288	999	1 499	2 498	32.27	35.00	67.27
160	1363	1 058	1 587	2 645	34.17	37.06	71.23
170	1365	1 059	1 589	2 648	34.20	37.11	71.31
180	1441	1 118	1 677	2 795	36.11	39.16	75.27

Scenario 3 - Government Revenue Impacts ($1993 millions/Year)					
	Provincial				Total Federal Taxes
Year	Resource Revenues	Personal Income Tax	Other Taxes	Total	
Current	$49.53	$8.25	$7.28	$65.06	$18.64
0	47.58	7.92	6.99	62.49	17.90
10-49	47.58	7.92	6.99	62.49	17.90
50	47.58	7.92	6.99	62.49	17.90
60	47.58	7.92	6.99	62.49	17.90
70	47.58	7.92	6.99	62.49	17.90
80-129	47.58	7.92	6.99	62.49	17.90
130	44.15	7.35	6.49	57.99	16.61
140	44.28	7.37	6.51	58.16	16.65
150	42.53	7.08	6.25	55.86	16.00
160	45.01	7.50	6.61	59.12	16.94
170	45.07	7.51	6.62	59.20	16.96
180	47.58	7.92	6.99	62.49	17.90

APPENDIX 9

INCREMENTAL IMPACT CHANGES

SCENARIO 1

	TSA Impacts				Provincial Impacts				Revenues	
	Employment (PYs/Year)		After-Tax Income ($1993 Mill/Year)		Employment (PYs/Year)		After-Tax Income ($1993 Mill/Year)		Prov.	Fed.
Year	Direct	Total	Direct	Total	Direct	Total	Direct	Total	($Mill/Year)	
0	0	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00
10-49	0	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00
50	0	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00
60	0	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00
70	-81	-118	-2.58	-3.44	-117	-292	-3.77	-7.85	-6.51	-1.87
80	-22	-32	-0.71	-0.95	-31	-78	-1.01	-2.12	-1.73	-0.50
90-129	0	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00
130	0	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00
140	0	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00
150	0	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00
160	0	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00
170	71	103	2.27	3.02	102	255	3.30	6.88	5.67	1.63
180	0	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00

SCENARIO 2

	TSA Impacts				Provincial Impacts				Revenues	
	Employment (PYs/Year)		After-Tax Income ($1993 Mill/Year)		Employment (PYs/Year)		After-Tax Income ($1993 Mill/Year)		Prov.	Fed.
Year	Direct	Total	Direct	Total	Direct	Total	Direct	Total	($Mill/Year)	
0	80	116	$2.56	$3.40	116	290	$3.76	$7.82	$6.50	$1.86
10-49	0	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00
50	-80	-116	-2.56	-3.40	-116	-290	-3.76	-7.82	-6.50	-1.86
60	-81	-118	-2.58	-3.44	-117	-292	-3.77	-7.85	-6.51	-1.87
70	-22	-32	-0.71	-0.95	-31	-78	-1.01	-2.12	-1.73	-0.50
80	0	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00
90-129	0	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00
130	0	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00
140	0	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00
150	0	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00
160	0	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00
170	71	103	2.27	3.02	102	255	3.30	6.88	5.67	1.63
180	0	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00

SCENARIO 3										
	TSA Impacts				Provincial Impacts				Revenues	
	Employment (PYs/Year)		After-Tax Income ($1993 Mill/Year)		Employment (PYs/Year)		After-Tax Income ($1993 Mill/Year)		Prov.	Fed.
Year	Direct	Total	Direct	Total	Direct	Total	Direct	Total	($Mill/Year)	
0	-32	-47	-$1.02	-$1.37	-46	-115	-$1.48	-$3.09	-$2.57	-$0.74
10-49	0	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00
50	0	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00
60	0	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00
70	0	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00
80	0	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00
90-129	0	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00
130	-56	-82	-1.79	-2.40	-81	-202	-2.62	-5.45	-4.50	-1.29
140	2	3	0.07	0.10	3	7	0.10	0.20	0.17	0.04
150	-29	-42	-0.93	-1.24	-41	-102	-1.32	-2.75	-2.30	-0.65
160	41	60	1.31	1.76	59	147	1.90	3.96	3.26	0.94
170	1	1	0.03	0.03	1	3	0.03	0.08	0.08	0.02
180	41	60	1.31	1.75	59	147	1.91	3.96	3.29	0.94