

Cranbrook Timber Supply Area Socio-Economic Analysis

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**Economics and Trade Branch
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Prepared by:

**Pierce Lefebvre Consulting
Vancouver, B.C.**

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Cranbrook Timber Supply Area Socio-Economic Analysis

Executive Summary

This **Socio-Economic Analysis (SEA)** provides information on social, environmental and economic implications of changing timber harvest levels for the Cranbrook Timber Supply Area (TSA). It is one of four reports being generated for the area as part of the Ministry of Forests' province wide timber supply review to assist the Chief Forester in setting allowable annual cut (AAC) levels. The purpose of this analysis is to describe the effects of various timber harvest forecast levels on the Cranbrook TSA communities, employment, income, government revenues, First Nations and the environment.

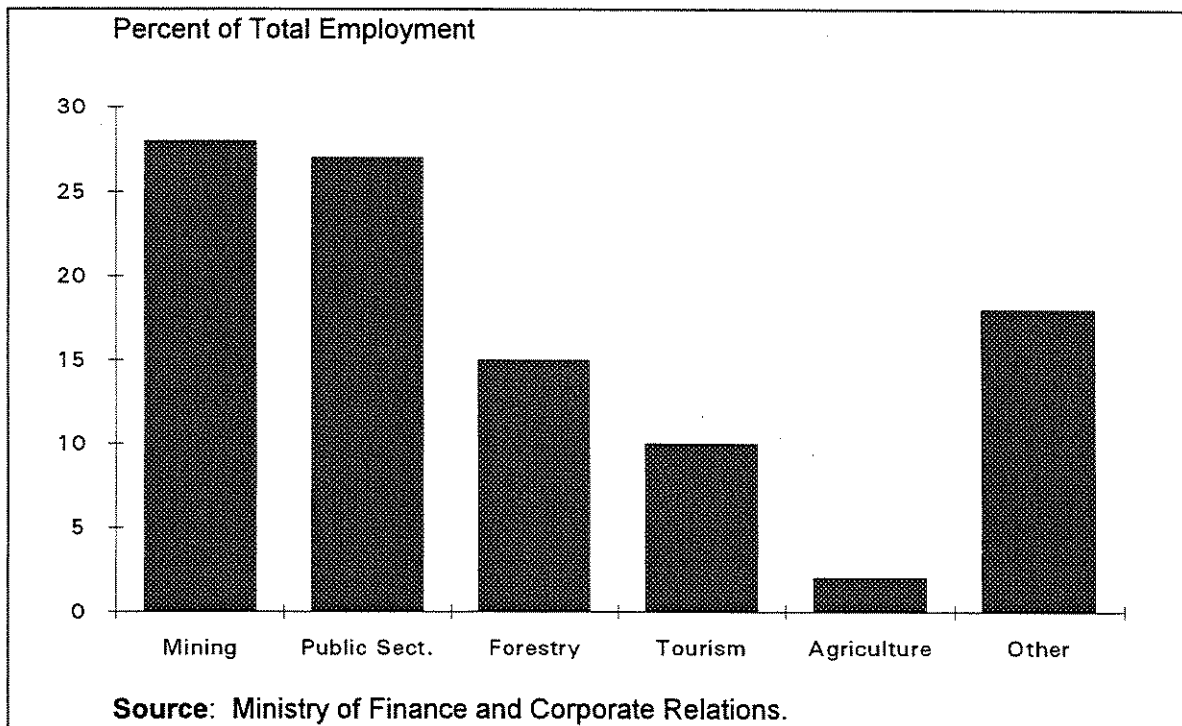
Environmental Setting

- The Cranbrook TSA comprises 1.48 million hectares and is located in the southeast corner of British Columbia, bordered by the B.C./Alberta boundary on the east side and the Canada/U.S.A. boundary on the south side.
- The area is comprised of two rugged mountain ranges separated by a broad, flat valley. The eastern portion of the Cranbrook TSA is dominated by the Rocky Mountain range and the western portion by the Purcell and McGillivray mountain ranges. The elevation above sea level at the floor of the Trench is approximately 800 metres while the surrounding peaks range up to 3500 metres.
- The Cranbrook TSA is unique in the province in terms of the density and diversity of ungulate populations. The area holds internationally significant populations of grizzly bear as well as important populations of woodland caribou and Rocky Mountain Bighorn Sheep. The Cranbrook TSA also contains a wide variety of other species of ungulates, small mammals, birds and fish, many of which are considered "at risk" within British Columbia.
- The great wealth and diversity of natural resources in the Cranbrook TSA increases the complexity of land use management in the area. Values for forestry, mining, agriculture, energy, tourism, hunting, fishing, outdoor recreation, cultural heritage, ecosystem preservation and human settlement are all very high throughout the region. This creates one of the most complex arrays of potentially complementary and competing land uses in British Columbia. All of these activities and interests tend to concentrate in the valleys and trenches of this generally rugged mountainous area, leading to a long history of land use conflicts.

Socio-Economic Profile

- The major Cranbrook TSA communities are Cranbrook, Kimberley, Fernie, Sparwood and Elkford. The current Cranbrook TSA population is estimated at 49 000, up from the 1991 Census count of 45 470.
- The following chart shows the breakdown of employment by major economic sector.

1991 Cranbrook TSA Employment by Industry Sector



- In 1991, the mining sector in the Cranbrook TSA accounted for 27% of employment and 21% of after-tax income. In August 1992, Westar Mining Ltd., operator of two of the five large coal mines in the Cranbrook TSA, declared bankruptcy and laid-off 1500 workers. The ex-Westar Mining operations re-opened in 1993, but with only 38% of the laid-off labour force. When we exclude the ex-Westar Mining employees who returned to work at local mines, 50% of the displaced workers continue to live in the Elk Valley but are still unemployed or in training, 34% re-located to other communities, 10% are no longer in the labour force and 6% started their own businesses.
- The lead and zinc Sullivan mine in Kimberley is the other major mining operation in the region and it has been operating since 1909. The mine employs 662 people, down from the 1980/81 peak of 1500 because of ore depletion. Cominco expects to close the mine by the year 2002.
- In 1991, the forest industry accounted for 13% of the Cranbrook TSA's employment and 10% of after-tax income. Crestbrook Forest Industries (CFI) dominates the forest industry sector in the region. Major wood product operations include the CFI sawmills at Cranbrook and Elko, the Galloway Lumber sawmill, the Kootenay Wood Preservers plant, and the Canada Cedar Pole operation. CFI also has a pulp mill in Skookumchuck, which is just outside the Cranbrook TSA, with most employees residing in Cranbrook or Kimberley.
- In 1991, the tourism sector accounted for 8% of employment and 3% of after-tax income. Major tourism/ recreation activities include touring, hunting, angling, golfing, skiing, snowmobiling and back country experiences like hiking and wildlife viewing. Cranbrook, Kimberley and the Fort Steele Historic Park provide the major focus of recreation/tourism development in the area.

- During the fall season, a large number of hunters arrive in the region from B.C., other provinces, the U.S. and overseas. Hunting is an important component of the tourism/recreation sector. Numerous big game species, such as black and grizzly bear, deer, elk, moose, mountain goat, mountain sheep and cougar attract hunters to the area.

First Nations¹

- The Cranbrook TSA is within the traditional tribal territory of the Ktunaxa Kinbasket Tribal Council and most First Nations people in the Cranbrook TSA are part of the Ktunaxa people. The St. Mary's Band and the Tobacco Plains Band are the two primary settlements in the Cranbrook TSA with both Bands having a combined population of approximately 575. First Nations account for 1.2% of the Cranbrook TSA population compared to 2.9% for all of B.C. Another three Ktunaxa Kinbasket member Bands are based outside the Cranbrook TSA but have territorial claims to the area.
- The forest sector generates between 20 and 25 person years (PYs) of employment for First Nations in the Cranbrook TSA, representing an estimated 7.5% of the local Aboriginal labour force. First Nations in the region are concerned that they do not receive an equitable share of the harvestable forest and of forest industry employment. They are also very concerned with the use of resources on their traditional territories and want to negotiate Treaties to define resource rights. The Ktunaxa Kinbasket Tribal Council has submitted a letter of intent with the governments of British Columbia and Canada to enter into comprehensive land claims to an area which includes the Cranbrook TSA.

TSA Forest Sector

- The Cranbrook TSA covers 1.48 million hectares, of which 29% is currently considered available for timber harvesting. Private lands cover some 13% of the Cranbrook TSA, of which a third (about 65 000 hectares or 4% of the total land area) are operable forest lands. In 1993, the private land harvest in the Cranbrook TSA was 375 000 cubic metres.
- The current Allowable Annual Cut (AAC) is 896 136 cubic metres². Crestbrook Forest Industries holds 71.5% of the AAC, Galloway Lumber Company holds 15.4%, the Small Business Forest Enterprise Program and other smaller licensees account for the other 13.1%.
- The major wood species harvested in the region include lodgepole pine, spruce, douglas fir, larch, balsam and hemlock. The area's ecosystems are prone to frequent and large forest fires. In addition, the TSA has experienced periodic mountain pine beetle infestations and

¹ The information presented in this section is based on discussions with Aboriginal community and government representatives as well as a review of the following documents: East Kootenay Land Use Plan, Commission on Resources and Environment (C.O.R.E.), October 1994; Report of the Native Forestry Task Force, November 1991; a report by the Council of Forest Industries titled A Proposed Aboriginal Forestry Strategy for the B.C. Forest Industry, March 1994.

² Includes the 1994 apportionment of 873 810 cubic metres and the TFL #13 of 27 200 cubic metres (Galloway and small business portion of TFL # 13), but excludes 4874 cubic metres of woodlot volume currently under tenure. Source: Ministry of Forests TSAR.

the AAC was increased by 235 000 cubic metres from 1990 to 1992 to control the infestation.

- The forest industry generates approximately 1.71 PYs in the Cranbrook TSA for each 1000 cubic metres harvested from the Cranbrook TSA. When extrapolated to the current TSA harvest of 896 136 cubic metres, this translates to 1531 PYs.
- At the provincial level, the forest industry generates approximately 2.51 PYs per 1000 cubic metres harvested (including the TSA impacts). This translates to 2245 PYs for the current Cranbrook TSA harvest.

Timber Harvest Forecasts

- All three forecasts involve a 29% drop from the current TSA harvest of 896 136 cubic metres to a Long Term Harvest Level (LTHL) of 633 000 cubic metres. The forecasts differ in the timing and magnitude of initial harvest reductions: under Scenario 1, there would be an immediate 10% drop in the current harvest level, Scenario 2 assumes an immediate 23% drop from the current harvest, and Scenario 3 assumes the status quo for the first decade. Each forecast achieves the LTHL in Decade 13 (130 years in the future).

Scenario 1 Harvest Forecast

- The effects of changes in harvest levels for Scenario 1 are summarized as follows.

Forest Related Economic Impacts - Scenario 1 (Includes Direct, Indirect and Induced Impacts)

	Current Harvest Level	Short Term		Medium Term	Long Term
		Decade 1	Decade 2	Decade 5	Decade 13
Harvest Level (000 m3)	896	807	726	559	633
TSA Economic Impacts:					
- Employment (PYs)	1531	1379	1241	955	1082
- Income (\$ millions)	\$43.6	\$39.3	\$35.4	\$27.2	\$30.8
Provincial Economic Impacts:					
- Employment (PYs)	2245	2022	1819	1401	1586
- Income (\$millions)	\$59.4	\$53.5	\$48.1	\$37.1	\$42.0
Government revenues (\$ millions):					
- Provincial	\$19.2	\$17.3	\$15.6	\$12.0	\$13.6
- Federal	13.5	12.2	10.9	8.4	9.5
- Total	\$32.7	\$29.5	\$26.5	\$20.4	\$23.1

➤ **Impacts of Scenario 1 on Other Economic Sectors:**

- No impacts on the public sector in the short-term as the population is not expected to drop significantly;
- No effects on mining or agriculture; and
- A mildly positive impact on tourism and recreation opportunities, assuming that access is not reduced significantly. About 14% of visitors to the region cited the outdoors as the main reason for visiting the region and it is this sector of the market which stands to be most affected by a reduced harvest. There will be no or very limited positive impact on the other 86% of the tourism sector.

- **Community Impacts:** Under Scenario 1, harvest reductions in Decade 1 would cause the loss of 152 local jobs increasing the unemployment level from the 1994 level of 9.9% to 10.6%. The harvest reduction under Scenario 1 would not likely be sufficiently large to lead to a mill closure in Decade 1. However, Cranbrook TSA sawmills rely heavily on private timber from B.C. and Alberta and any reductions in private timber volumes could amplify the TSA harvest reduction in Decade 1. A mill closure could result in an additional 150 PYs of direct processing jobs being lost.

Most of the job losses would likely occur in the Cranbrook region where the economy is more diversified, larger and somewhat stronger than in the Elk Valley. Also, the community infrastructure is well developed to handle the demands of displaced workers. However, the timing of the job losses would be important particularly since the Kimberley lead and zinc mine is expected to close in the next few years, leading to 662 direct job losses. Unemployment can affect the mental and physical health of individuals and adequate services will need to be put in place.

- **First Nations Impacts:** Reduced harvest levels are more consistent with Aboriginal environmental and cultural values. Most of the forestry related employment for First Nations is in silviculture and fire fighting and, therefore, is not directly tied to harvest levels. Declining harvest levels would increase the difficulty for First Nations to obtain forest licences within the Cranbrook TSA and may not be consistent with the economic objectives of some First Nations Bands.
- **Environmental Impacts:** Most of the environmental issues in the Cranbrook TSA concern the preservation and regeneration of preferred fish and wildlife habitat. To the extent that harvest levels would be lower than current levels, one could expect some positive impacts on the environment. However, to determine the impacts of timber harvesting Scenarios in more detail, data are required on the present and future rates and distribution of timber removals by forest age class and area within the TSA.

Scenario 2

- Scenario 2 assumes an immediate 23% decline in the harvest, or a reduction by 210 000 cubic metres from current harvest levels. Under this Scenario, 365 local jobs and 161 jobs elsewhere in B.C. would be lost. This scenario would likely result in the immediate closure of one of the three Cranbrook TSA sawmills. Significant negative impacts on the displaced workers, their families and the Cranbrook TSA communities would be evident.

Given the long term reductions in harvest levels modelled under all Scenarios, one of the

sawmills would likely eventually close. However, under Scenario 2, the closure would likely occur in Decade 1, thereby leaving limited, or no time for workers and the communities to plan for the lay-offs.

Scenario 3

- Under Scenario 3, the harvest level would remain at the current rate of 896 136 cubic metres for Decade 1, thereby helping secure the jobs at the existing mills for the next ten years. However, even under the current harvest level, there are significant wood supply shortages in the Cranbrook and neighbouring TSAs. There are therefore no guarantees that the three major Cranbrook TSA sawmills would all remain open in the future, even if the current TSA harvest level is maintained. Also, the prospect of eventual declines in harvest would likely influence current decisions regarding re-investment in plant and equipment.

1.0 Introduction

1.1 Background

The British Columbia Ministry of Forests is conducting a timber supply review to assist the Chief Forester in setting allowable annual cut (AAC) levels. Four documents are being prepared for each of the province's 36 Timber Supply Areas (TSAs):

- The **Timber Supply Review (TSR)** examines the amount of timber available for harvesting in timber supply areas (TSAs) if current management practices continue.
- The **Socio-Economic Analysis (SEA)** provides information on the social, environmental and economic implications of changing timber harvest levels.
- The **Discussion Paper** summarizes the technical information and provides a focus for public discussion of issues surrounding timber harvest levels.
- The fourth report describes the rationale behind the Chief Forester's AAC decision.

This report, the **Cranbrook TSA Socio-Economic Analysis**, describes the economy, physical environment and land use issues within the TSA as well as the socio-economic and environmental implications of changing the current timber harvest level.

1.2 Approach

This report follows a multiple accounts approach which recognizes the need to consider a variety of factors and a range of values when examining options for forest land management. The report reviews the effects of changing harvest levels on five major accounts, as follows:

Table 1: Multiple Accounts Methodology (1)

Accounts	Description
Economic Accounts:	
1. Employment	. Identifies the direct and indirect effects on employment and employment income for the TSA and for the province of British Columbia (short term and long term).
2. Government revenues	. Identifies impacts on government revenues derived from the timber resource.
Social/Environmental Implications:	
3. Community	. Reviews possible effects on local residents who lose their jobs and their families. Also, reviews pressures this may place on the existing social services infrastructure. . Discusses local community adaptive capacity and opportunities for mitigation.
4. First Nations	. Discusses possible effects on local Aboriginal communities and identifies potential areas of conflict with Aboriginal cultural values and political aspirations.
5. Environment	. Discusses possible effects on the forest ecosystem.
Note:	
(1) The first two accounts, employment and government revenues are economic in nature and the discussion is largely quantitative. The discussion for the other three accounts is primarily qualitative.	

The Ministry of Forests chose three timber harvesting forecasts³ from the Cranbrook TSR report as a basis for discussing the economic, social and environmental impacts of various forest management decisions (see chapter 3). These timber harvesting forecasts are not meant to suggest a preferred AAC level, nor will they be the only options considered in the final AAC determination.

Information for this report was collected over a three month period (August 1994 to October 1994) and is intended to provide an overview rather than a detailed profile of the area. The data collection involved discussions with a broad cross-section of individuals and organizations and a review of a wide range of published and unpublished data sources. We are comfortable with

³ A timber harvesting forecast represents the flow of potential timber harvests over time. It measures the maximum timber supply that can be realised over time for a specified land base and set of management assumptions. It is a result of forest planning models and is affected by the size and productivity of the land base, the current growing stock and management objectives, constraints and assumptions.

the accuracy of the information collected through interviews and other sources. However, we cannot be responsible for misrepresentations or lack of disclosure of information that could affect the findings of this analysis.

1.3 Report Structure

The report is organized into six chapters including this introductory chapter. Chapter two describes the environment, communities and the economy of the TSA. Chapter three reviews the timber harvesting situation and describes in detail the region's forest industry. Chapters four and five examine the impacts of changes in harvest levels. Chapter six presents a summary and a conclusion. Appendices include a glossary, list of contacts, references and a discussion of the methodology.

2.0 Profile of the Cranbrook TSA

2.1 Introduction

The Cranbrook TSA is one of seven TSAs in the Nelson Forest Region. It is located in the southeast corner of British Columbia, bordered by the B.C./Alberta boundary on the east side and the Canada/U.S.A. boundary on the south side. It comprises 1.48 million hectares of land area running north to the headwaters of the Elk River, Top of The World Provincial Park and the Purcell Wilderness Conservancy, and west to the Purcell mountain range. Major communities located within the Cranbrook TSA boundaries include Cranbrook, Fernie, Kimberley, Sparwood and Elkford.⁴

The regional economy of the Cranbrook TSA depends on the mining industry (coal mining in the Elk Valley and the lead and zinc Sullivan mine in Kimberley) and the forest industry. The public sector, the tourism industry, cattle ranching and agriculture also contribute to the region's economy.

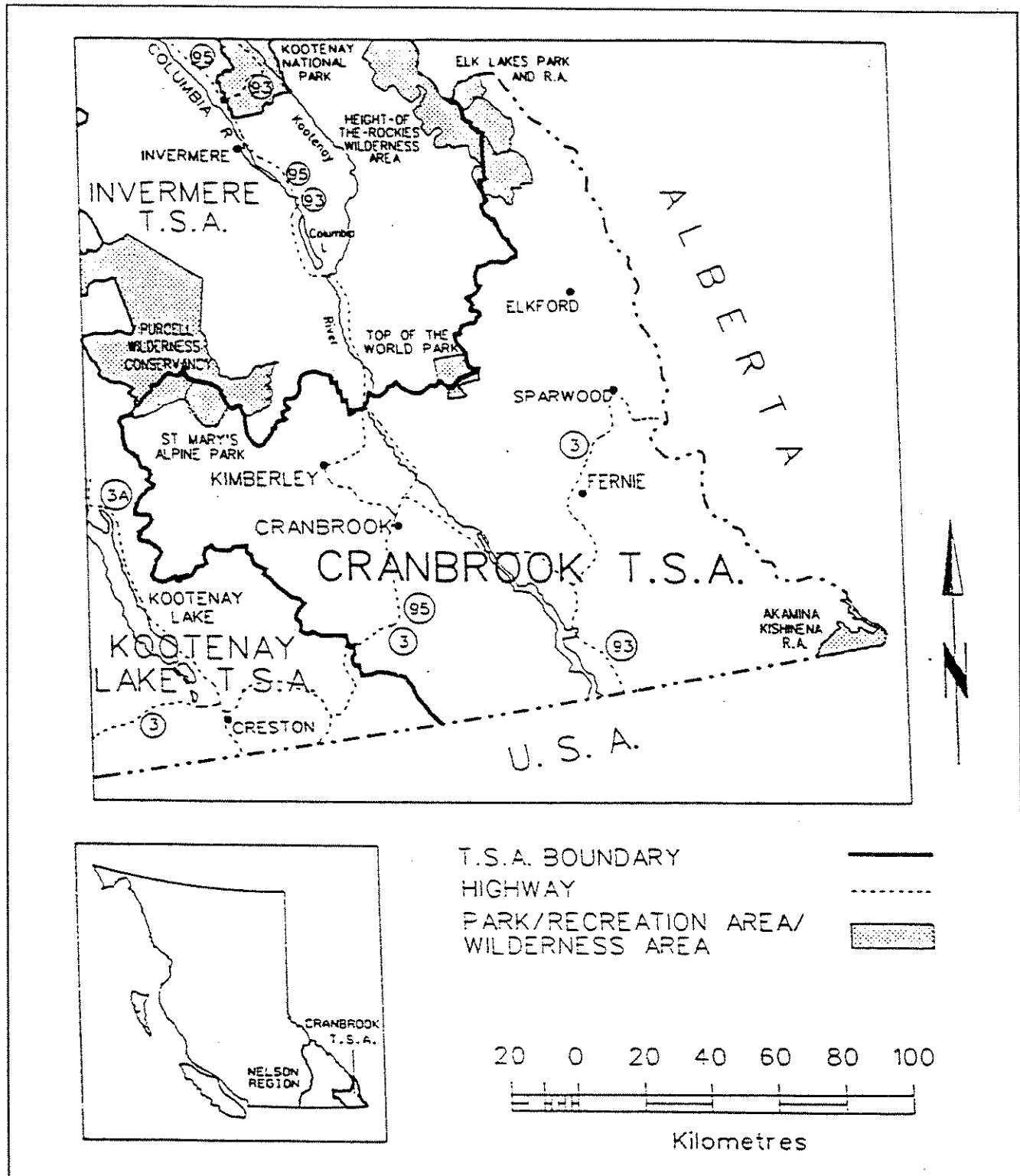
The major wood species harvested in the region include lodgepole pine, spruce, douglas fir, larch, balsam and hemlock. The ecosystems in the area are prone to frequent and large forest fires and regeneration rates tend to be slower than in most other TSAs in the province. In addition, the TSA has experienced periodic infestations of mountain pine beetle and the Allowable Annual Cut (AAC) was increased by 235 000 cubic metres from 1990 to 1992 to control the infestation. The focus of this report is the current AAC which is set at 896 136 cubic metres.⁵

The following map shows the boundaries of the Cranbrook TSA.

⁴ Throughout this report, we have chosen to use the term Cranbrook TSA interchangeably with Cranbrook Forest District (FD), even though the boundaries and area within the Cranbrook TSA are not exactly the same as those under the Cranbrook FD. For example, the Cranbrook TSA excludes portions of some of the provincial parks on the edge of the Cranbrook FD, and it excluded TFL #13 until 1994 when that TFL was amalgamated with the AAC. Please refer to the glossary in Appendix A for a definition of a TSA.

⁵ Includes the 1994 Apportionment of 873 810 cubic metres and TFL#13 of 27 200 cubic metres but excludes 4 874 cubic metres of woodlot volume currently under tenure. The Ministry of Forests has incorporated TFL#13 into the TSA land base and the AAC. Source: Ministry of Forests TSAR.

Figure 1: Map of the Cranbrook Timber Supply Area 1: Map of the Cranbrook Timber Supply Area



2.2 Environmental Setting

This section provides an environmental profile of the Cranbrook TSA and describes the major environmental issues and concerns in the area.

2.2.1 Ecological Profile

The Cranbrook TSA is comprised of two rugged mountain ranges separated by a broad, flat valley. The eastern portion of the district is dominated by the Rocky Mountain range and the western portion by the Purcell and McGillivray mountain ranges. The central portion of the district comprises the southern end of the Rocky Mountain Trench, which bisects the district from north to south with a width of up to twenty-seven kilometres. The elevation above sea level at the floor of the Trench is approximately 800 metres while the surrounding peaks range up to 3500 metres.

The primary drainage in the district is the Kootenay River flowing from north to south into Lake Koocanusa, a reservoir created in 1972 by the construction of the Libby Dam in Montana, U.S.A. The Kootenay River has several major tributaries in the Cranbrook TSA including:

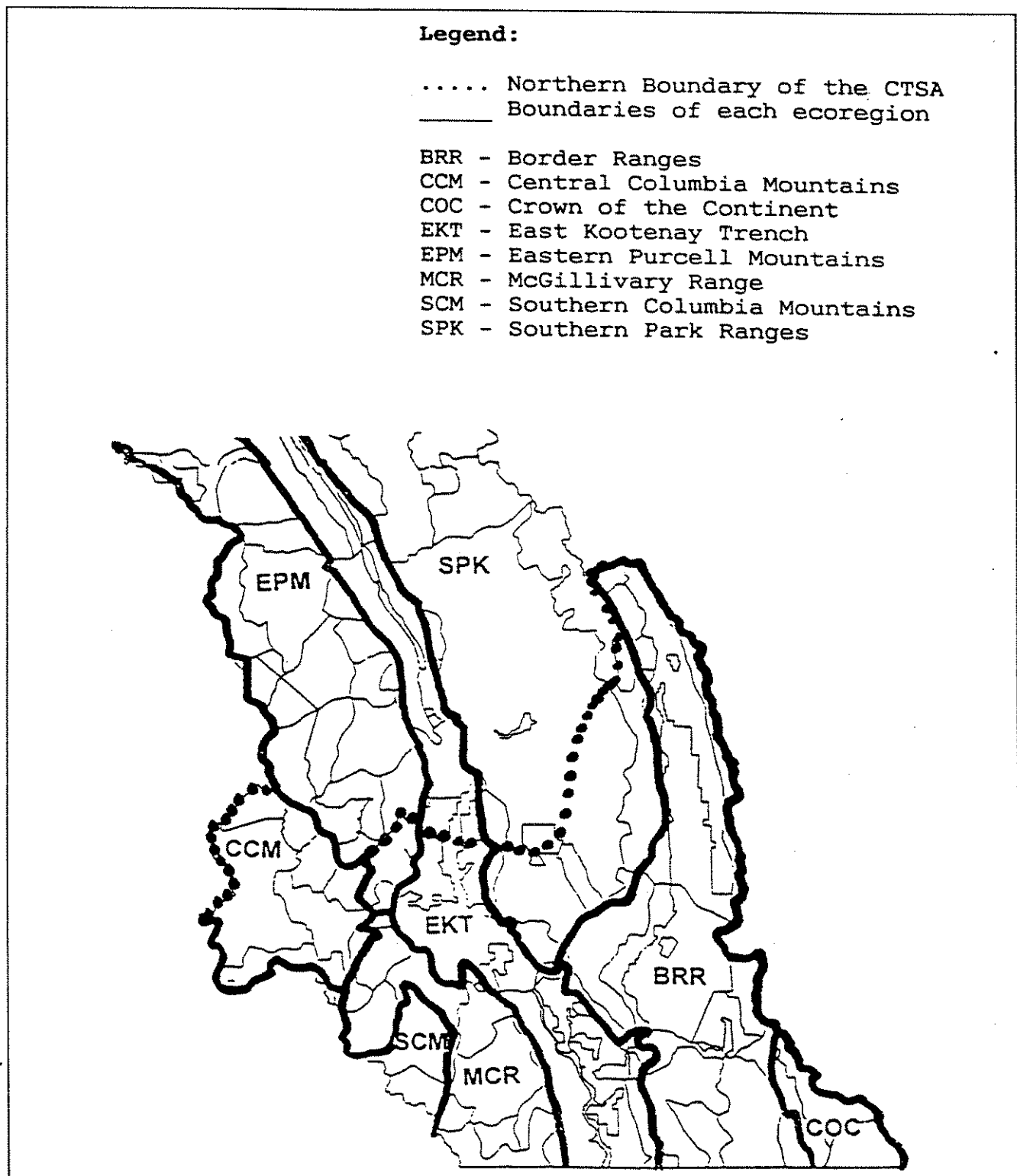
- St. Mary River which joins from the west near Fort Steele;
- Bull River which joins from the northeast just above the northern tip of Lake Koocanusa; and
- Elk River which flows onto Lake Koocanusa between Elko and Grasmere.

Other important drainages include the Moyie and Yahk Rivers which originate in the southwestern corner of the district and flow south into the U.S.A. and the Flathead River which originates in the southeastern corner of the district and also flows into the U.S.A. The natural lakes within the Cranbrook TSA tend to be small landlocked lakes with the exception of Moyie Lake which is approximately 12 kilometres (Km) long.

Four Ecoregions⁶ are represented in the Cranbrook TSA and these are further divided into eight Ecosections (Figure 2).

⁶ Ecoregions and ecosections are defined in the glossary at the end of the report. For this section of the report, we relied heavily on: Draft Report-Ecoregions of British Columbia, Third Edition; Dennis A. Demarchi, British Columbia Ministry of Environment, Lands and Parks (MELP), Wildlife Branch, Victoria, B.C., March 1993.

Figure 2: Map of the Cranbrook TSA Ecosections



The following section summarizes the major properties of the ecoregions and each ecosection of the Cranbrook TSA, from West to East.

The **Columbia Mountains and Highlands Ecoregion** is a mountainous area that rises from highlands and isolated ridges on the west and south to culminate in high, rugged, often ice-capped mountains along the north and eastern margin. This block of mountains intercepts eastward flowing precipitation, making these the wettest mountains in the interior of the province. It covers approximately 31% of the Cranbrook TSA and includes the following ecosections:

- The **Eastern Purcell Mountains Ecosection (EPM)** - This ecosection, comprising 2% of the Cranbrook TSA land area, is situated west of the Rocky Mountain Trench and to the north of the TSA with a small portion protruding down into the TSA northwest of Kimberley. It is characterized by high rugged alpine areas with high snow depth and dense coniferous forests. Minor areas with moderate snow depth occur adjacent to the East Kootenay Trench Ecosection. There are three biogeoclimatic zones⁷ represented in this ecosection in the Cranbrook TSA. In the main valleys and adjacent mountain slopes is the "Montane Spruce" zone, and at higher elevations in the smaller valleys and on the mountain slopes is the "Engelmann Spruce - Sub-Alpine Fir" zone. Above these forested zones is the "Alpine Tundra" zone.
- The **McGillivray Range Ecosection (MCR)** - This ecosection, comprising 15% of the Cranbrook TSA land area, is a physiographically lower, more subdued range situated south of the Eastern Purcell Mountains Ecosection and west of the East Kootenay Trench Ecosection. It is drier than other ecosections in the ecoregion, however snow depth still limits ungulate winter use. There are four biogeoclimatic zones in this area. The lower parts of the major valleys show "Interior Douglas-Fir" zones, while the higher valleys and mountain slopes exhibit "Montane Spruce" zones with extensive lodgepole pine, Douglas-fir and western larch forests. On the higher mountain slopes and mountain tops is the "Engelmann Spruce - Sub-Alpine Fir" zone, with a very minor representation of "Alpine Tundra" at the highest elevations in the northern portion of MCR ecosection.
- **Central Columbia Mountains Ecosection (CCM)** - A portion of this ecosection, comprising 11% of the Cranbrook TSA land area, lies in the northwest corner of the TSA to the west of the Eastern Purcell Mountains and McGillivray Range ecosections. It is dominated by the Purcell Mountains and includes St. Mary's Alpine Provincial Park and a portion of the Purcell Wilderness Conservancy Area. There are three biogeoclimatic zones in this ecosection starting with the "Interior Cedar - Hemlock" zones in the valley bottoms and lower mountain slopes, "Engelmann Spruce - Sub-Alpine Fir" zones on the upper mountain slopes, and finishing with extensive "Alpine Tundra" zones on the mountain tops.

⁷ Biogeoclimatic zones are altitude-based ecosystems showing distinct climate, vegetation, soils and wildlife attributes. While the Ecoregion classification system describes distinct physiographic areas, within each ecosection climatic zones occur where specific soils, plant and animal communities and aquatic systems develop because of the interaction of climate with the land surface and surficial materials. These zones are best defined within the Biogeoclimatic Ecosystem classification system.

- **Southern Columbia Mountains Ecoregion (SCM)** - A small portion of this ecoregion is represented in the southwest side of the Cranbrook TSA centered around Moyie Lake, comprising 3% of the TSA land area. Mountain peaks are lower in this ecoregion and there are three main biogeoclimatic zones represented. The valley bottoms and lower mountain slopes are dominated by "Interior Cedar - Hemlock" forests while the upper slopes generally show "Engelmann Spruce - Sub-Alpine Fir" zones. The higher peaks and ridges in the northern portion of the SCM ecoregion are covered by "Alpine Tundra" zones and in some areas fescue grasslands develop.

The **Southern Rocky Mountain Trench Ecoregion** is a long, wide, flat-bottomed valley that dissects the Southern Interior Mountains Ecoprovince. In the Cranbrook TSA, it includes the East Kootenay Trench Ecoregion:

- **East Kootenay Trench Ecoregion (EKT)** - This is the broadest and southernmost portion of the Rocky Mountain Trench, and bisects the Cranbrook TSA from north to south comprising 14% of its land area. Centered on the Kootenay River and Lake Koocanusa, this ecoregion contains the majority of the Cranbrook TSA human population and is the most developed of the TSA's eight ecoregions. The EKT ecoregion is comprised of a broad flat valley with two biogeoclimatic zones. The "Interior Douglas-Fir" zone dominates most of this ecoregion exhibiting broad areas of seral shrub/grasslands interspersed between scattered Douglas-fir and ponderosa pine. The "Ponderosa Pine" zone is represented near the northern and southern boundaries of the TSA. With lower snow depths, this ecoregion provides the primary ungulate winter range in the East Kootenay area.

The **Southern Rocky Mountains Ecoregion** has high, rugged mountains, usually with deep, narrow valleys and a continental type climate. In the Cranbrook TSA, it includes the Southern Park Ranges ecoregion:

- **Southern Park Ranges (SPK)** - This ecoregion, comprising 14% of the Cranbrook TSA land area, lies primarily to the north of the TSA but pushes down into the District between the East Kootenay Trench ecoregion to the west and the Border Ranges ecoregion to the east. It contains the Top Of The World Park and most of the Bull River valley. It is a rugged mountainous area which is dissected by long rivers forming moderately wide valleys. There are four biogeoclimatic zones represented in this ecoregion within the Cranbrook TSA: "Interior Cedar - Hemlock" at lower levels, "Engelmann Spruce - Sub-Alpine Fir" and "Montane Spruce" on the upper slopes, and "Alpine Tundra" on the peaks and high ridges.

The **Northern Continental Divide Ecoregion** is an area of wide valleys and rounded mountains interspersed with higher ridges of less erodible bedrock. It includes the following ecoregions:

- **Border Ranges Ecoregion (BRR)** - This ecoregion comprises 37% of the Cranbrook TSA land area, and covers most of the TSA's eastern boundary. It consists of wide valleys, including the Elk River Valley, and subdued mountains which only occasionally rise to steep, rugged ridges. There are four biogeoclimatic zones in this ecoregion with "Interior Cedar-Hemlock" and "Montane Spruce" zones in the valleys and lower mountain slopes, widespread "Engelmann Spruce - Sub-Alpine Fir" zones on the upper mountain slopes and "Alpine Tundra" zones on the mountain peaks and ridges. This ecoregion provides ungulate winter range in some alpine areas where wind sweeping and steep southerly aspects

reduce snow depths.

- **Crown of the Continent Ecosection (COC)** - This ecosection, comprising 4% of the Cranbrook TSA land area, is located in the southeast corner of the TSA and includes the Akamina-Kishinena Provincial Recreation Area. It is a mountainous area that rises abruptly from the surrounding plains, basins and valleys. "Engelmann Spruce - Sub-Alpine Fir" is the predominant biogeoclimatic zone, with smaller representations of "Montane Spruce" and "Alpine Tundra".

Currently, five substantial (over 1000 ha) areas are protected from forest harvesting within the Cranbrook TSA. These include the Elk Lakes Provincial Park and adjacent Recreation Area, a portion of the Top of the World Provincial Park, St. Mary's Alpine Provincial Park, a portion of the Purcell Wilderness Conservancy, and the Akamina-Kishinena Recreation Area. In addition to these larger areas, several smaller Provincial Parks, ecological reserves bring the size of the protected land base to 55 827 hectares, or approximately 4% of the total land base in the TSA. The Height of the Rockies Wilderness Area is a Forest Service wilderness area which is currently excluded from the operable forest land base and represents an additional 1% of the total Cranbrook TSA land base. Much of the protected areas are in steep sloped, high elevation "Engelmann Spruce - Sub-Alpine Fir" or "Alpine Tundra" biogeoclimatic zones which do not contain merchantable forests.

There are four remaining "undeveloped" watersheds of over 5000 hectares in the Cranbrook TSA.⁸ These are Baribeau Creek, Mark Creek, North Galbraith Creek and Wigwam River.

Climate

The East Kootenay region has a continental climate that is the result of interactions between weather systems, solar radiation and topography. Prevailing westerly winds and dry maritime polar air masses are the most influential. High-pressure systems over the north-central United States occasionally pump warm air into the region during the summer. The winters are dominated by surges of Arctic air bringing cold weather and deep valley inversions. These inversions cause the mid-elevations of the lower Kootenay River valley to be considerably warmer than sites at lower elevations.

The major drainage systems and intervening topography of the East Kootenay region run perpendicular to prevailing winds. Precipitation patterns reflect the rising, sinking and drying of the maritime polar air mass as it traverses successive mountain ranges in the region, and therefore precipitation generally decreases from north to south and east to west.

⁸ From An Inventory of Undeveloped Watersheds in British Columbia, Recreation Branch, Ministry of Forests, Victoria, B.C., 1992. An undeveloped watershed is defined as "a watershed in which no more than two percent of the area, or, in the case of watersheds greater than 10 000 hectares, less than 200 hectares, have been developed by human activity".

The East Kootenay Trench ecosection is under a strong rainshadow leeward of the Columbia Mountains. This enhances the sunny, warm, dry conditions which characterize the summer climate.

Vegetation

The six biogeoclimatic zones represented in the Cranbrook TSA exhibit the following vegetation characteristics:

- **Interior Cedar Hemlock.** The rare climax sites in this zone have stands of western red cedar, hybrid white spruce and sub-alpine fir (balsam). Due to an extensive history of wildfires, seral stands of lodgepole pine, Douglas-fir and western larch are common. These stands have an extensive history of mountain pine beetle infestation. Falsebox, black huckleberry and Utah honeysuckle are common shrubs. Typical herbs are twinflower, bunchberry, queen's cup and prince's pine, with a common floor of red-stemmed feathermoss.
- **Interior Douglas-fir.** Although Douglas-fir is the climax forest in this zone, widespread fires and a history of extensive grazing have created transitional woodlands and open grasslands. In valley bottoms, ponderosa pine is the main seral conifer but gives way to lodgepole pine and western larch at higher and moister sites. Saskatoon, redstem ceanothus, antelope brush, and grasses including Idaho fescue, junegrass, Kentucky bluegrass, needle grasses and cheatgrass are found in persistent shrub-grasslands. The following shrubs are common in the forests: rose, saskatoon, soopalalie, and birch-leaved spirea. Pinegrass and kinnikinnik are also common. Floodplains may have black cottonwood, spruce, red-osier dogwood, false Solomon's-seal and horsetails.
- **Montane Spruce.** Climax sites have stands of hybrid white spruce and sub-alpine fir (balsam) with minor amounts of Douglas-fir. Widespread wildfires have created extensive seral stands of lodgepole pine. Mountain pine beetle infestations are common, resulting in extensive salvage logging in areas such as the Flathead River drainage. False azalea, Utah honeysuckle and soopolallie are common shrubs, with herbal groundcover of grouseberry, twinflower, pinegrass and heart-leaved arnica.
- **Englemann Spruce-Sub-Alpine Fir.** The common seral conifers in this zone are spruce and subalpine fir. Spruce is usually the older species dominating the canopy of mature stands, while sub-alpine fir is prevalent in the understory, at high elevations and in wetter areas. Lodgepole pine frequently dominates the landscape in areas of past fires and in drier areas of the zone. Douglas-fir, pine and larch are also common. Common shrubs and herbs of the understorey at lower levels include Utah honeysuckle, soopalalie, saskatoon, birch-leaved spirea, false azalea, pinegrass, bunchberry and mosses. Widespread fires have resulted in large stands of lodgepole pine. At higher levels the understories support white-flowered rhododendron, grouseberry, false azalea, thimbleberry, queen's cup, bunchberry, pinegrass and mosses. Moist sites may have horsetails and meadowrue. Avalanche chutes with dense growths of Sitka alder and herbaceous cover are common. Forest cover becomes discontinuous at higher elevations and in the Fording Valley gives way to rough fescue grasslands that occupy south-facing slopes and ridges. Alpine meadows are common and whitebark pine and alpine larch may

be found at the timberline.

- **Ponderosa Pine.** Open stands of ponderosa pine and Douglas-fir with an understorey of predominantly bluebunch wheatgrass are typical of this zone. Common shrubs are saskatoon, prairie rose, and rosy pussytoes. The hot, dry summers in this zone have contributed to extensive wildfires. The excellent rangelands in this zone have supported a history of intensive domestic grazing. Fire suppression is leading to forest ingrowth and noxious weeds, which is diminishing the quantity and quality of rangeland.
- **Alpine Tundra.** These zones are dominated by rock, ice, and pockets of grass-sedge meadows and heath vegetation.

Wildlife

The Cranbrook TSA is unique in North America in the density and diversity of ungulate populations, other large mammals, small mammals and birds. This wealth of wildlife values is made possible by the great variety of habitat types available in the region. Ungulate species include Mule Deer, White-tailed Deer, Rocky Mountain Elk, Moose, Mountain Goat, Rocky Mountain Bighorn Sheep and Caribou. Other large mammals represented are Black Bear, Grizzly Bear, Gray Wolf, Cougar and Coyote. Smaller mammals in the district include Lynx, Wolverine, Fisher, Badger, Beaver, Marten and several species of Squirrels and Chipmunks.

The Southern Interior Mountains Ecoprovince, which includes the Cranbrook TSA, supports 70% of the bird species known to occur in British Columbia and 62% of those birds that breed in the province. Most of these bird species are found in the Cranbrook TSA, including many threatened or vulnerable species (Table 2). This concentration of bird species exemplifies the tremendous diversity of wildlife habitats in the East Kootenay area. Major game bird species in the Cranbrook TSA include varieties of Grouse, Pheasant (introduced, not hunted), Wild Turkey (introduced), Common Snipe, White-tailed Ptarmigan, Mourning Dove, as well as several species of waterfowl.

The Cranbrook TSA contains a wide variety of wildlife species considered "at risk" within British Columbia. Table 2 on the following page contains the "red and blue listed" wildlife species in the TSA.⁹

⁹ Please refer to glossary in Appendix A for a definition of red and blue listed species.

Table 2: Red and Blue Listed Wildlife Species in the Cranbrook TSA

Category	Name	Status	Key Habitat Types
Mammals	"Western" Wolverine	Blue	Open areas, softer soils Undisturbed forests, riparian
	Badger	Blue	
	Grizzly Bear	Blue	
	"Rocky Mtn." Bighorn Sheep	Blue	
	Fisher	Blue	Old growth forest Near and above timberline Timberline meadows, trees
	"Columbia" Red-Tailed Chipmunk	Red	
	"Rocky Mountain" Least Chipmunk	Blue	
	"Rocky Mountain" Red-Tailed Chipmunk	Red	
	"Selkirk" Least Chipmunk	Red	Old growth forest Forests, caves, old mines cool moist forest, wet subalp. Dry shrublands, caves, crev. Open areas, shade trees
	Caribou	Blue	
	Northern Long-eared Myotis	Red	
	"Rocky Mtn" Southern Red-backed Vole	Blue	
	Townsend's Big-eared Bat	Blue	
Southern Red Bat	Red		
Birds	Western Grebe	Red	Lakes with stable water level
	American White Pelican	Red	
	American Bittern	Blue	Marshes, protected lakes Old growth riparian
	Great Blue Heron	Blue	
	Trumpeter Swan	Blue	
	Oldsquaw & Turkey Vulture	Blue	
	Bald Eagle	Blue	Old growth mixed forests
	Swainson's & Rough-legged Hawk	Blue	
	American Peregrine Falcon	Red	
	Prairie Falcon	Red	
	Lesser Golden-Plover & California Gull	Blue	Shrub/grass steppe, open fst
	"MacFarlane's" Western Screech Owl	Blue	
	Flammulated & Short-eared Owl	Blue	
	Lewis' Woodpecker	Blue	
	"Rocky Mtn." Williamson's Sapsucker	Red	Grass steppe or pasture
	Bobolink & Surf Scoter	Blue	
	"Columbia" Sharp-tailed Grouse	Blue	
	Sandhill Crane & Grey Flycatcher	Blue	
	Upland Sandpiper	Red	Ponds, marsh, muddy shore
	Long-billed Curlew	Blue	
	Red-necked Phalarope	Blue	
	Short-billed Dowitcher	Blue	
	White-throated Swift	Blue	
	Black-chinned Hummingbird	Blue	
	"Sagebrush" Brewer's Sparrow	Red	
	American Avocet	Blue	
Reptiles	Coeur d'Alene Salamander	Red	Cool, moist riparian
	Painted Turtle & Rubber Boa	Blue	
Source:	Draft List of Red, Blue and Selected Yellow Species by Ecosection; Wildlife Habitat Areas Working Group, Habitat Protection Branch, B.C. MOELP, Victoria, 1994.		

Fish

The Cranbrook TSA supports a high value sport fishery in its lakes and river systems. The primary angling species are cutthroat trout, bull trout, Rocky Mountain whitefish and kokanee. These species are present throughout the main river systems in the district including the Elk, Bull, St. Mary, Wigwam and Flathead rivers. The populations of cutthroat trout had recently been in decline until changing angling regulations introduced in 1985 led to a resurgence of the stock over the past 5 years. The Wigwam and Flathead river systems are major spawning habitats for bull trout, which tend to be very sensitive to changes in water flow and water quality. Most of the lakes in the Cranbrook TSA are landlocked lakes which are stocked annually.

Water Resources

Approximately 150 domestic watersheds in the Cranbrook TSA provide fresh water supplies for human consumption or use. These range from small, remote streams supplying a single user to large community water sheds such as Gold Creek and Joseph Creek which supply Cranbrook, Matthew Creek and Mark Creek which supply Kimberley/Marysville, and Fairy Creek which supplies Fernie. In addition to consumptive uses, the high fish values in the Cranbrook TSA are dependent on the quality, quantity and flow timing of fresh water. Several factors related to human settlement, industrial development and resource extraction have led to an accumulating decline in water quality from natural levels, as well as substantial disruptions to flow patterns in the streams, creeks, rivers and lake levels in the East Kootenay area over the last century. More effort has gone into preserving water quality over the past few decades, which has slowed, or in some cases reversed this declining trend. Enhanced management of domestic watersheds is now an accepted principle in forest harvest planning, and the new Forest Practices Code will further protect domestic water quality.

2.2.2 Issues and Concerns

The great wealth and diversity of natural resources in the Cranbrook TSA increases the complexity of land use management. Values for forestry, mining, agriculture, energy, tourism, hunting, fishing, outdoor recreation, cultural heritage, ecosystem preservation and human settlement are all very high throughout the region. This creates one of the most complex arrays of potentially complementary and competing land uses in British Columbia. All of these activities and interests tend to concentrate in the valleys and trenches of this generally rugged mountainous area, leading to a long history of land use conflicts.

Most of the major environmental issues in the Cranbrook TSA concern the preservation and regeneration of preferred fish and wildlife habitat. The following paragraphs describe the key

environmental issues in the Cranbrook TSA:

- **Ungulate Winter Range.** During the winter months most of the ungulate populations in the Cranbrook TSA concentrate on low elevation, low snow depth habitats in the East Kootenay Trench ecosection. The principle attributes which influence foraging opportunities and subsequently the condition of ungulates on those winter ranges are slope, aspect, snow depth and shelter. Substantial forest stands provide three types of required shelter to over-wintering ungulates: snow interception cover¹⁰, thermal cover and security cover. Mature stands with interlocking crowns are especially crucial for snow interception during periods of high snowfall or in high snow accumulation areas like the Elk Valley. To enable wintering ungulates the opportunity to adapt to changing weather conditions, retention of diversified habitat types with good connectivity are essential on winter ranges.

Access development and use, timber harvesting and rangeland management practices are the three principle factors influencing the quantity and quality of suitable winter range habitat in the Cranbrook TSA.

- **Caribou.** Woodland caribou is a 'blue listed' species which has been identified as being "old growth dependent". Critical elements of caribou winter range habitat include forest cover for snow interception and security, with the addition of old growth forest arboreal lichen as forage. The South Purcells caribou herd, which utilizes habitats in the western portion of the Cranbrook TSA, has dwindled to approximately 100 animals¹¹ and is largely isolated from larger populations farther north. There is concern about the long term viability of this herd if current forest land management practices continue.
- **Grizzly Bears.** The Grizzly bear is a "blue listed" species in the province, but is represented by some large and relatively stable populations in the Cranbrook TSA. Internationally significant populations are found in the Flathead River area with smaller populations in the Gilnockie Creek, Upper Elk Valley and other less developed areas of the Cranbrook TSA.

Grizzly Bears require large areas of uninhabited wildland in which to survive. They are seriously impacted by road access into wildland areas, fire suppression and silviculture practices which reduce the availability of understorey forage species. While the grizzly bear populations have been relatively stable in the Cranbrook TSA there is concern that continued development of wilderness areas is rapidly diminishing the amount of suitable grizzly bear habitat in the district.

- **Furbearers.** The preferred habitat of many furbearing species is riparian zones within or near mature and old growth forests. The removal of mature forest cover and coarse woody debris in these areas through forest harvesting and silviculture activities diminishes the availability of preferred habitat for many furbearing species. There is concern that continuation of these practices will lead to further declines in the populations of these species.
- **Fish.** The major issues facing the fishery in the Cranbrook TSA regarding timber harvesting

¹⁰ The snow interception capability of a forest stand is heavily influenced by stand structure, age and species composition. For example, an age class 6, Douglas-fir stand over 10 meters in height with high crown closure will provide a high degree of snow interception capability, as well as litterfall forage. Consequently, these habitat types are a very important winter range component.

¹¹ Source: Trevor Kinley, Sylvan Consulting.

are the disruption of riparian areas, access development, stream blockage and silting, and extreme fluctuations in water flows and temperatures caused by tree removal. New riparian management guidelines being developed as part of the new Forest Practices Code will address many of these issues. The rate of timber harvesting in watersheds and its effect on peak water flows in the streams and rivers remains a concern in the Cranbrook TSA.

- **Riparian Habitats.** Riparian areas provide a rich diversity of food, water and cover to a wide variety of wildlife species. Consequently, these areas tend to be more intensively used by wildlife than any other habitat type. These areas are very easily disturbed and detrimentally altered by most forms of human industry including timber harvesting, domestic livestock grazing, road construction, silviculture, pesticide use, mining and hydro electric power generation.

Degradation of riparian areas impacts not only the wildlife habitat, but can also have seriously negative impacts on water quality and fisheries in associated water bodies. In the Cranbrook TSA, approximately 20% of the harvestable land base is comprised of riparian management zones. Environmentalists are concerned that these areas could be severely impacted by timber harvesting and silvicultural practises. The implementation of the new Forest Practices Code should substantially alleviate these concerns.

- **Connectivity.** The rugged terrain in the Cranbrook TSA, with its natural communication and migration barriers, accentuates the need for habitat connectivity management in the area. Several of the wildlife species in the district require movement between various seasonal habitats, and as these habitats become further fragmented through development activities on adjacent lands, it is crucial that these species have migration corridors that provide appropriate thermal and security cover. It is also important that similar regional habitats be connected to each other by migration corridors to provide for genetic diversity within a species population. The continuation of current forest management practices, as well as mining, road construction, agriculture, urban expansion and utilities development will likely lead to connectivity problems in many areas of the District.
- **Biodiversity.** A major distinguishing characteristic of the Cranbrook TSA is the remarkable diversity of wildlife species, made possible by the great diversity of habitats available. The term biodiversity addresses not only the diversity of plant and animal species, but also the diversity of the gene pool within each species and the diversity of ecosystems that maintain this variety. Current timber harvesting and silviculture practices radically alter the ecosystems in which harvesting occurs, and lead to a general decline in biodiversity.

One of the major goals of the "Protected Areas Strategy for British Columbia"¹² is to protect viable samples of each ecosystem throughout the province, using the "ecosection" and "biogeoclimatic zone" definitions to identify individual ecosystems. The Border Ranges, East Kootenay Trench and McGillivray Range ecosections, which are entirely or substantially within the Cranbrook TSA, have been identified as having very little protected area. The protected areas in the other ecosections with representation in the Cranbrook TSA tend to over represent the higher elevation biogeoclimatic zones and under-represent the lower ones. It is feared that the continuation of current forest management practices will eliminate opportunities to protect some ecosection/biogeoclimatic zone combinations.

¹² Please refer to glossary in Appendix A for a description of the B.C. Protected Area Strategy (PAS).

- **Access Development.** One of the major environmental impacts of timber harvesting activities is the development of extensive logging road networks into wilderness areas. In addition to the immediate impacts of the construction and use of these roads on landscape and water resources, more subtle long term impacts can be far more devastating to wildlife habitats. These include increased exposure to hunters and trappers, increased harassment from motorized recreational vehicles and people, and infiltration of noxious weeds into forage supplies.
- **Forest Encroachment/Fire Suppression.** Prior to the commencement of timber harvesting activities in the early 1900s much of the East Kootenay Trench was covered by well spaced stands of large trees and open grasslands. Regular wildfires helped to maintain this regime by keeping ingrowth to a minimum. Timber harvesting and several major wildfires led to a large increase in open grasslands and the forest cover was reduced to only scattered trees. These grasslands supported very large wildlife populations and attracted cattle ranchers to the area.

Over the past 40 years, fire suppression has allowed forests and undergrowth to encroach on much of the rangeland, putting stress on the remaining diminishing grasslands to support the established wildlife and domestic cattle populations. In addition, the forests that have regenerated are generally poor quality thicket stands with very little commercial value. The grazing lands are now over stressed and declining in quality, and the resulting competition for forage has been the focus of continual land use conflicts between wildlife proponents and cattle ranchers.

- **Libby Dam/Koocanusa Reservoir.** The construction of the Libby Dam in Montana, U.S.A. in 1972 created the Koocanusa reservoir by flooding the entire floodplain of the Kootenay River as well as substantial areas of upland. This has had a substantial influence on wildlife in the area (particularly white-tailed deer) through alienation of winter habitat and put additional pressure on the remaining land base in the East Kootenay Trench to support competing uses.
- **Proposed Additional Protected Areas.** Several areas in the Cranbrook TSA have been identified as providing especially high environmental, cultural and recreational values for which protection from further development may be desirable. Table 3 lists each area, the number of hectares and ranking attributed under PAS, and the proposed C.O.R.E. designation.

Table 3: List of Proposed Additional Protected Areas

Reference Name	Area (Hectares)	Ecosection	Best P.A.S. Ranking	C.O.R.E. Proposed Designation
Akamina	7 659	COC	1	Protected
Sage Creek	34 914	BRR, COC	23	Special Management/Integrated
Flathead River	56 134	BRR, COC	26	Special Management/Integrated
Wigwam	29 280	BRR	18	Special management
Galton/Bighorn	27 306	BRR, EKT	40/43	Integrated
Elko/Morrissey	n/a	EKT, BRR	101	Integrated/Private Land
Iron/Lizzard	37 545	BRR, SPK	48	Integrated
North Galbraith	10 824	SPK	17	Special Management/Integrated
Steeple	n/a	EKT, SPK, BRR	100	Special Management/Integrated
Gilnockie	34 774	MCR	21	Protected/Special Management/Integrated
<p>n/a: not readily available</p> <p>Source: These areas have been identified in the East Kootenay C.O.R.E. Table reports, the Kootenay Region Best Protected Areas Report and in discussions with Ministry of Forests and Ministry of Environment staff as well as community representatives.</p>				

2.3 Socio-Economic Overview

This section describes the population of the area, its communities and the economic profile of the region.

2.3.1 Population and Communities

The Cranbrook TSA population in 1991 was 45 470, down 3% from the 1981 level. The major communities in the district are Cranbrook, Kimberley, Fernie, Sparwood and Elkford. As shown on the following graph and on Table 4, between 1981 and 1991, the population dropped in every community except Cranbrook where it increased by 3% and in Sparwood where it remained essentially the same.

Figure 3 Cranbrook TSA Community Population Census Estimates

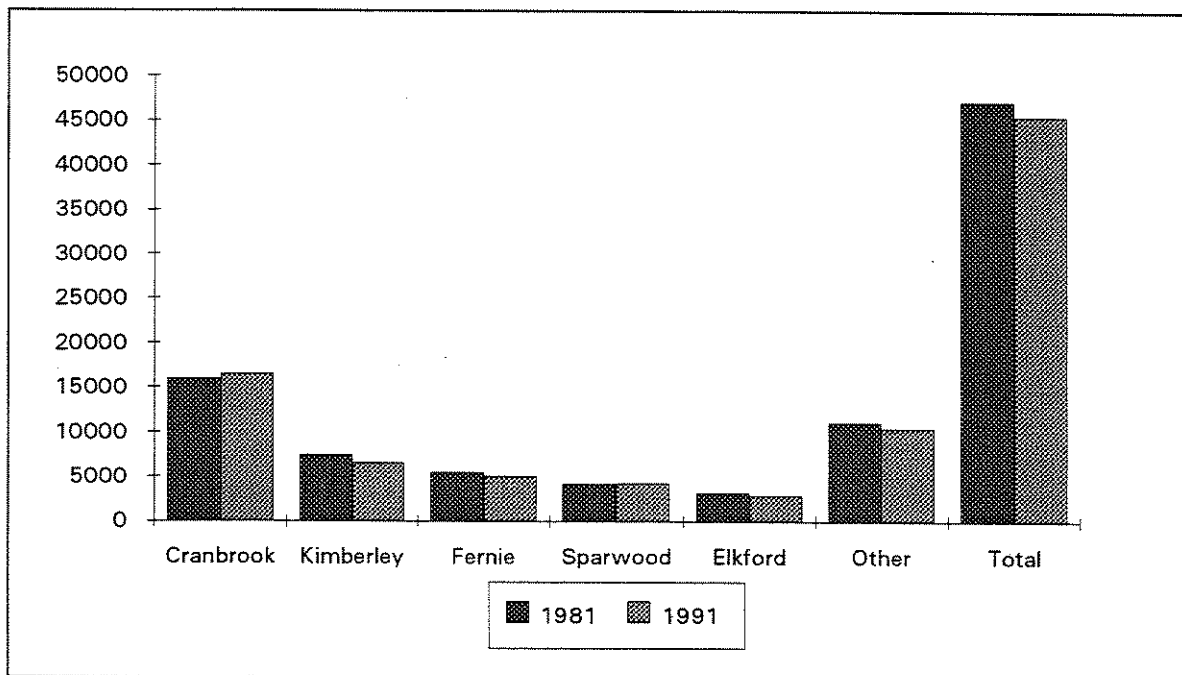


Table 4: Cranbrook TSA Population by Community

	Population, Census Years - 1971 to 1991					Percentage Change		
	1971	1976	1981	1986	1991	71-91	81-91	86-91
Cran./Kimber.:								
- Cranbrook	12 000	13 510	15 941	15 893	16 447	37%	3%	3%
- Kimberley	7641	7111	7375	6732	6531	-15%	-11%	-3%
- Census B	4226	6008	6913	7118	6914	64%	0	-3%
Sub-total	23 867	26 629	30 229	29 743	29 892	25%	-1%	0.5%
Elk Valley:								
- Fernie	4422	4608	5444	5188	5012	13%	-8%	-3%
- Sparwood	2990	4050	4161	4540	4211	41%	1%	-7%
- Elkford (1)	-	1873	3126	3187	2846	-	-9%	-11%
- Census C	3271	3563	3986	3758	3433	5%	-14%	-9%
Sub-total	10 683	14 094	16 717	16 673	15 502	45%	-7%	-7%
Other (2)			164	134	76	n/a	n/a	n/a
Total	34 550	40 723	47 110	46 550	45 470	32%	-3%	-2%
Notes: n/a: not applicable (1) Elkford was incorporated in 1971. (2) Other includes other rural/boundary adjustments.								
Source: Statistics Canada, Census data. Data extracted from <u>East Kootenay Regional CORE Table Report, Appendix A</u> and BC Stats, Victoria.								

Table 4 shows that the Cranbrook TSA population dropped by 3% between 1981 and 1991. This compares to a 19% increase for all of B.C. for the same period (see Table 8). The change in population by community was as follows:

- Kimberley lost approximately 850 residents largely because of the drop in employment levels at the Cominco Sullivan mine, the largest employer of that community. About 800 jobs were lost between 1981 and 1991.
- The Elk Valley population dropped by 7% between 1981 and 1991, representing approximately 1200 residents.
- The Cranbrook population increased by approximately 500 between 1981 and 1991, counteracting some of the drop experienced in Kimberley and the Elk Valley.

The 1991 Census is the most recent formal measure of the Cranbrook TSA population. However, based on discussions with community representatives, the 1994 TSA population was approximately 49 000, a 7% increase since 1991:

- The Cranbrook population has likely increased by approximately 2000 since the 1991

Census, bringing the total to 18 500.¹³ The Kimberley area has also seen an increase of people moving into the area. This influx into the Cranbrook/Kimberley region is creating a significant increase in construction activity.

- In the Elk Valley, the current population is approximately the same as it was in 1991. Population likely dropped in 1992 and 1993 because of severe employment losses which occurred in 1992 in the mining sector. At the time, about one third of the mining employees who lost their jobs permanently left the area. However, there has been an influx of semi-retirees and other individuals who are moving to the Elk Valley because of the low cost of living, the lifestyle and the environment. This is reversing the downward population trend which prevailed in the Elk Valley throughout the 1980s and early 1990s.

The history and economic profile of the major Cranbrook TSA communities are described below¹⁴:

- **Cranbrook.** In post-European contact times, development of the region began in the 1860s with the discovery of gold in the East Kootenays. Shortly before the turn of the Century, the Canadian Pacific Railway established a railway divisional point at the current Cranbrook location. The city was incorporated in 1905. By 1921, the Cranbrook population reached 2725. It then grew at about 3% a year until the 1960s when it doubled from about 5500 to 12 000 people. This fast growth was largely attributed to growth in the forest industry and the building of a pulp mill in Skookumchuck, about 50 km north of Cranbrook.

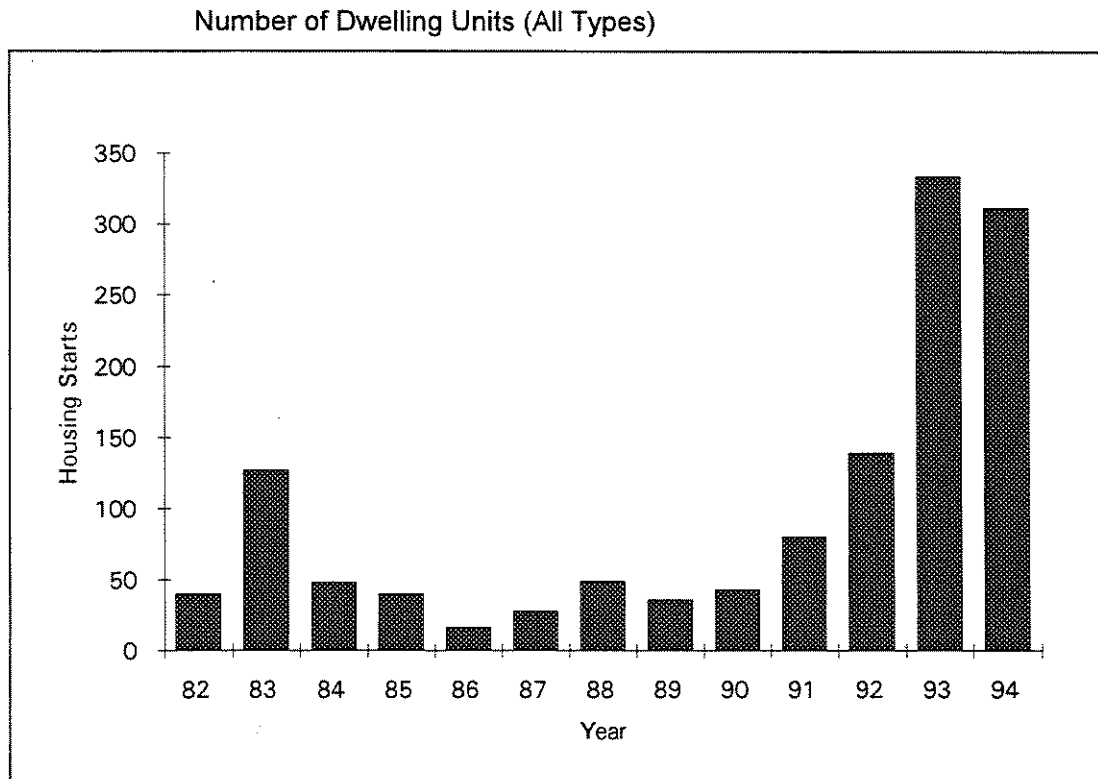
The economy of Cranbrook is closely tied to the forest industry, but it also depends heavily on the public sector. The city acts as the supply and service centre for the East Kootenay region and is a major stop-over point for tourists visiting the East Kootenays. Key attractions include Cranbrook's international railway museum and a wildlife museum.

Cranbrook's economy was affected by the recession in the early and mid 1980s. The significant capital investments at the Skookumchuck pulp mill in the late 1980s and early 1990s have helped the local economy. However, the influx of people moving into the area primarily from Alberta, the Okanagan and other B.C. regions, is now largely responsible for the acceleration in construction activity currently being experienced in the Cranbrook region.

The following graph shows residential housing starts in the City of Cranbrook between 1982 and 1994.

¹³ Source: Cranbrook and the Elk Valley Market Review, Canada Employment Centres of Cranbrook, Creston and Fernie, January to March 1994.

¹⁴ The material for this section was developed from various reports prepared by the East Kootenay Regional District, various tourism promotion brochures, the East Kootenay CORE final report and the Elk Valley Economic Development Implementation Strategy (see Appendix C for exact references).

Figure 4: City of Cranbrook Housing Starts (all types) , 1982-1994

Source: City of Cranbrook.

As shown on the above graph, housing starts for the City of Cranbrook more than doubled between 1992 and 1993 and have remained at very high levels in 1994. The improving economy of the Cranbrook region has also resulted in a lower residential vacancy rate and in higher housing prices:

- the residential vacancy rate was as high as 20.8% in 1987 but it has been between 1% and 2% since 1990; and
- housing prices for the first quarter of 1994 averaged \$120 905 for a single family detached house, an increase of 24% since the first quarter of 1993 and a 33% increase since the third quarter of 1993.

Major employers located in the City of Cranbrook are listed in Table 5.

Table 5: Major Cranbrook Employers

	Estimated Number of Person Years
Government:	
- Province of British Columbia	308
- City of Cranbrook	120
- Government of Canada	49
Other public sector:	
- Cranbrook School District	525
- Cranbrook Regional Hospital	280
- East Kootenay Community College	150
- Cranbrook Home Support Services	86
- RCMP	77
- BC Hydro	60
- Canada Post	32
Sub-total	1687
Major industrial employers:	
- Crestbrook Forest Industries (1)	659
- Canadian Pacific Railway	245
- Kootenay Wood Preservers	50
- Major industrial suppliers (2)	132
Sub-total	1086
Other Major Employers:	
- Fort Steele Heritage Town (in Fort Steele) (3)	55
- Zellers	96
- Canada Safeway	94
- Inn of the South	90
- BC Telephone company	84
- Overwaitea Foods	79
- Rocky Mountain Lodge	60
- Other (4)	242
Total (5)	3573
Notes: (1) Includes Crestbrook Forest Industries (CFI) mill and head office employees in Cranbrook and CFI pulp mill employees in Skookumchuck (most pulp mill employees reside in Cranbrook). Excludes all logging and silviculture contractors. Also, excludes MacDonald Ranch and Lumber in Grasmere (22 PYs excluding contractors). (2) Includes Bell Maintenance Contracting (100) and Fiorentino Bros. Contracting (32). (3) Most Fort Steele Heritage Town employees reside in Cranbrook. Includes government employees, concession contractors and their employees. (4) Includes the following: Canadian Tire (50), Beaver Lumber (48), Home Hardware (31), Daily Townsman (28), Dr. F.W. Green Memorial Home (43) and Kootenay Advertiser (42). (5) Generally refers to PYs, except when only the number of employees was available.	
Source: City of Cranbrook Official Community Plan, Background Report, June 28, 1994 and discussions with employers.	

- **Kimberley.** The history of Kimberley is built around the mining industry. In 1892, prospectors searched the area and discoveries made at that time led to the development of the North Star silver-lead mine and the Cominco Sullivan lead and zinc mine which is still in operation today.

The Sullivan mine began operation in 1909 and over 8 million tonnes have since been shipped to the smelters at Nelson and Trail. Employment at the mine peaked at 1500 employees in 1980/81 but it has been dropping gradually as ore is being depleted (employment was about 900 in 1988 and in September 1994 it was down to 662). Cominco is expected to close the mine by the year 2002.

In the early 1970s, Kimberley was by-passed by Highway 95 when a new connector was built between Cranbrook and Fort Steele. Traffic going through the community declined and the business community decided to bring back the visitors with a Bavarian theme for the town. Kimberley calls itself the Bavarian City of the Rockies and key tourist attractions include a centre plaza (the Platzl with its Cuckoo clock), a number of historical buildings including the original CPR railway station and the Cominco gardens. The city of Kimberley and many volunteers have also developed a small railway called the Bavarian City railway which runs a half hour tour of the surrounding area.

Kimberley also offers many recreation opportunities. In the winter, these include downhill and cross-country skiing, indoor tennis at the Kimberley Ski Resort and snowmobiling. In the summer, these include golfing (two 18 hole courses), wildlife viewing, hiking, visits to the Marysville falls and various natural hot springs and recreational fishing and boating activities.

Major employers in Kimberley are as follows:

Table 6: Major Kimberley Employers

	Estimated Number of Employees
Cominco Sullivan Mine	662
Public Sector:	
- School District # 3	260
- Kimberley District Hospital (incl. casuals)	105
- City of Kimberley	73
Tourism/Recreation Sector:	
- Kimberley Ski and Summer Resort Society (seasonal)	180-200
- Trickle Creek Golf Resort Society (seasonal)	56
- Kimberley Community Development Society (1)	30
Total	1366- 1386
Note:	
(1) Includes employees of Happy Hans Campground, Kimberley Tennis and Racquet Centre, Cominco gardens and Kimberley Vacations.	
Source: Economic Development Department, City of Kimberley.	

- **Elk Valley: Fernie, Sparwood and Elkford.** The Elk Valley is the coal centre of British Columbia. Coal mining in the Elk Valley began in 1897, but after reaching a peak during the first quarter of the century production declined as other fuels rose in popularity. Production rose again in the 1960s and early 1970s because of a renewed worldwide interest in coking coal. However, in the 1980s, depressed market conditions worldwide affected all of the mines in Southeast British Columbia and employment at the 5 coal mines in the region dropped from a peak of 3858 in 1988 to 2210 by 1993 (a drop of 43%) and to 2070 in 1994 (a further drop of 6%).

There are three major communities in the Elk Valley: Fernie, Sparwood and Elkford. All three communities developed primarily to service the coal mining industry. Fernie was incorporated in 1904, Sparwood in 1966 and Elkford in 1971 (when Fording Coal developed a new mine 65 km north of Sparwood, some 1560 employees and their families formed the village of Elkford).

While coal mining is the dominant activity in the Elk Valley, the proximity to the Rockies and Purcell Mountains, the drainage system of the Elk River and other natural resources have led to other activities in the area including forestry, cattle ranching and outdoor recreation. Crestbrook Forest Industries has a sawmill at Elko (32 km south of Fernie) and there are forestry operations throughout the Valley.

Tourism is also increasing in importance. Major summer and fall tourism and recreational activities include hunting, wildlife viewing, fishing and golfing. In winter, downhill and cross-country skiing as well as snowmobiling are very popular. An increasing number of active/semi retirees and other individuals are moving to the area because of the lifestyle, cost of living and attractive environment.

Table 7 on the following page lists the major employers in the Elk Valley.

Table 7: Major Elk Valley Employers

	Estimated Number of Person Years
Five coal mines (1)	2070
Forest Sector (2):	
- Crestbrook Forest Industries (Elko)	212
- Galloway Lumber (Galloway)	108
- Canada Cedar Pole (Galloway) (3)	27
Public Sector:	
- School District # 1	313
- City of Fernie	50
- District of Elkford	20
- District of Sparwood	40
- Fernie District Hospital	75
- Sparwood General Hospital	60
Other	
- Transwest Dynequip (Elkford)	54
- Fernie Snow Valley ski hill (excluding hotels/condominiums/resorts)	65
- Overwaitea Foods	60
Total (4)	3154
Notes: (1) Includes employment at the following mines: - Balmer, operated by Elkview Coal Corp. (307 employees); - Greenhills Mines near Elkford, operated by Fording Coal (270 employees); - Fording Coal north of Sparwood (936 employees); - Line Creek Resources northeast of Sparwood (487 employees); and - Byron Creek Collieries near Corbin, south of Sparwood near the Alberta border (average of 91 employees in 1993 but approximately 20 employees were terminated in 1994). When we conducted the research, the operators of Byron Creek were considering closing temporarily. (2) The three forest product companies in the Elk Valley are located southwest of Fernie. Employment data exclude logging and silviculture contractors. (3) Includes 20 PYs at Canada Cedar Pole (manufacturing plant), 5 PYs at CFP Enterprises (preparation of raw materials) and 2 PYs at B.J. Carney and Co. Ltd. (marketing of treated poles). (4) Generally refers to PYs, except when only the number of employees was available. Source: Discussions with various companies/organizations including municipalities and the chambers of commerce in each municipality. Also, <u>Cranbrook Community Profile</u> , Human Resources Development Canada, July 1994.	

2.3.2 Community Characteristics

This section of the report describes the region in terms of several indicators: age structure of the population, unemployment, average family income levels, mobility and education levels attained, and training and education infrastructure. Table 8 shows the 1991 age structure and population for each community in the Cranbrook TSA.

Table 8: Age Structure of Population by Community, 1991

	Cranbrook	Kimberley	Elk Valley	Total Cranbrook TSA	B.C. average
Age structure:					
% under 15	23%	19%	26%	23%	20%
% 15 - 34	30%	24%	31%	29%	30%
% 35 - 44	16%	16%	19%	18%	17%
% 45 - 64	20%	22%	17%	20%	20%
% 65 and over	11%	19%	7%	10%	13%
1991 Population:	16 447	6531	15 502	45 470	3 275 500
% change since 1981:	3%	-11%	-7%	-3%	19%
Source: Census Data					

Table 8 shows that the Cranbrook TSA has a younger population than the British Columbia average. The difference is most pronounced in the Elk Valley region where 26% of the population is under 15 compared with 20% for all of B.C. and only 7% of the population is 65 and over compared with 13% for all of B.C.

Table 9 on the following page provides education levels and other selected demographic information for the Cranbrook TSA and all of B.C. As shown in that table, the Cranbrook TSA population has about the same percentage of high school graduates as the B.C. average but fewer individuals hold post secondary degrees.

Table 9: Selected Demographic Information for the Cranbrook TSA and British Columbia

	Total Cranbrook TSA	B.C. average
Education, 1991 (1)		
% population with:		
less than grade 9	9%	9%
grade 9-13, no graduation	29%	25%
high school graduation	14%	14%
post secondary	48%	52%
	100%	100%
Unemployment (2)		
% labour force		
1991:	10.8%	10.3%
1986:	14.2%	13.1%
1981:	6.4%	6.5%
Average Income (3)		
1991:	\$44 973	\$47 594
1986:	\$35 849	\$33 512
1981:	\$26 894	\$26 180
Mobility, 1991 (4)	77%	69%
Notes: (1) Represents highest education levels attained for population 15 years and older. Post secondary education includes any training beyond high school. (2) Unemployment is expressed as a percentage of the labour force (15 years and older). (3) Represents average nominal income per household. (4) Mobility is expressed as a percentage of the population which is older than 5 years of age and has resided in the same community for the last five years or more. Source: Census Data.		

Table 9 also shows the following demographic trends:

- The unemployment rate for the Cranbrook TSA was higher than the B.C. average in 1986. However, by 1991, it dropped to 10.8%, or about the same as the B.C. average. More recent comparable data by community are not available. However, regional data for the East Kootenay Regional District (EKRD) indicate that while unemployment worsened significantly in 1992 and 1993 because of the major lay-offs in the coal mining industry, the unemployment situation improved in 1994.

The EKRD unemployment rate was 11.0% in 1992 and 13.3% in 1993, compared to the B.C. average for those same years of 10.4% and 9.7%, respectively. The climb to 13.3% in 1993 was largely due to the Westar Mining lay-offs, with the EKRD unemployment rate peaking at 18.2% in January 1993. In 1994, however, the EKRD unemployment rate dropped to an annual average of 9.9%, or about the same as the B.C. average of 9.5%.

- Average household income for the Cranbrook TSA was higher than the B.C. averages by 3% in 1981 and 7% in 1986, respectively. In 1991, however, average household income was 5.5% lower in the Cranbrook TSA than for all of B.C. Lay-offs in the mining sector and an increasingly important tourism and service sector, which offers lower paying jobs on average

than the mining and forestry sectors, contributed to this relative decline in average income.

- Mobility is lower in the Cranbrook TSA than the B.C. average with 77% of the population having resided in the same community for five years or more.

Training and Education Infrastructure

The Cranbrook TSA has a well developed infrastructure for providing adult education and training, career planning courses and handling the needs of displaced workers. The major providers of training and education include the East Kootenay Community College, Human Resources Development Canada and the Ministry of Social Services. Further details of these facilities are as follows:

- **East Kootenay Community College (EKCC).** The college began operations in 1975 and has since developed into an important educational/training facility. The college has its main campus in Cranbrook with four satellite centres for local training opportunities in the communities of Fernie, Creston, Invermere and Golden. Enrollment in terms of full-time equivalent in the various programs was 1329 for the 1994/95 school year. The college offers a variety of programs responding to the needs of the East Kootenay communities. These programs include:
 - various programs of relevance to the forest industry including a planer mill maintenance program and various trade apprenticeship programs such as welding and pipe fitting;¹⁵
 - university transfer programs and academic programs in business administration, arts and social sciences;
 - other programs catering to specific economic sectors including tourism and health care;
 - adult basic education, literacy and a variety of vocational and general interest courses.

In addition, EKCC offers distance education programs where required as well as programs under contract from the federal or/and provincial governments to assist specific target groups.

- **Human Resources Development Canada (HRDC) Centres.** There are HRDC centres in Cranbrook and in Fernie. The centres provide career counselling and fund various classroom and on-the-job training programs to assist people in finding long-term, full-time employment. Other programs available through the HRDC include:
 - Self-employment assistance program which entitles individuals to receive unemployment benefits and access training while starting up their own businesses. Clients in the forest industry have included silviculture contractors and a horse logging business. That program was used by ex-Westar Mining employees to start up service oriented businesses (e.g. restaurant, convenience store, service station and small engine and

¹⁵ The EKCC does not offer a forestry technology program, but that program is offered at the Castlegar Community College in the West Kootenay region and at other locations in B.C.

mechanical repair shop).

- Job development program which provides funding for employees to train a minimum of 3 individuals at a time (not often used by the forest industry).
- Job opportunities program which provide employers with funding for up to 60% of an employee's salary and training.
- job creation program which provides funding for UIC recipients to receive slightly higher benefits while taking part in community development projects like building ski trails, etc. This program is sometimes used by seasonal forestry workers.

- **B.C. Government.** The Ministry of Skills, Training and Labour (MSTL) offers programs targeted at individuals who are on income assistance. The Ministry of Forests in collaboration with the Ministry of Social Services have developed the **Forest Worker Development Program**. That program was created to generate seasonal jobs outside the Lower Mainland, assist social assistance recipients in finding employment and stimulate the development of a localized forest contracting industry.

2.3.3 Economy

The economy of the Cranbrook TSA depends on mining and forestry, but the service sector, the tourism industry and agriculture/ranching are also important contributors. Estimates of employment and income prepared by the Treasury Board Secretariat of the Ministry of Finance and Corporate Relations are summarized in Tables 10 and 11 on the following pages.

Table 10: Estimates of 1991/92 Employment in the Cranbrook TSA (1)

	Number of Employees							% By Sector (2)
	Basic and Non-Basic Employment By Place of Residence (1)					Non-Basic Generated by Sector	Total	
	Cranbrook	Kimberley	Fernie	Elk V. Spar	Other (1)			
Basic:								
Mining	324	558	776	1876	580	1491	5606	27
Forestry	937	194	68	32	896	665	2791	13
Public Sector	1715	698	479	419	834	1074	5219	25
Tourism	574	145	220	162	334	186	1621	8
Agriculture	52	22	24	10	291	73	471	2
Other (3)	1688	171	156	95	690	722	3522	17
Pen/UI (4)	-	-	-	-	-	1625	1625	8
Sub-total	5290	1788	1723	2594	3625	5835	20 855	100
Non-basic:	2490	827	612	676	1230		-	-
Total	7780	2615	2335	4825	3300	-	20 855	-

Notes:

(1) Basic employment includes direct and indirect employment but not induced employment. Information is based on residency, not employment location. For example, employees who work in tourism in Kimberley or at the Fort Steel Heritage Town Centre but reside in Cranbrook will be included as part of the tourism sector for Cranbrook. Similarly, pulp mill workers living in Kimberley or in Cranbrook will be counted as forestry employees in those two communities.

(2) Includes basic and non-basic employment. Non-basic employment was allocated on the basis of basic after-tax income for each basic sector as per table 11.

(3) Other basic employment includes 1064 employees in construction (38%) and 1736 (62%) in transportation and other basic industries.

(4) Includes induced employment supported by the spending of pension and investment income, unemployment insurance and other social transfer payments.

Source: Ministry of Finance and Corporate Relations.

Table 10 shows that the public sector is the second largest component of the TSA's economy, after mining. However, the public sector depends on the size of population, which in turn depends at least partly on the health of the other basic natural resource sectors.

Table 11: Estimates of 1991/92 After Tax Income in the Cranbrook TSA

	After-Tax Income (\$millions)							% By Sector
	By Place of Residence (1)					Non-Basic	Total (2)	
	Cranbrook	Kimberley	Fernie	Elk V. Spar.	Other			
Basic industry								
Mining	7.9	16.0	23.1	60.4	20.3	26.4	154.1	27
Forestry	21.5	5.0	1.7	0.9	27.9	11.2	68.2	11
Public Sector	33.5	14.9	10.8	10.5	22.3	18.3	110.3	18
Tourism	5.6	1.5	2.5	1.9	4.4	3.1	19.0	3
Agriculture	0.7	0.3	0.3	0.1	4.8	1.1	7.3	1
Other	<u>32.5</u>	<u>3.9</u>	<u>3.5</u>	<u>2.4</u>	<u>19.6</u>	<u>12.2</u>	<u>74.1</u>	<u>12</u>
sub-total	101.7	41.6	41.9	76.2	99.3	72.3	433.0	72
Other basic:								
Pension	20.5	13.5	6.1	4.2	2.8	9.2	56.3	9
Investment	22.2	5.4	5.3	4.4	0.9	8.2	46.4	8
Transfer	7.9	3.4	2.8	4.1	6.8	5.2	30.2	5
UIC	6.1	2.6	2.1	3.2	5.2	4.1	23.3	4
Social security	<u>5.7</u>	<u>1.5</u>	<u>1.1</u>	<u>0.9</u>	<u>0.8</u>	<u>2.1</u>	<u>12.1</u>	<u>2</u>
Sub-total	62.4	26.4	17.4	16.8	16.5	28.8	168.3	28
Total basic	164.0	68.0	59.4	93.4	115.8	-	500.2	83
Non-basic	37.5	13.6	11.3	13.2	25.5	-	101.1	17
Total	201.5	81.6	70.7	106.6	141.3	-	601.3	100
Notes:								
(1) Includes basic after-tax income, i.e., income which results from direct and indirect employment but not induced employment.								
(2) Includes after-tax income from basic and non-basic industry sectors. The non-basic after-tax income was allocated to each basic sector on the basis of its proportion of total income.								
Source: Ministry of Finance and Corporate Relations.								

The following sections provide an overview of the mining, forestry, tourism and agriculture sectors in order of importance.

2.3.4 Mining Sector¹⁶

In 1991, the mining sector accounted for 27% of the Cranbrook TSA's employment and 26% of after tax income. In August 1992, Westar Mining, operator of the Balmer and Greenhills mines in the Elk Valley, declared bankruptcy. Subsequently, Teck Corporation purchased Balmer, and Fording Coal purchased Greenhills. Regardless, from 1992 to 1993, employment at the two coal mines dropped from 1973 workers to 748, a loss of 1225 jobs. Another 275 jobs were lost at the other mines bringing to about 1500 the total number of job losses in the coal sector between

1991 and 1994.

The lead and zinc Sullivan mine in Kimberley is the other major mining operation in the Cranbrook TSA. The mine employs 662 people (September 1994) and has been operating since 1909. Employment at the mine has declined from its 1980/81 peak of 1500 because of ore depletion, and Cominco expects to close the mine by the Year 2002. Exploration is continuing throughout the area but there is yet no alternative to the Sullivan mine in the Cranbrook Kimberley region.¹⁶

The following briefly provides further details on mining activity in the region:

- **Coal mining.** Coal production averaged 18.7 million tonnes between 1987 and 1991 but dropped 44% to 10.6 million tonnes in 1992 because of major shut downs at three of the five producing mines. The 1993 production increased to about 12.9 million tonnes and production in the first three months of 1994 was up a further 25%. However, employment levels are not likely to return to 1991 levels because of the new ownership arrangements and the on-going requirements for productivity improvements to offset continuing intense price pressure in a very flat world coal market.

The Elk Valley has extensive reserves of metallurgical coal (over 1 billion tonnes of known reserves) but opportunities for the industry to expand will depend on world-wide market demand for coal. A recent strategic report titled Elk Valley Economic Development Strategy summarizes the strengths and weaknesses of the industry. The report also identifies economic development opportunities to try to capitalize on the industry that remains.

- **Exploration spending.** Exploration spending in the East Kootenay (Cranbrook and Invermere TSAs) has averaged around \$7 to \$10 million per year over the last ten years. This generates about 150 PYs of employment, the majority of which would be for Cranbrook TSA residents. A recent increase in exploration activity in the region has reversed a downward trend which began in 1990. Key factors affecting exploration levels include mineral prices, the Canada/US currency exchange rate, the cost competitiveness of the Canadian mining industry relative to that of other countries, and government policy initiatives.

There are no plans for any new major mining developments in the area. However, the area is promising from a geological standpoint and the outlook for another base metal mine is fairly good. The outlook for the development of industrial minerals is also favourable. Approximately 100 people are employed at seven industrial mineral mines in the Invermere TSA, just north of the Cranbrook TSA.

¹⁶ Cominco in a joint-venture with Tech Corporation recently purchased a new lead/zinc mineral deposit in north-eastern B.C. (previously owned by the now bankrupt Curragh Resources). Cominco indicated that mining will likely be underway at that property by the time of the Kimberley shutdown and there may be opportunities for Cominco's current employees in Kimberley to find work at the new mine when the Sullivan mine closes. For example, many of the displaced Sullivan mine Cominco employees living in Kimberley currently work at Cominco's fly-in fly-out mining operation in Alaska. (Source: Human Resource Development and Labour Canada, Cranbrook and the East Kootenay Labour Market Review, January to March 1994; also, discussions with community representatives).

2.3.5 Forestry Sector

In 1991, the forest industry accounted for 13% of the Cranbrook TSA's employment and 10% of after-tax income (about half of the mining industry's contribution). Crestbrook Forest Industries (CFI) dominates the forest industry sector of the region. Major wood product manufacturing operations in the Cranbrook TSA include the CFI sawmills at Cranbrook and Elko, the Galloway Lumber Sawmill, the Kootenay Wood Preservers plant and the Canada Cedar Pole operation. CFI also has a pulp mill in Skookumchuck which is just outside the Cranbrook TSA with most employees residing in Cranbrook or Kimberley. The forest sector is presented in greater detail in Chapter 3.

2.3.6 Tourism and Recreation Sector

In 1991, the tourism sector accounted for 7% of employment and 3% of after tax income. The tourism sector accounts for a small percentage of after tax income relative to its share of employment, because employees in the tourism sector are typically lower paid than in the mining, forestry and public sectors.

Outdoor recreation activities in the Cranbrook TSA are highly valued by local residents and tourists alike. Major activities include hunting and angling, golfing, skiing, snowmobiling and back country experiences like hiking and wildlife viewing. When compared to the rest of the Rockies and the Invermere area, the tourism sector of the Cranbrook TSA is relatively undeveloped. The Cities of Cranbrook and Kimberley and the Fort Steele Historic Park provide the major focus of recreation-tourism development in the area:

- **Cranbrook** has a railway museum, a golf course, various theatres and hotels. The city is the service and business centre of the area and acts as a major stop-over point.
- **Kimberley** is a popular year round tourist destination. The city has adopted a Bavarian architectural theme to complement its alpine setting. The ski hill is very popular in winter. In summer, there are two 18 hole golf courses including one in town and the Trickle Creek championship course near the ski hill.
- **Fort Steele Historic Park** is a reconstructed late 19th century pioneer village with displays, demonstrations, museums and professional theatre. In 1993, Fort Steele attracted some 140 000 visitors, and at peak season, it generates employment for approximately 120 employees, or an estimated 55 PYs (including government employees, contractors and their employees).¹⁷

¹⁷ Total employees include 18 full time government employees, 7 part time government employees, and an estimated 95 contractor and concession employees. Most part time employees work an average of 3.5 months during the summer. **Source:** Discussions with representatives of Fort Steele Heritage Town.

There is very little tourism in the Elk Valley despite its location in the Rocky Mountains and some of the most spectacular scenery in North America. The area is also noted for its wildlife resources, excellent fishing and coal mining heritage:

- **Fernie** is the core area for tourism in the Elk Valley. The Fernie downtown core and old C.P.R. railway station have historical importance. Other recreation assets include a golf course and the Fernie Snow Valley ski hill.
- **Heritage sites** of particular note in the region also include the Hosmer underground coke ovens and the remains of the old mining towns of Michel-Natal. **Elkford and Sparwood** also offer skiing and golf course facilities but on a smaller scale than in Fernie.

Accommodations, Parks and other Major Tourist Facilities

The Cranbrook TSA offers extensive tourist facilities:

- **Parks.** The seventeen Cranbrook TSA provincial parks offer about 450 campsites and many have beach facilities.
- **Hotels and Motels.** The Cranbrook TSA offers a wide range of accommodations including hotels (811 units), motels (384) and campgrounds (1050 sites including private and provincial campgrounds).¹⁸
- **Ski Hills.** The Cranbrook TSA offers skiing at the following locations: Kimberley resort (Maximum Vertical Descent (MVD) of 701 metres and on site accommodations of 248 units), Fernie Snow Valley (MVD of 732 metres) and smaller ski hills in Sparwood and Elkford.
- **Other.** Other tourist facilities include five golf courses and various family tourist attractions like mini golf. The area also has natural hot springs and various small and large lakes which provide opportunities for water sports, beach and picnic activities. The largest lakes include Moyie Lake in the southwest and Lake Kooacanusa (the Libby Dam reservoir) in the south centre of the TSA.

Visitor Characteristics

In 1989, the Ministry of Tourism conducted a major study of visitors to British Columbia. Information is available for the Rocky Mountain region, the boundaries of which closely correspond to the Cranbrook TSA and the Invermere Forest District combined. Extracts of the study results are as follows:

- In 1989, over 1.46 million non-residents spent at least one night in the Rocky Mountain region and they spent a total of \$168 million during their stay.

¹⁸ Source: Regional District of East Kootenay, Economic Profile, People and Resources, December 1989. Original data source is the Ministry of Tourism Accommodation Guide.

- The survey reports data on the main purpose for coming to the region:

Table 12: Main Purpose for Visiting the Rocky Mountain region

	Region	Province
Touring trip	31%	26%
Visiting friends and relatives	25	33
Resort vacation	21	8
Outdoors/wilderness/adventure trip	14	8
Conference and other business	5	17
Other	4	8
Total	100%	100%
Source:		
<u>Visitor 89 - A Travel Survey of Visitors to British Columbia - Rocky Mountain Tourism Region</u> , prepared for Industry, Science and Technology Canada, the B.C. Ministry of Tourism and the B.C. Ministry of Regional and Economic Development, October 1990.		

- Table 12 shows that 14% of visitors cited the outdoors/ wilderness/ adventure trip as the main purpose for visiting the Rocky Mountain tourism region. This compares to 8% for all visitors to British Columbia. It is that sector of the tourism business which is most likely to be affected by timber harvesting and forest management practices.

The other 86% of visitors to the Rocky Mountain tourism region cited touring, visiting relatives, resort vacation, or business as the main reason for their visit. As a result, these visitors are not likely to be affected significantly by timber harvesting practices.

- Almost half of the visitor parties to the Rocky Mountain tourism region come from Alberta, about twice the provincial average. However, fewer visitor parties come from other provinces (22% compared to 32% for all of B.C.) and from overseas (6% compared to 14% for all of B.C.). The balance of visitors come from the U.S.
- A much larger percentage of visitors to the Rocky Mountain tourism region choose to camp than the B.C. average (28% choose to camp compared to 16% for all of B.C.).
- The average tourist to the region spends \$35.75 per person per day, or about 35% less than the provincial average of \$54.90.

Guide Outfitting/ Other Adventure Travel Operators

Guide outfitters, guest ranches and other adventure travel operators account for an estimated 80 person years of employment:

- **Guide outfitters** have historically provided guiding services to non-resident hunters. There are about 20 guide outfitters operating in the Cranbrook TSA. These guide outfitters operate within specific guiding territories on Crown Land. The primary product offered by guide outfitters is multi-day hunting packages (about 85% of revenues)¹⁹. Other products include trail riding (7%), wildlife viewing (3%), sportfishing (2%) and winter activities (2%). We

estimate that the guide outfitting industry generates 45 person years of employment in the Cranbrook TSA (based on 20 guide outfitters and an average of 2.2 PYs per guide outfitter in the East Kootenay).

- **Guest ranches.** There are four guest ranches in the Cranbrook TSA which generate approximately 15 PYs of employment. These provide a variety of recreational activities including horseback riding, canoeing, hiking and skiing.
- **Other outdoor.** We identified 7 other operators who sell a variety of outdoor experiences including heli-skiing, wildlife viewing, catskiing, hiking, rock climbing, horseback riding and motorized off-road adventure. These generate approximately 20 PYs of employment.

Hunting and Angling

During the fall season, a large number of hunters arrive in the region from B.C., other provinces, the U.S. and overseas. Numerous big game species such as black and grizzly bear, deer, elk, moose, mountain goat, mountain sheep and cougar attract hunters to the area. Hunting is an important component of the tourism/recreation sector with resident and non-resident big game hunters spending an estimated \$16.6 million on hunting in the Cranbrook TSA in 1993. Table 13 shows hunting effort and estimated gross expenditures by resident and non-resident hunters for each major big game specie.

Table 13: 1993 Hunting Effort and Expenditures on Big Game Hunting in the Cranbrook TSA(1)

	Hunting Effort (Hunter Days)		Expenditures (\$ 1000)	
	Resident Hunters	Non-Resident	Resident Hunters	Non-Residents
Wildlife Specie:				
Deer	100 517	2523	6278	791
Elk	52 720	1878	5537	749
Black Bear	6202	1320	875	477
Sheep	3366	191	679	117
Goat	1674	327	398	176
Cougar (2)	894	25	176	17
Grizzly Bear	597	164	129	64
Moose	1142	26	113	8
Caribou (2)	19	-	4	-
Total	167 131	6454	14 189	2399
Notes:				
(1) The information presented is consolidated from Wildlife Branch Management Units 4-1 through 4-5, and 4-20 through 4-23. The boundaries of each of these management units are contained within the boundaries of the Cranbrook TSA, with the exceptions of 4-4, 4-5, 4-20 and 4-21 which lie primarily within the Cranbrook TSA, but extend into neighbouring TSAs.				
(2) Data for Cougar and Caribou are for 1992.				
Sources:				
<u>Summary Statistics Data Base, Hunter Harvest and Effort</u> , Wildlife Branch, B.C. Ministry of Environment, Lands and Parks, Victoria, 1994.				
Reid, R. <u>"Value and Characteristics of Resident and Non-Resident Hunting"</u> , Wildlife Branch, BC Environment, Victoria, 1985. Updated to 1992/1993 dollars and hunting effort by BC Environment.				

Hunting activities in the Cranbrook TSA are very significant in the provincial context. Table 14 shows the total big game hunting effort in British Columbia and in the Cranbrook TSA. As shown on that table, about 15.7% of big game hunter days in British Columbia are spent in the Cranbrook TSA, an area which covers only 1.5% of the province.

Table 14: Big Game Hunting Effort in the Cranbrook TSA and British Columbia, 1993 (1)

	Cranbrook TSA (2)		British Columbia
	(000s)	% of B.C.	(000s)
Hunter Days:			
Resident Hunters	167	15.7%	1062
Non-Residents	6.5	17.6%	37
Total Hunter Days	173.5	15.8%	1099
Area (Square Km)	14.7	1.5%	968.5
Notes:			
(1) Includes deer, elk, black bear, sheep, goat, cougar, grizzly bear, moose and caribou.			
(2) Includes Wildlife Branch Management Units 4-1 through 4-5, and 4-20 through 4-23.			
Source: B.C. Ministry of Environment, Lands and Parks, Wildlife Branch, Victoria, 1994.			

Angling and boating activities also provide an important source of income and recreation to the region. In 1990, there were approximately 256 000 angler days in the Cranbrook TSA¹⁹, which represented 5.6% of the total fresh water angling effort in British Columbia. We also estimate that gross expenditures, including capital expenditures on boats and tackle, by anglers fishing in the Cranbrook TSA were \$73.96 per angler day in 1990²⁰, or approximately \$18.9 million. Recreational fishing in the Cranbrook TSA is concentrated in the Elk, Bull, St Mary, Wigwam and Flathead river systems. Angling also takes place in the many stocked lakes in the area.

2.3.7 Other Sectors

Several other sectors make a significant contribution to the economy of the Cranbrook TSA. These include agriculture/ranching, Christmas Tree production, the energy sector and trapping.

- **Agriculture/Ranching:** In 1991, agriculture accounted for 2% of employment and 1% of after tax income. Agriculture was one of the first industries in the region and cattle ranching is common throughout the region.

The Cranbrook TSA has 35 119 Animal Unit Months (AUM), which represents about 75% of the AUMs for all of the East Kootenay region²¹. There are an estimated 100 ranchers grazing livestock in the District and 6249 head of cattle grazing on crown land. Based on current

¹⁹ Source: Personal communication with Bill Westover, Fisheries Biologist, B.C. Ministry of Environment, Lands and Parks, Cranbrook.

²⁰ Source: 1990 National Survey, Preliminary Analysis of Findings of Freshwater Anglers in British Columbia; BC Fisheries, Planning and Economics Section, Victoria, B.C.; 1992.

²¹ Please refer to the glossary in Appendix A for a definition of AUMs.

livestock values, these ranchers represent revenues of about \$4 million. The industry is primarily a cow-calf industry with almost no backgrounding or finishing taking place in the region. The industry's overall size has changed little over the last twenty to thirty years. While there are generally strong market demand conditions for Canadian beef at the moment, industry growth is limited by the availability of range lands in the region.

- **Native Stand Douglas-fir Christmas Tree Industry:** In 1991, approximately 95 Christmas tree growers in the Cranbrook TSA cut 400 000 trees worth an estimated \$900 000 in farm gate value (i.e. excluding distribution and retailing costs).²² The industry creates approximately 35 PYs of basic employment in the Cranbrook TSA.

The land base for Christmas tree growing is evenly split between private and crown lands with the two largest growers operating on very large blocks of private land. The amount of crown land available for Christmas tree growing has been declining over the past decade, primarily as a result of land being dedicated to wildlife rangeland with prescribed burning to improve forage production. This is a major issue for the industry, as growers believe there is tremendous opportunity to expand the industry on crown lands and still meet wildlife range management objectives.

- **Energy Sector:** The energy sector in the East Kootenays comprises two broad sub-sectors, the oil and gas sector and the electricity sector:
 - **Oil and Gas:** There is considerable oil and gas exploration interest in the region because of the proximity and geological similarity to the south-west Alberta oil and gas operations. No commercial developments have occurred to date.
 - **Electricity:** B.C. Hydro operates hydroelectric generating stations on the Elk River near Elko and one on the Bull River. BC Hydro also operates a substation in Cranbrook. There are opportunities for future electricity generation in the East Kootenay particularly from co-generation facilities that use wood residues, natural gas, coal or a combination of fuels. The required phasing out of beehive burners at sawmills by the end of 1995 will provide opportunities for the use of these "waste" products of the forest industry as fuel for electricity generation.
- **Trapping:** There are approximately 72 trap lines in the Cranbrook TSA being worked by 86 registered trappers. Very few of the trappers rely on trapping to provide a major portion of their income. Species trapped include beaver, muskrat, otter, marten, mink, weasel, wolverine, coyote, fox, skunk, wolf, bobcat, lynx, racoon, squirrel and fisher.

2.3.8 Community Concerns and Issues

Local community members have key concerns relating to the forest industry and land use in the Cranbrook TSA. These include unemployment levels and the need to maintain forest industry jobs, the value of training programs for displaced workers, forest management practices, the need to retain the scenic beauty of the area, wildlife and wilderness protection, and product security and guaranteed tenures for tourism operators. These and other issues are described as follows.

²² Source: Estimates based on discussions with operators.

Unemployment.

The East Kootenay region and particularly the Elk Valley suffered greatly during the 1980s and early 1990s. The economy is only starting to return to the B.C. average levels of unemployment. Forest industry jobs are highly paid and there are no comparable employment alternatives. There is scepticism towards the ability of government programs to create employment and alleviate the negative impacts which will be created by any reductions in harvest levels.

Community representatives are also concerned with the timing of any employment losses related to the forest industry. Cominco will be closing down the mine in Kimberley by the year 2002. The area has already experienced employment losses created by the shutdown of the Westar Mining operations in 1992, and many community representatives expressed concern over the unemployment closures could create.

Value of Training Programs for Displaced Workers

Community representatives expressed concern over the ability to re-train displaced workers and the likelihood of these workers finding alternate employment and remaining in the Cranbrook TSA. The case of the displaced Westar Mining employees provides some useful insight into the functioning and results of these programs.

The EKCC, the federal government and the provincial government were all extensively involved in providing adult education and re-training programs to the Westar Mining employees that lost their jobs when the company declared bankruptcy in 1992. At the time, the federal government established resource centres to handle the nearly 1400 registered UIC clients. The College offered a variety of courses including career counselling, basic academic upgrading, English language training, entrepreneurial skills, heavy duty mechanics and first aid. Between 700 and 1000 individuals who were directly or indirectly linked to Westar Mining participated in training programs. Enrollment in training programs was not as high as might be anticipated because many ex-Westar mining employees expected to be re-hired at the local mines.

It is difficult to assess the benefit of the training programs offered to the former mining workers. By March 1994, about 53% of the ex-Westar Mining workers had found alternate employment but two thirds of these were simply re-hired when the two former Westar Mining operations were re-opened by other operators. When we exclude the displaced workers who found employment at the local mines, only 28% found alternate employment (6% started their own businesses and at least 22% found employment in other communities). Table 15 provides further details.

Table 15 also shows that when we exclude the Westar Mining employees who returned to work at the local mines:

Table 15: Status of Displaced Westar Mining Workers (as of March 1994)

Status of former Westar Mining employees	Number of Employees by Place of Residence				Total	
	Spar-wood	Fernie	Elkford	Other (1)	All	Excl. Miners (2)
Employed:						
re-hired by local mines	280	227	28	173	708	-
own business	28	35	2	19	84	84
other (re-located) (3)	94	102	8	90	294	294
Sub-total	402	364	38	282	1 086	378
Other:						
Not in work force (4)	50	43	3	41	137	137
Moved away/status unknown	61	16	5	71	153	153
Unemployed/status unknown	221	177	26	120	544	544
School	37	19	2	64	122	122
Total displaced workers:	771	619	74	578	2 042	1 334
% displaced workers:						
- at local mines	36%	37%	38%	30%	35%	-
- own bus.	4	6	3	3	4	6%
- no longer in work force	6	7	4	7	7	10
- school	5	3	3	11	6	9
- unempl./status unknown	29	29	35	21	27	41
- re-located:						
- working (3)	12	16	11	16	14	22
- status unknown	8	2	6	12	7	12
total	100%	100%	100%	100%	100%	100%
Notes: (1) About 84% lived in the Crowsnest Pass area, the balance lived in surrounding communities. (2) This last column excludes displaced Westar Mining employees who were hired at local mines (the two former Westar Mining operations re-opened under new management). (3) Most of those hired by other employers relocated to other areas. (4) Includes retired workers, those on POWA, deceased workers and those on long term disability. Source: Industrial Adjustment Service, final report, March 1994 as quoted in Fernie Free Press, April 1994 issue.						

- 34% of the displaced workers re-located to other communities mainly because they found alternate employment.
- 6% started their own businesses. Starting a business seemed to be one of the only options for those who wanted to remain in the community and continue working.

- 10% are no longer in the labour force (retired, deceased or on Long-Term Disability).
- Two years after the lay-offs, 50% continue to live in the community but are still unemployed and looking for work, or are in employment training programs.

Forest Management Practices.

Many community representatives are concerned about forest management practices, particularly the impact on rangeland for wildlife. Specific concerns include rates of cut, clearcutting, the size of clearcuts, high altitude logging, fire suppression and silviculture.

Some community representatives also expressed concern over the need to protect key scenic corridors. This is of particular importance to tourism businesses which rely on visitors who cited touring (31% of all visitors) or an outdoors/wilderness/adventure trip (14% of all visitors) as the main purpose of their visit to the region.

Wildlife and wilderness protection

Virtually every community representative contacted as part of this study is concerned about wildlife and wilderness protection. However, there is disagreement regarding the best ways to encourage and promote wildlife populations and wilderness protection. The main issues are as follows:

- Local hunters are concerned with forestry practices and the availability of range lands for wildlife.
- Guide outfitters and back country operators depend on restricted road access to a region. As soon as road access to an area is provided, the region attracts local hunters and local residents thus diminishing the pristine environment sold by the operators. Guide outfitters are often in conflict with B.C. hunters and local residents who are interested in motorized recreation (e.g. snowmobiling in the winter, and the use of four wheel drive and all terrain vehicles year round).
- Other community representatives would like a larger proportion of the land base and wildlife populations protected.

Product security and guaranteed tenures for tourism operators

There is no guarantee for tourism operators that a pristine area will be maintained well into the future, as natural settings can be compromised by other resource uses. Since most outdoor operators use crown land, this is a major issue. Guide outfitters have licences but these cover only hunting activities. The absence of tenures and product security therefore creates uncertainty for tourism operators and this may result in expansion plans, such as plans by guide-outfitters for non-hunting products, to be put on hold.

2.4 First Nations Communities

The Cranbrook TSA is within the traditional tribal territory of the Ktunaxa Kinbasket Tribal Council. The following section provides an overview of the Ktunaxa population in the area. This section of the report is based on a review of published material. While we met with members of the Tribal Council and individual Bands as part of the research, time and budgetary constraints prevented the collection of detailed data.²³

2.4.1 Historical Review and General Description

Most First Nations people in the Cranbrook TSA are part of the Ktunaxa people. Archaeological evidence suggests that the Ktunaxa people have inhabited the East Kootenay region since the last glaciation over ten thousand years ago. Prior to contacts with Europeans, First Nations in the East Kootenay region adapted their lifestyle to the changing seasons, the resultant change in vegetation and the availability of wildlife and fish.

There is evidence of First Nations presence throughout the Cranbrook TSA with key areas of significance including:

- **Top of the World Park and Upper Galbraith.** Major pre-contact communication corridor for the Ktunaxa people; one of their most important cultural foci for 8500 years.
- **Akamina-Kishinena.** Major pre-contact travel route for Aboriginal people moving between the Kootenay Trench and the Prairies (South-Kootenay Pass).
- **Wigwam river.** Traditional uses.
- **St. Mary's Lake.** Traditional uses.
- **Baker Mountain.** Spiritual values and traditional uses.
- **Galton Range.** Travel corridor into the Flathead, sustenance use.
- **Joseph's Prairie.** Ceremonial gathering place.

The Ktunaxa people established trade relations with the early settlers starting with the explorer David Thompson in 1807. In 1884, Commissioner O'Reilly established reserves for two First

²³ The information presented in this section is based on discussions with First Nations community and government representatives and on a review of the following documents: East Kootenay Table, Recommendations for Land Use and Resource and Environmental Management for the East Kootenay Region, July 1994; Report of the Native Forestry Task Force, November 1991; a report by the Council of Forest Industries titled A Proposed Aboriginal Forestry Strategy for the B.C. Forest Industry, March 1994. (see exact references and list of contacts in Appendices 1 and 2).

Nations groups in the Cranbrook TSA, the St. Mary's Band and the Tobacco Plains Band. First Nations groups within the Cranbrook TSA include members of those two Bands, numerous Ktunaxa who are not recognized as status First Nations, and status and non-status First Nations who are not Ktunaxa (predominantly Cree, Sioux, Pagan, Blood and others from Alberta, Saskatchewan and Manitoba).

The St. Mary's Band and the Tobacco Plains Band remain the primary Aboriginal settlements in the Cranbrook TSA. Population estimates for these two Bands range between 396 people (Indian and Northern Affairs Canada, 1994) and approximately 575 people (St. Mary's and Tobacco Plains Bands, 1994)²⁴. The latter estimate of population statistics for the Cranbrook TSA excludes status and non-status First Nations living in the Cranbrook TSA who are not receiving Band services. As a result, the total number of First Nations in this area is higher by an unknown amount than the Band membership of 575. Based on an estimated Aboriginal population for the Cranbrook TSA of 600 individuals, First Nations account for 1.2% of the Cranbrook TSA population compared to 2.9% for all of B.C.

Another three bands are based outside the Cranbrook TSA but have territorial claims to the area. These three Bands are members of the Ktunaxa/Kinbasket Tribal Council and together, they represent an additional 600 Aboriginal people (based on Indian and Northern Affairs Canada statistics, as per Table 16).

²⁴The criteria used by Bands and by Indian and Northern Affairs Canada (INAC) to evaluate Band membership statistics differ. The Bands include in their membership population statistics everyone who is receiving Band services (as a result, this excludes status and non-status First Nations living in the Cranbrook TSA who are not receiving Band services). INAC cites Band membership statistics which include only those people who are receiving Band services who are also officially recognized using INAC criteria as "Status" First Nations. Source: Ktunaxa/Kinbasket Tribal Council.

Table 16: Aboriginal Band Populations with a Territorial Interest in the Cranbrook TSA

Band Name	Number of Band Members (1)			
	Own Band Reserves	Other Band Reserves	Off-reserves	Total
Cranbrook TSA:				
- St. Mary's	198	5	42	245
- Tobacco Plains	89	8	54	151
sub-total	287	13	96	396
Other TSAs (2):				
- Columbia Lake	113	32	65	210
- Shuswap	116	17	74	207
- Lower Kootenay	78	10	69	157
Total	594	72	304	970
Notes: (1) Number of First Nations living on their own Band reserves includes members living on Crown land allocated to their Band. (2) Includes Ktunaxa Kinbasket member Bands based on Reserves located outside the Cranbrook Forest District. The Columbia Lake and Shuswap Bands are based in the Invermere Forest District; the Lower Kootenay Band is based in the Kootenay Lake Forest District. Source: Indian and Northern Affairs Canada, 1994.				

The following provides a short description of the two Bands which are based in the Cranbrook TSA.

- **St. Mary's Band.** The Band is located on four reserves covering 7445 hectares. Key economic activities for Band members include the following: construction of the St. Mary's resort and upon opening, the hospitality and tourism based employment involved in daily operations of the resort; forestry work including christmas tree management, fire fighting and various types of contract work such as right of way clearing for Alberta Natural Gas, B.C. Hydro and others; the St. Mary's ranch (livestock); Band administration; arts and craft; and individually owned hay farms.

The St. Mary's Band community includes a recreation centre, the Ktunaxa Kinbasket Independent School System, Band office, Tribal Council Administrative Offices and the St. Mary's resort which is currently under construction. The community also includes the St. Eugene Mission Church which features stained glass windows hand painted by First Nations. This gothic style mission church was built in 1897 with funds from the sale of two local First Nations' mining claims.

- **Tobacco Plains.** The Band is located on 4227 hectares servicing one reserve. The community includes a small sawmill, a Band office, garage, school, firehall and Band hall. Key employers for Band members include the forest industry, agriculture and band administration. Other economic activities include a restaurant/gas bar and a duty free shop.

2.4.2 Involvement in the Forest Industry

Published information and discussions with Aboriginal community, government and industry representatives indicates that the forest sector generates approximately 20 to 25 person years (PYs) of employment for First Nations in the Cranbrook TSA. This represents about 7.5% of the First Nations labour force in the region, compared to about 15% for the non-First Nations labour force.²⁵ Current employment opportunities in the forest industry are as follows:

- **Silviculture.** The Ministry of Forests (MOF) enters into silviculture contracts with Aboriginal contractors. In 1993 and 1994, MOF awarded \$175 000 in pruning/spacing contracts to First Nations (excluding a \$30 000 contract which is being planned). The contracts are awarded directly or under restrictive bidding.²⁶ We estimate that the MOF silviculture contracts provide about 3 PYs of employment annually.
- **Unit Crews.** The primary role of a Unit Crew is fire fighting; however, during low fire hazard periods, these unit crews conduct other forest improvement projects including silviculture. The Cranbrook TSA has one Aboriginal Unit Crew which provides employment for 21 individuals for about 5 months (or about 10 PYs of employment).
- **Harvesting and Processing.** Some of the individual Band members are logging contractors. The Tobacco Plains Band has a small sawmill and logging operation which employs about twelve people.²⁷

2.4.3 Aboriginal Issues and Concerns

The Ktunaxa Kinbasket Tribal Council has submitted a letter of intent to enter into comprehensive land claims negotiations with the governments of British Columbia and Canada. The area under claim extends west to the Arrow Lakes Revelstoke River system, north to the Big Bend in the Columbia River, east to the Alberta-B.C. border, and south to the Canada-U.S.

²⁵ This is based on an estimated Aboriginal population in the District of 600 people and a labour force equal to about half the population or about 300 individuals. An estimated 40 Aboriginals are involved in the industry but the average length of employment is approximately six months.

²⁶ The MOF silviculture direct award program provides First Nations the opportunity to develop experience and become competitive participants in silviculture.

²⁷ **Source:** From Dan Gravelle of the Tobacco Plains Band, as quoted in: Native Forestry in British Columbia, Task Force on Native Forestry, Final Report, November 1991. In 1994, the mill employs about six people, and there are also approximately six other First Nations involved in forestry management, training and job development programs.

border.

The Council is reluctant to take part in any process leading to land use decisions including the C.O.R.E. process and the Timber Supply Review. While Aboriginal groups support the principle of local participation in land use planning, they maintain that this should take place amongst governments with authority and responsibility to care for these lands and resources. They believe that the Tribal Council should be treated as a legitimate and equal order of government.

First Nations in the region are also concerned that they do not receive an equitable share of the harvestable forest and forest industry employment. Moreover, First Nations have a deep attachment to the land and, therefore, are also very concerned with the use of resources on their traditional territories. Common concerns include the following:

- Effects of logging on wildlife and fishery;
- Need to integrate the use of the timber resource with other sectors including tourism, trapping, hunting, fishing and other traditional, spiritual and commercial uses;
- Need to preserve archaeological and cultural sites; and
- Forest management practices.

The Task Force on Native Forestry conducted in 1991 quotes Sophie Pierre of the Ktunaxa/Kinbasket Tribal Council:

"We want government and private industry to recognize and negotiate with the Ktunaxa People when they want to use the resources in our traditional lands. The government must adopt a forest management policy that reflects true integrated resource management.

There is a need to identify and protect cultural and heritage values before issuance of cutting permits. A study must be done of the environmental impact of the industries operating in an area and a comprehensive resource inventory updated.

We strongly recommend that a forestry resource liaison person assist the Native community in taking advantage of FRDA II and other initiatives. We need someone working with the Bands."

First Nations are also concerned that they get inundated with information and data requests by governments including the Ministry of Forests, private organizations and other groups. In the words of the Tribal Council "we do not have the time or the people to dedicate to responding to data requests". Other concerns regarding providing detailed data include the use of the information, the technical knowledge required to develop the data, the fact that much of the data is held in confidence by the elders and the need to pay the individuals involved in collecting the data.

First Nations in the region would like to see a team approach to collecting, analyzing and reviewing data. Under this approach, one person from the Band would work with individuals at MOF and MELP to collect data and participate in the land review process. This team approach would foster cross-cultural ties and provide technical expertise to the Aboriginal individuals involved.

3.0 TSA Forest Sector Overview

This chapter describes the land base available for harvesting, the current AAC, the timber supply situation, forest sector employment and timber harvest forecasts.

3.1 Timber Harvesting Land Base

The Cranbrook TSA covers 1.48 million hectares, of which 29% is currently considered available for timber harvesting. Private lands cover some 13% of the Cranbrook TSA, of which a third (approximately 65 000 hectares or 4% of the total land area) are operable forest lands. The timber harvesting land base is comprised mainly of lodgepole pine, spruce, douglas fir, larch, balsam and hemlock.

The Ministry of Forests recognizes that the existing calculation of the timber harvesting land base does not consider several factors which could have an important effect on the land base and the timber available for harvest. These factors are detailed in the Cranbrook Timber Supply Analysis Report (TSAR) and are summarized as follow:

- **Land base.** The operable land base is subject to significant uncertainty due to potential changes in land status (e.g. operable crown forest lands, recreation areas, ecological reserves, environmentally sensitive areas, etc) from various land use reviews and initiatives. These include the Commission on Resources and the Environment (CORE), Protected Area Strategy (PAS), First Nations Treaty negotiations, the Land and Resource Management Planning (LRMP) process and other initiatives.²⁸
- **New Forest Practices Code.** The implementation of the new Forest Practices Code is expected to add more constraints on forest cover requirements and timber supply.
- **Caribou and forage management.** The Ministry of Forests has identified and considered core Caribou habitat and key forage production areas for livestock and wildlife. However, additional forest cover constraints may be required to maintain critical caribou habitat. Also, additional areas may need to be converted to greater forage production and less timber production in order to meet wildlife and domestic range objectives.
- **Old growth requirement.** Old growth is an issue in the Cranbrook TSA and the Ministry of Forests has established an Interim Old Growth Strategy to manage the old growth forest in the district. However, old growth targets may change from those currently set in the interim strategy.
- **Visual quality objectives (VQO).** The Ministry of Forests has established VQOs for most travel corridors. However, there are uncertainties related to the timber available for harvest in Visual Quality zones.

²⁸ See glossary in Appendix A for a definition of CORE, PAS, LRMP and other land use initiatives.

- **Community watersheds.** There are several community watersheds where special management will be undertaken to protect water and other resources.
- **Riparian areas.** Riparian management guidelines have been developed and approved for the Cranbrook TSA.
- **Unsalvaged losses.** Unsalvaged losses due to insects, disease, fire and windthrow are a major concern. Mountain Pine Beetle has been at epidemic levels in recent years. While the pine beetle population appears to have declined, about 110 000 hectares remains susceptible to infestation.
- **High elevation sites.** Regeneration delays and growth rates on high elevation sites are a concern.
- **Uncertainties regarding timber supply conditions.** The Ministry of Forests recognizes the difficulties in estimating timber supply conditions in the following areas:
 - Volumes from selection management systems;
 - Adjacency effect of many of the current integrated resource management guidelines;
 - Estimated amount of non-recoverable losses due to insect epidemics and diseases;
 - Length of green-up period;
 - Volumes from existing and regenerated stands;
 - Minimum harvest ages; and
 - Class of various sites for harvest may affect the yield projections.

The following table presents the long term timber harvesting land base.

Table 17: Cranbrook TSA Timber Harvesting Land Base

Classification	Area (hectares)	% of Total Area
Total land base	1 478 146	100%
Less private and Federal lands:		
Private lands (1)	-194 067	13
Indian reserves	-12 198	1
Other Federal lands	-20 209	1
Total Provincial Crown Land	1 251 672	85
Less Non-Forest Lands:		
Provincial Parks, Recreation Areas & Ecological Reserves	-55 827	4
Total Provincial Crown Forest Land	1 195 845	81
Less:		
Non-forest type (2)	-391 319	26
Total Crown Productive Forest	804 526	54
Less:		
Non-contributing (3)	-27 333	2
Non suitable for harvesting	-353 748	24
Net Operable Provincial Crown Forest Land	423 445	29%
Notes: (1) Includes about 65 000 hectares of private operable forest lands. (2) Includes forests of type ID 5 (non-commercial), ID 6 (non-productive) and ID 8 (no forest typing available, which typically means non-productive). (3) Includes Christmas tree permits (CTP), woodlot licences (WLL), Order in council map reserves for the use, recreation and enjoyment of the public (OIC UREP) and Forest service wilderness reserves (FS Wilderness). Source: Ministry of Forests, <u>Data package, appendix I</u> (page 31) and discussions with Ministry of Forests representatives.		

3.2 Current Timber Supply Situation

The current allowable annual cut (AAC) for the TSA is 896 136 cubic metres (including TFL#13 which has been added to the AAC at the end of 1994). Table 18 outlines the AAC apportionment.

Table 18: Apportionment of Cranbrook TSA Allowable Annual Cut

	Coniferous (cubic metres)	Percent of Total AAC
Forest Licences:		
Crestbrook Forest Industries	640 842	71.5%
Galloway Lumber Co. (1)	137 909	15.4
Sub-total	778 751	86.9
Timber Sales Licences - Small Business:		
any Category (2)	96 816	10.8
<= 10 000 cubic metres (3)	5672	0.6
Portion of TFL # 13 (4)	1771	0.2
Sub-total	104 259	11.6
Other:		
Forest Service Reserve	9000	1.0
Woodlot Licences (WLL)	9000	1.0
Less WLL under tenure (5)	-4874	-0.5
Allowable Annual Cut	896 136	100.0%

Notes:

- (1) Includes forest licences for Galloway Lumber Company Ltd (Galloway Lumber) of 72 922 cubic metres and for Silver Ridge Sawmills (owned by Galloway Lumber) for 39 558 cubic metres. Also, includes Galloway Lumber's TFL #13 for 25 429 cubic metres of wood. The three licences have been amalgamated by the Ministry of Forests.
- (2) Includes 28 440 cubic metres of small business sales under Category 1 (section 16), 28 430 cubic metres under Category 2 (section 16) and 39 946 of Bid proposals (section 16.1).
- (3) Includes three licences: 5596 cubic metres for McDonald Ranch and Lumber Ltd. and 76 cubic metres for Mallard, W.A. (estate of). These two licences have terms of 10 years and are replaceable.
- (4) Includes portion of TFL # 13 which has now been rolled into the AAC (1771 cubic metres).
- (5) When estimating forecasts in harvest levels as part of the Timber Supply Review, the Ministry of Forests opted to exclude the Woodlot Licences (WLL) which have already been awarded. For consistency purposes, this is how we chose to report the apportionment of the AAC.

Source: Ministry of Forests.

The AAC has been at the same level since 1981 except in 1990, 1991 and 1992 when the two major licensees, CFI and Galloway Lumber, received temporary licences to harvest 235 000 cubic metres of Mountain Pine infested forests. However, while the temporary licences brought the AAC to over 1.1 million cubic metres of wood, the average harvest level for the years 1990 through to 1993 was only about 1.5% higher than the current AAC.

In addition to the timber harvested on crown land, there is a significant harvest from private lands (the major sawmills in the area obtain approximately 62% of their wood from Cranbrook TSA Forest Licences). Table 19 shows the private land harvest for the Cranbrook TSA.

Table 19: Private Land Harvest for the Cranbrook TSA, 1989-1993

	1990	1991	1992	1993	1994
Private Land Harvest (000s m3)	529	381	341	375	389
Note: Includes wood harvested (not necessarily processed) under a private mark from the Cranbrook TSA. Does not include wood volumes from Alberta.					
Source: Ministry of Forests					

Table 19 shows that the private land harvest from the Cranbrook TSA dropped by 26% between 1990 and 1994. Much of the private wood was harvested during the last cycle of high wood prices or is on the property of individuals who are reluctant to harvest it. Partly to compensate for this decline in private wood from the Cranbrook TSA, in 1994, the major licensees purchased a significant amount of private wood from Alberta (estimated to be at least 100 000 cubic metres). The major licensees in the Cranbrook TSA are concerned about the future availability of private wood from the Cranbrook TSA and from Alberta. The private supply from the TSA will not likely increase in the future.

3.3 Overview of Major TSA Licensees

Crestbrook Forest Industries holds 71.5% of the AAC, Galloway Lumber Company holds 15.4% (with Silver Ridge sawmills and part of TFL # 13) and the Small Business Forest Enterprise Program and other smaller licensees account for the balance (Table 18). The following describes the operations of the major licensees and small business program.

- **Crestbrook Forest Industries Ltd. (CFI).** CFI is an integrated producer of market kraft pulp and lumber with operations in southeastern British Columbia. Crestbrook originated as Cranbrook Sash and Door which was formed as a partnership in 1898. The company expanded its operations through the acquisition of several small sawmill companies and in 1956 was acquired by Crestbrook Timber Limited. In the late sixties, Crestbrook Timber Ltd., Creston Sawmills Ltd. and Pawluk Bros. Lumber Ltd. amalgamated to form Crestbrook Forest Industries Ltd.

Also in the late 1960s, CFI entered into a joint venture agreement with Honshu and Mitsubishi. Under the agreement, Honshu and Mitsubishi obtained controlling interest in the company and agreed to provide financing for the construction of a bleached pulp mill at Skookumchuck, about 15 km north of the TSA boundary. The pulp mill, which began operation in 1968, now has an annual capacity of 220 000 Air Dry Metric Tonnes (ADMT). In 1993, CFI processed 328 192 BDU of chips. Approximately 85% of the mill's chip consumption now originates as a by-product of the sawmilling industry and 15% comes from the production of roundwood chips. CFI now utilizes about 100 000 cubic metres of non-sawlog materials for the production of roundwood chips from the Cranbrook TSA. This includes dry non-sawlogs, green undersized logs, inferior trees (under 6 inches) and tree tops. Traditionally, this material was burned or otherwise wasted.

CFI operates two sawmills within the Cranbrook TSA (one in Cranbrook and one in Elko) and one outside the TSA in Canal Flats. The sawmills produce kiln-dried dimension lumber and specialty products including:

- Laminated beam lumber (lam stock), which is used for the production of laminated beams in industrial buildings, homes, theatres, libraries and sports plazas;
- Machine Stress-Rated (MSR) lumber, which is used for roof and floor trusses and in all types of engineered wood structures where precise strength of materials is required; and
- One inch finished lumber, which is used in a variety of products including shelving for the U.S. market.

In 1993, CFI sawmills in Elko and Cranbrook consumed 1.0 million cubic metres of wood, of which about 65% originated in the Cranbrook TSA. Wood from other TSAs and purchases from private lands account for the other 35%. The two sawmills have a combined capacity of 241 000 m³ of lumber. Approximately 90% of the wood products are exported to the United States, 8% remain in the Canadian market and 2% are exported to Japan. CFI is increasingly interested in the Japanese and European markets for potential long-term opportunities.

In 1993, CFI employed 1157 people of which 909 work in the Cranbrook TSA (logging division, two sawmills in Elko and Cranbrook, pulp mill in Skookumchuck and head office in Cranbrook).²⁹ In addition, the CFI operations in the Cranbrook TSA generate full-time employment for about 235 harvesting and silviculture contractors. CFI also generates employment through its major capital investment program. Between 1989 and 1993, CFI spent \$298 million to totally renew its sawmill and pulp mill assets (about \$30 million for the sawmills and \$268 million for the pulp mill in Skookumchuck).

CFI also holds a 40% interest in the Alberta Pacific (Al-Pac) joint venture which was formed to construct and operate a bleached kraft pulp mill in northeastern Alberta. The 1500 tonnes per day operation opened in August 1993.

- **Galloway Lumber Company Ltd.** (Galloway Lumber) is an independently owned sawmill operation in Galloway, about 50 km east of Cranbrook. The operation started in 1945 and it amalgamated with Silver Ridge Sawmills a few years ago.

Galloway Lumber holds forest licences from the Cranbrook TSA for 112 480 cubic metres. Galloway has also held TFL # 13 which provides another 25 429 cubic metres of wood. The Ministry of Forests has amalgamated TFL # 13 with the AAC bringing Galloway's forest license from the Cranbrook TSA to 137 909 cubic metres. In 1993, the mill consumed 247 834 cubic metres of wood, of which 67% originated from the Cranbrook TSA licenses.³⁰ Purchases from the Small Business Program and from private land owners accounted for

²⁹ The Skookumchuck pulp mill is just outside the TSA. However, since the majority of the employees reside in the Cranbrook TSA, employment is included in the TSA estimate of direct jobs. Other CFI operations outside the Cranbrook TSA include a sawmill in Canal Flats in the Invermere TSA (some of the employees reside in the Cranbrook TSA) and an executive office in Vancouver.

³⁰ Harvest levels from any licensee can be as much as 50% lower or higher than the AAC in any given year (provided that other years compensate for the varying levels over a five year period). Galloway Lumber harvested more than their AAC in 1992 and 1993.

the other 33%.

Galloway Lumber employs 108 people full time and generates an estimated 50 PYs through silviculture (4 PYs), harvesting, log hauling and road contractors (43 PYs) and trucking (3 PYs) - excluding indirect and induced employment impacts. According to the company, about half of its employees reside in the vicinity of the mill (Jaffray, Wardner and Elko) and the other half reside in Cranbrook. Very few employees reside in Kimberley or Fernie.

- **McDonald Ranch and Lumber.** McDonald Ranch and Lumber is a small operator with a licence of 5672 cubic metres renewable every 10 years. The mill is located in Grasmere near the U.S. border and has 22 employees (person years).
- **Small Business Forest Enterprise Program (SBFEP).** From 1990 to 1993, the TSA SBFEP averaged an annual timber harvest of approximately 98 800 cubic metres a year, or about 11% of the current TSA harvest. About 135 000 cubic metres in timber sales license volumes were awarded per year over the period 1990 to 1994 to different businesses. On average each year, some 25 businesses have participated in the program and timber sales volumes have ranged from one cubic metre to about 15 000 cubic metres. Some of the larger operations which rely on small business sales include Kootenay Wood Preservers Ltd. in Cranbrook and McDonald Ranch and Lumber.

There are an estimated 662 full-time jobs at the three major sawmills, 355 at the CFI pulp mill and 150 at the smaller operations. This adds to 1167 full time jobs in wood products manufacturing operations in the Cranbrook TSA (including company logging employees but excluding contractors). The three major sawmills in the region have a capacity of approximately 300 million fbm³¹ of lumber, and produce approximately 165 000 BDUs of chips for the Skookumchuck pulp mill. Table 20 summarizes key statistics for the wood products operations of CFI and Galloway Lumber.

³¹ fbm is one square foot of lumber, one inch thick. Mfbm is one thousand square feet of lumber.

Table 20: Major Forest Products Manufacturers in the Cranbrook TSA, 1993

Mill	Number of employees (1)	Wood Consumption (000 m3)	Cranb. TSA Licences (000 m3)	% Wood From AAC (2)
CFI (Cranbrook TSA):				
Elko sawmill	212	628	641	63.7%
Cranbrook sawmill	200	378	-	
Head Office (3)	104	-	-	
Logging Divisions (4)	38	-	-	
Galloway (5)	108	248	138	55.7%
Total in TSA	662	1 254	779	62.1%
CFI pulp mill (6)	355	328 192 BDU		35.2% (7)
Notes: (1) Employment estimates exclude contractors (harvesting, road construction and maintenance, silviculture) and trucking. This also excludes 60 Ministry of Forests employees (PYs) in the Cranbrook TSA (wages and salaries of \$3.375 million). (2) Excludes purchases under the Small Business Programs from the Cranbrook and other TSAs. (3) CFI reports 104 employees at the Cranbrook head office. We estimate that about 80 of these relate to the Cranbrook and Elko sawmills and the Skookumchuck pulp mill. In addition, CFI has 7 employees at the Vancouver head office. (4) CFI reported 108 company employees at its logging divisions in Southeastern B.C., of which 38 are from logging divisions in the Cranbrook TSA. Excludes contractors. (5) Galloway Lumber reports 100 mill employees, 5 head office employees and 3 at its logging division. (6) The Skookumchuck pulp mill is about 15 km north of the TSA but the majority of the mill employees live in the Cranbrook TSA and it is being included in this analysis. However, the CFI mill in Canal Flats, about 40 km from Cranbrook is included in the Invermere TSA analysis. (7) An estimated 35.2% of the chips consumed by the pulp mill originate from wood harvested from the TSA. The three major sawmills listed above produce about half of the pulp mill chips, or 165 000 BDUs in 1993, but some of those chips originate from wood harvested on private lands and in other TSAs.				
Source: Survey of licensees and discussions with Ministry of Forests.				

Table 20 shows that the major sawmills in the Cranbrook TSA consume 1 254 000 cubic metres of wood of which 62%, or about 779 000 cubic metres, originate from Cranbrook TSA Forest Licences. The balance of about 500 000 cubic metres originates from other TSAs in B.C. and from private lands in B.C. and Alberta. Table 21 lists other Cranbrook TSA forest products manufacturing facilities.

Table 21: Other Wood Manufacturing Operations in the Cranbrook TSA, 1993

Operator	Location	Type of Product	Number of Employees
Kootenay Wood Preservers	Cranbrook	wood preservation, fence posts	50 (1)
Canada Cedar Pole	Galloway	utility poles and fence posts	27 (2)
MacDonald Ranch & Lumber	Grasmere	lumber	22
Fab-Co. Forest Products 1989 Ltd.	Kimberley	lumber/ specialty cuts	13
Bear Lumber	Cranbrook	lumber/ specialty cuts	8
Valley Lumber Sales	Wasa	lumber	5
Log Home builders and other smaller sawmills	various	log homes, lumber, various other products	25
Total			150

Notes:

(1) Represents only the number of employees at the Cranbrook location. Kootenay Wood Preservers (KWP) has about 150 employees when all three manufacturing operations in Cranbrook, Brisco and Alberta are included. KWP- Cranbrook relies heavily on Small Business Sales from the Cranbrook TSA for its wood supply.

(2) Employment includes 20 PYs at Canada Cedar Pole (manufacturing plant), 5 PYs at CFP Enterprises (preparation of raw materials) and 2 PYs at B.J. Carney and Co. Ltd. (marketing of treated poles).

(3) Includes log home builders (Kootenay Log Homes, Ram Creek Log Homes and Custom Log and Timber Construction) and smaller sawmills.

Source: Survey of small manufacturers and review of publicly available data.

3.4 Forest Sector Employment Attributable to the Cranbrook TSA

This section calculates the forest sector employment attributable to the Cranbrook TSA harvest levels. Table 22 shows the direct, indirect, induced, and total employment levels which are attributable to the current TSA harvest, and the labour coefficients which we used to estimate these employment levels.

Table 22: Cranbrook TSA Forest Industry Related Employment Coefficients and Employment

	Person Years (PYs) per 1000 m3 Harvested and Processed		PYs Attributable to Current TSA Harvest of 896 136 m3	
	TSA	B.C. (1)	TSA	B.C. (1)
Direct employment (2):				
- Harvesting (3)	0.30	0.30	269	269
- Silviculture (4)	0.07	0.07	63	63
- Wood processing (5)	0.57	0.57	511	511
- Pulp processing	0.14	0.14	125	125
Total direct	1.08	1.08	968	968
Indirect/induced:	.63	1.452	563	1277
Total direct, indirect & induced (7)	1.71	2.506	1531	2245

Notes:

- (1) Provincial employment includes TSA employment. Employment is equal to the coefficient times the current harvest level (may not be exact due to rounding).
- (2) Direct employment is comprised of all forestry related activities; indirect employment results from forest industry expenditures on goods and services, induced employment is the result of direct and indirect employees spending their incomes.
- (3) Harvesting includes company employees at logging divisions and logging and road construction/maintenance contractors. Excludes log hauling contractors.
- (4) Includes basic silviculture; excludes incremental silviculture.
- (5) Wood processing includes all primary wood industry activities and value added. The PYs attributable to the current harvest include only the mill and head office employees reported in Tables 20 and 21 who depend on the TSA (based on estimated wood consumption).
- (6) Indirect employment at the TSA and provincial levels include: log hauling (about 0.04 PYs per 1000 m3 or 35 PYs at the current harvest level); the trucking of chips and lumber (also estimated at about 35 PYs at the current harvest level); and employment at other companies supplying the forest industry in the Cranbrook TSA.
- (7) Excludes 60 PYs at the Ministry of Forests office in Cranbrook. These are not considered to be dependent on the harvest level.

Source:

For further discussion, please refer to Appendix D, which provides labour coefficients by type of forest activity and gives a detailed description of the coefficients' calculations, use and assumptions.

Table 22 shows that the forest industry directly generates 1.71 jobs in the TSA for each 1000 cubic metres harvested. When extrapolated to the TSA harvest level, this translates to 1531 PYs. Table 22 also shows that approximately 2.51 PYs of provincial employment (including the TSA impacts) is generated per 1000 cubic metres harvested in the Cranbrook TSA. This translates to approximately 2245 PYs at the current Cranbrook TSA harvest.

3.5 Timber Harvest Forecasts

For this socio-economic impact analysis, the Ministry of Forests chose three timber harvest forecasts from the Timber Supply Analysis Report (TSAR), the technical document that drives this harvest level socio-economic review. In the context of the SEA, the scenarios provide a basis for discussion of the socio-economic impacts and issues involved in resource management decisions and resulting changes in timber harvest. The use of scenarios will provide the Chief Forester with socio-economic information on the impacts of changes in harvest levels. The forecasts are not harvest level recommendations, but provide a basis for discussion of the timber supply and harvest levels.

All three forecasts involve a 29% drop in the harvest level from the current harvest level of 896 136 cubic metres to a Long Term Harvest Level (LTHL) of 633 000 cubic metres. The forecasts differ in the timing and magnitude of initial harvest reductions; each forecast achieves the LTHL in Decade 13 (130 years in the future).

The three scenarios are as follows:

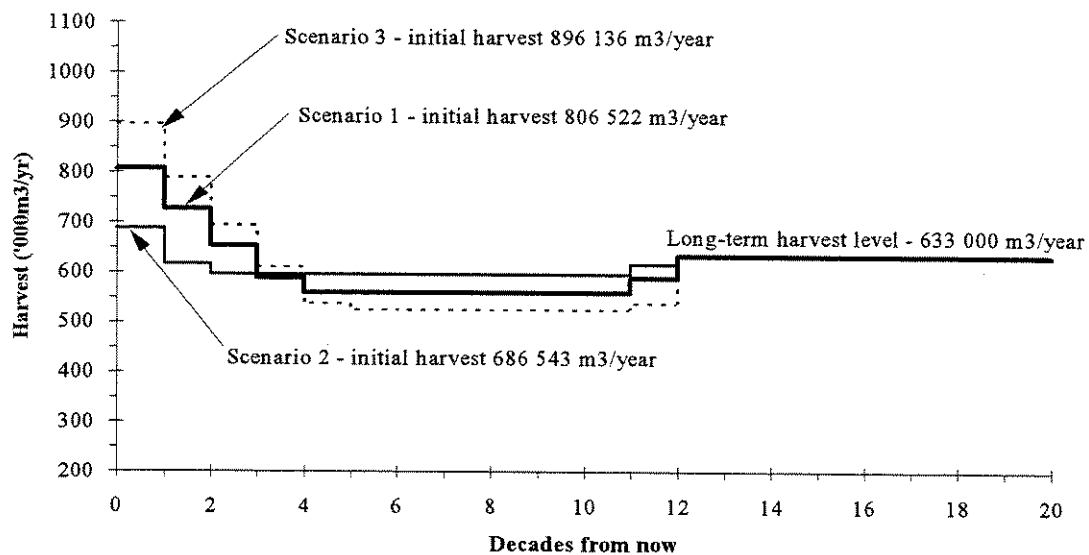
- **Scenario 1 (the Base Case):** This scenario assumes an immediate 10% drop from the current harvest level of 896 000 cubic metres, a further 10% drop per decade for the following 3 decades, a harvest level of 559 000 cubic metres for Decades 5 through to 11 and a gradual increase to reach the Long Term Harvest Level (LTHL) of 633 000 cubic metres by Decade 13.
- **Scenario 2:** This scenario assumes an immediate 23% drop from the current harvest level (or a further 15% from the base case level), a further 10% drop in Decade 2 and a drop of 3.4% in Decade 3 to reach 596 000 cubic metres. That level is held for 9 decades until the harvest level is allowed to increase by 3.5% in Decade 12 to 617 000 cubic metres and by 2.6% in Decade 13 to reach the LTHL of 633 000 cubic metres.
- **Scenario 3:** Under this scenario, the current harvest level continues through Decade 1, it then declines gradually to 525 000 cubic metres by Decade 6, it remains at that level until Decade 12 where it increases by 2.3% in Decade 12 and 17.9% in Decade 13 to reach the LTHL of 633 000 cubic metres.

Table 23 shows the projected harvest levels for each Decade under each scenario.

Table 23: Cranbrook TSA Timber Harvest Forecasts by Decade (000s m3)

	Scenario 1		Scenario 2		Scenario 3	
	000s m3	Change from current harvest level	000s m3	Change from current harvest level	000s m3	Change from current harvest level
Current	896	-	896	-	896	-
Decade 1	807	-10%	687	-23%	896	0%
Decade 2	726	-19%	617	-31%	789	-12%
Decade 3	653	-27%	596	-33%	694	-23%
Decade 4	588	-34%	596	-33%	611	-32%
Decade 5	559	-38%	596	-33%	537	-40%
Decades 6-11	559	-38%	596	-33%	525	-41%
Decade 12	588	-34%	617	-31%	537	-40%
Decade 13-25	633	-29%	633	-29%	633	-29%

Source: Ministry of Forests, Cranbrook Timber Supply Analysis Report, 1994.

Figure 5: Cranbrook TSA Timber Harvest Forecasts

4.0 Economic Impacts

The purpose of this chapter is to present the results of the economic impact analysis of the timber supply forecasts for the Cranbrook TSA.

4.1 Economic Impacts of Scenario 1

This section presents employment, employment income, and government revenue impacts associated with the Scenario 1 harvest forecast.

There are key limitations to the analysis and data presented. These relate to the following:

- **Linear relationship:** The presentation of impacts suggests that employment losses would occur concurrently with a change in harvest level. While harvesting employment may be closely tied to the level of cut, processing and silviculture may not immediately feel the impact of a reduced harvest. Processing employment changes may be more closely related to thresholds where, at some quantity of timber supply, mills may reduce the number of shifts, or as a worst case, shut down completely.

Further, indirect and induced impacts will adjust over a longer period of time as spending levels adjust and businesses recognize and adjust for the loss of business. The time-frame over which the full impacts would occur is unknown.

- **Future economic activity:** The analysis predicts future economic activity using employment coefficients which are based on current productivity standards and existing inter-industry and employment relationships. Changing productivity, growth in other employment sectors and other unknown variables will affect the accuracy of the coefficients.

4.1.1 Cranbrook TSA Forestry Related Employment and Income Impacts - Scenario 1

Employment and income levels for the base harvest level are presented in Table 24. As shown, the current harvest level supports 1531 PYs and contributes \$43.6 million in after tax employment income within the TSA.

Table 24: Cranbrook TSA Forestry Related Employment and Income Impacts - Scenario 1

Decade	harvest level 000 m3	Person Years			After Tax Income (\$ millions)		
		Direct	Indirect/ Induced	Total	Direct	Indirect/ Induced	Total
Current	896	968	563	1531	\$31.4	\$12.2	\$43.6
1	807	872	507	1379	\$28.2	\$11.1	\$39.3
2	726	784	457	1241	\$25.4	\$10.0	\$35.4
3	653	705	411	1116	\$22.9	\$8.9	\$31.8
4	588	635	370	1005	\$20.6	\$8.0	\$28.6
5-11	559	604	351	955	\$19.6	\$7.6	\$27.2
12	588	635	370	1005	\$20.6	\$8.0	\$28.6
13-25	633	684	398	1082	\$22.2	\$8.6	\$30.8

Notes:

- (1) Please refer to Appendix D for a discussion of the methodology used in calculating employment and employment income impacts.
- (2) Direct forest activity includes harvesting, processing and silviculture. Direct, indirect and induced employment levels are calculated by multiplying the coefficients in Table 22 with the harvest level. Indirect activities account for 33% of the spin-off employment impacts and 41% of the associated after-tax income impacts. Induced activities account for the balance, or 67% of the indirect/induced employment and 59% of the associated income.
- (3) Total employment excludes Ministry of Forests employees (60 PYs). These are not considered to be dependent on the harvest level, particularly since new initiatives like the B.C. Forest Practices Code are likely to add new responsibilities to government employees.

Table 24 also shows:

- Reducing the harvest level by 10% in Decade 1 would result in a decline in total TSA employment of 152 PYs, and 96 PYs of direct forestry employment. The loss of 152 PYs represents 0.7% of the total employment base in the TSA. Under this scenario, the short term unemployment rate for the area would therefore worsen from the 1994 average of 9.9% (the East Kootenay Regional District - EKRD rate) to 10.6%, a rate significantly higher than the 1994 B.C. average of 9.5%. However, a rate of 10.6% would still be much lower than the EKRD unemployment rate of 18.2% which prevailed in January 1993 following the Westar Mining shutdown, or the 1986 Cranbrook TSA unemployment rate of 14.2% which prevailed during the recession of the mid 1980's.
- Under Scenario 1, total after tax employment income would decline by \$4.3 million in Decade 1. This would represent a 0.7% drop in the TSA total after tax employment income of \$601 million (estimated for 1991/92 by the Ministry of Finance and Corporate Relations, see table 11).
- By Decades 2 and 3, the timber harvest would drop by another 10% in each decade,

resulting in a further loss in total employment of 138 PYs in Decade 2 and another 125 PYs in Decade 3.

- Under this scenario, employment generated by the forest industry would be lowest between Decades 5 and 11 at 955 PYs and \$ 27.2 millions in after tax income. This represents a 38% drop from current levels. In the very long term (Decades 13 to 25), jobs and income would be 29% below the current levels.

Scenario 1 assumes a 10% immediate drop in the harvest level. An important issue is whether this drop would result in the closure of one of the major sawmills in the Cranbrook TSA. CFI has three sawmills in the East Kootenay, one in Elko, one in Canal Flats in the Invermere TSA and one in Cranbrook. The CFI mills are already operating on two and not three shifts so that the option of reducing a shift is not likely to be feasible (operating a major sawmill with only one shift is not likely to be profitable in the long-term). The Galloway Lumber sawmill also operates on two shifts. The closure of any one of those sawmills would result in immediate job losses which could be higher than is indicated in the analysis:

- The analysis assumes a linear relationship between harvest and job losses so that a 10% drop in the harvest level would result in a loss of 50 PYs in wood products processing.
- The 10 % reduction in the harvest rate would reduce mill input by approximately 7% ($896 \times 10\% / 1254$). Two options faced by mills would be (1) to lower throughput to account for the reduction in fibre supply, or (2) to shut down the mill and transfer the remaining timber to another mill, and consequently shift some employment also. For the CFI mill in Cranbrook, the reduction of 10% would mean a loss of about 38 000 cubic metres of fibre, from a total mill input of about 378 000 cubic metres in 1993. If the mill were to shut down the fibre could be shifted to the CFI mill in Elko requiring a third shift. Thus, approximately half of the current employment could be lost, or about 100 PYs. A reduction in the supply of private timber would create additional rationalization of local processing and increase the number of jobs lost.

Over the long-term, the harvest would be reduced by approximately 263 000 cubic metres, or 29%. This would represent 21% of the current mill throughput and would lead to the loss of 284 direct forestry PYs. It is unlikely that all mills would be able to continue operation with this timber supply.

Another important issue is the potential of a drop in the Cranbrook TSA harvest resulting in a temporary or permanent closure of the Skookumchuck pulp mill. In the short-term, the pulp mill is not likely to close permanently because of a reduction in chip supplies, particularly since a 10% drop in harvest levels as forecast for Decade 1 under Scenario 1 would only result in a 4%

drop in the total chip consumption for the mill.³² In 1993, the mill processed 328 192 BDUs of chips of which 50% originated from mills in the Cranbrook TSA. Any reduction in harvest will impact chip supplies and the operation of the mill in Skookumchuck. CFI is concerned with the capacity utilization and ultimate viability of the pulp operations partly because of the size of the investments in assets (the assets of the pulp mill are valued at approximately \$500 million compared with \$90 million for all of their sawmills). The longer term reductions in harvest levels, however, will likely affect decisions regarding future investments at the mill. This is an important issue since pulp mills must continually re-invest to remain competitive.

Another issue which affects CFI and Galloway Lumber is that mills in the Cranbrook TSA rely heavily on wood from private sources including private timber from Alberta. Representatives at CFI and Galloway Lumber expect some tightening in the supply of wood from private lands over the next few years (as was shown on Table 19, the harvest from private lands in the Cranbrook TSA dropped by 41% between 1989 and 1993). In 1994, part of that decline has been compensated by an increase in timber volume from private lands in Alberta. However, the current Alberta government is reviewing policies that may impact timber shipments to B.C. in the future.

4.1.2 Provincial Forest Sector Employment and Income Impacts - Scenario 1

Essentially all of the direct employment related to the harvest of the Cranbrook TSA flows to Cranbrook TSA residents:

- **Local mills are net importers of wood:** The local Cranbrook TSA sawmills consume more wood than is generated from within the TSA. All manufacturing operations in the Cranbrook TSA, large or small, rely on non-TSA wood because of the acute wood shortage that already exists in the region.

While local Cranbrook TSA mills are net importers of wood, some trade in wood volumes occurs between the Cranbrook TSA and neighbouring TSAs. Mills that sometimes process Cranbrook TSA wood volume include Slocan Forest Products, Evans Forest Products, Wynndel Box & Lumber and J.H. Huscroft.

- **Exports:** Most of the end-use products are re-processed in the region or exported outside British Columbia:
 - because of the Cranbrook TSA's proximity to the United States, most of the Cranbrook TSA lumber is exported to that country with a small percentage going to Japan (the CFI sawmills are starting to produce some Japanese grades but the U.S. and Canadian

³² A 10% drop in harvest level from the Cranbrook TSA would represent approximately 12 000 BDUs of chips, or a 4% drop in total chip consumption of 328 192 BDUs (1993). This represents the fibre consumption for the mill for approximately two weeks. The mill would have two choices: operate at a lower capacity for a period of time, or shutdown for approximately two weeks.

markets still account for about 98% of their sales);

- all of the chips are re-processed into pulp at the mill in Skookumchuck; the pulp is then primarily exported to the U.S., Japan and Europe.³³

While all of the direct employment and income supported by the TSA harvest goes to Cranbrook TSA residents, a significant portion of the indirect jobs flow to other regions of the province. The following table summarizes the effects of Scenario 1 on B.C. employment and income levels.

Table 25: Provincial Forestry Related Employment and Income Impacts - Scenario 1

Decade	Harvest Level 000 m3	Person Years			After Tax Income (\$ millions)		
		Direct	Indirect/ Induced	Total	Direct	Indirect/ Induced	Total
Current	896	968	1277	2245	\$31.4	\$28.0	\$59.4
1	807	872	1150	2022	\$28.3	\$25.2	\$53.5
2	726	784	1035	1819	\$25.4	\$22.7	\$48.1
3	653	705	931	1636	\$22.9	\$20.4	\$43.3
4	588	635	838	1473	\$20.6	\$18.4	\$39.0
5-11	559	604	797	1401	\$19.6	\$17.5	\$37.1
12	588	635	838	1473	\$20.6	\$18.4	\$39.0
13-25	633	684	902	1586	\$22.2	\$19.8	\$42.0

Note:

(1) Provincial employment and income levels include TSA employment and income. Please refer to Appendix D for details on the methodology.

(2) At the provincial level, indirect activities account for approximately 53% of the spin-off employment effects and 58% of the after-tax income impacts. Induced activities account for the balance, or 47% of the spin-off employment and 42% of the spin-off after-tax income impacts.

Table 25 shows that the Cranbrook TSA has the following impacts on the province:

- The Cranbrook TSA currently supports total employment of 2245 PYs and \$59.4 million in total after tax income in all of B.C. (including the TSA impacts).
- Under Scenario 1, timber harvest levels would drop by 10%, resulting in an immediate loss in total employment of 223 PYs throughout B.C.
- Scenario 1 assumes that the timber harvest level will be 19% lower than the current harvest by Decade 2 and 27% lower by Decade 3. At the provincial level, this would translate into a further loss in total employment of 203 PYs in Decade 2 and another 183 PYs in Decade 3. By Decade 3, total provincial employment generated by the Cranbrook TSA under Scenario 1 would be 1636 PYs, some 609 PYs lower than under the current harvest level.

³³ Source: 1993 CFI Annual Report and discussions with CFI representatives.

- Under Scenario 1, provincial employment generated by the Cranbrook TSA would be lowest between Decades 5 and 11 at 1401 PYs and \$37.1 million in after tax income. This represents a 38% drop from current levels. In the very long term (Decades 13 to 25), jobs and income would be 29% below the current levels.

4.1.3 Employment and Income Impacts in Other Economic Sectors - Scenario 1

This section discusses employment and income impacts of Scenario 1 on the other basic sectors of the Cranbrook TSA economy.

- **Mining Sector.** The mining sector is the largest industrial sector in the Cranbrook TSA and employment in mining will not be affected by the changes in harvest levels. However, mining employment in the Cranbrook TSA is likely to drop in the next few years with the shutdown of the Cominco lead and zinc mine in Kimberley. The mine currently has 662 employees and it is expected to close down by the year 2002. The combined community effects of the mine closure and the drop in forest employment which would result from changes in harvest levels are discussed in the next chapter.
- **Public Sector.** The public sector is the second largest economic sector in the Cranbrook TSA generating approximately 27% of employment. Most public sector employment provides health, education and other services to the population.

Under Scenario 1, Cranbrook TSA employment would likely drop by 155 PYs in Decade 1. Based on the experience of the Westar Mining displaced employees, about one third of the individuals can be expected to leave the area with their families within the first two years following the lay-offs. With their families, this could lead to approximately 200 people leaving the community, or 0.4% of the total Cranbrook population.

This is a very small population drop and some of it may be mitigated by initiatives like the Forest Renewal Plan, or offset by people moving into the area. As a result, public sector employment is not likely to vary significantly, at least in the short term, because of harvest level reductions and the resulting forest industry job losses.

- **Tourism and Recreation Resources.** The relationship between harvesting and tourism/recreation is complex. Tourism impacts resulting from an immediate reduction in timber harvest levels are therefore difficult to quantify. Tourists do not immediately visit an area because there is a reduction in harvest levels. Tourism depends on many factors such as marketing and amenities. It is likely that tourism and recreation will not change significantly as a result of the reduced harvest level under Scenario 1, particularly in the short-term. In the long-term, however, reduced levels of harvesting may have a positive impact on tourism and recreation, particularly for the adventure market segment. The following details the impacts on each market segment:
 - Some 86% of visitors to the Rocky Mountain region cited touring, visiting relatives, resort vacation, business and other activities that do not depend on the outdoors and wilderness as the main reason for their visit. That segment is not likely to be affected by harvesting levels provided that visual quality objectives are maintained in the main viewing corridors.

- About 14% of visitors to the region cited the outdoors as the main reason for visiting the Rocky Mountain tourist region. It is that segment of the tourism and recreation sector which is most likely to be affected by changes in harvest levels. The economic contribution of the adventure tourism sector is smaller than other tourism business because tourists who seek a wilderness adventure often choose to camp and their daily expenditures are typically lower than those of other tourists.
 - Guide outfitting also relies on wilderness and wildlife. Logging typically increases road access for local hunters to reach wildlife populations that were previously in wilderness areas. The guide outfitting and adventure tourism industry generates an estimated 80 direct PYs and the reduced levels of harvesting proposed under Scenario 1 may help protect these jobs in the Cranbrook TSA.
 - Hunting activities also depend on a healthy wildlife population. As noted earlier, hunting is an important part of the tourism/recreation sector. Forestry practices that will foster the development and maintenance of wildlife habitats and rangelands are more important to hunters than the rates of cut.
- **Agriculture:** Agriculture and ranching account for approximately 2% of employment in the Cranbrook TSA. Industry growth in the Cranbrook TSA is limited because of the shortage of rangeland. Logging activity assists in providing much needed grazing lands, although tree planting practices especially if done almost immediately after logging, negates most of the grazing opportunities. Overall, however, the reduced logging under the base harvest level will not significantly affect the agriculture and ranching industries unless TSA lands are specifically converted to rangelands.
- **Trapping:** Trapping in the Cranbrook TSA generates only part-time employment. The trappers share many of the same concerns as the guide outfitters. Certain species like the marten have been less common because of their dependence on old growth forests. Other species benefit from harvesting because of increased forage. In general, the reduced harvesting level suggested for Scenario 1 could reduce wildlife disturbances that are problematic for trappers.

4.1.4 Provincial Government Revenue Impacts - Scenario 1 1

Table 26 shows estimated government revenues generated by the current harvest from the Cranbrook TSA.

Table 26: Annual Government Revenue Impacts - Scenario 1

Decade	Harvest Level (000 m3)	Provincial (\$ millions)				Fed. (4)	Total
		Stumpage /Rents (1)	Pers.Inc. Tax (2)	Other (3)	Total		
Current	896	7.4	6.4	5.4	19.2	13.5	32.7
1	807	6.7	5.7	4.9	17.3	12.2	29.5
2	726	6.0	5.2	4.4	15.6	10.9	26.5
3	653	5.4	4.6	4.0	14.0	9.8	23.8
4	588	4.9	4.2	3.5	12.6	8.9	21.5
5-11	559	4.6	4.0	3.4	12.0	8.4	20.4
12	588	4.9	4.2	3.5	12.6	8.9	21.5
13-25	633	5.2	4.5	3.9	13.6	9.5	23.1

Notes:

- (1) The average 1993 Cranbrook TSA stumpage rate of \$7.89/m³ was used for the estimate of stumpage revenues. A rental rate of \$0.38/m³, based on the interior average published in the report "The Forest Industry in British Columbia, 1993" by Price Waterhouse, was added to stumpage estimates. Policy changes announced in April 1994 under the Forest Renewal Plan has led to an approximately 80% increase in stumpage revenues across the province.

The above table shows that stumpage, royalties and rents of \$7.4 million are being paid under the current harvest level. In reality, stumpage revenues vary with harvest levels which can be as much as 50% lower or higher than the harvest level in any given year (provided that other years compensate for the varying levels). As a result, the 1993 stumpage actually collected for the Cranbrook TSA was about \$7.7 million excluding rents of \$0.3 million, or \$0.6 million more than what is shown above.

- (2) Includes personal income tax paid by direct, indirect and induced employees; assumes that one third of personal income taxes are provincial, the other two thirds are federal.
- (3) Other provincial taxes include corporate income taxes, provincial sales taxes, electricity taxes, logging tax and corporate capital tax. A rate of \$6.06/m³ has been used based on an inflation adjusted five year provincial average (1988-1993) published by Price Waterhouse.
- (4) Federal taxes include federal personal income taxes, corporate income taxes, excise, sales and withholding taxes. Federal revenues exclude Goods and Services Tax and contributions to the Unemployment Insurance Program and the Canada Pension Plan.

Source: Please refer to Appendix D for more detail.

Table 26 shows that the Cranbrook TSA currently generates \$19.2 million in provincial tax revenues and another \$13.5 million in federal revenues. For the purpose of this analysis, government revenues stemming from the Cranbrook TSA include corporate taxes (including corporate income tax and stumpage revenues) as well as income tax paid by individuals who are directly and indirectly employed in the B.C. forest industry. The analysis does not consider sales taxes (PST and GST) paid by employees, nor does it consider taxes paid by employees

who reside outside B.C. but depend on the B.C. forest industry. Table 26 also shows the following:

- Stumpage revenues and rents account for 39% of provincial government revenues from the forest industry in the Cranbrook TSA. Personal income taxes paid by direct, indirect and induced employees account for another 33%. Other taxes account for the remaining 28%.
- Under Scenario 1, a drop of 10% in the harvest level in Decade 1 would reduce provincial government revenues by about \$1.9 million. Under the LTHL, provincial government revenues would be 29% lower than they are now, representing a drop of \$5.6 million per year.
- At current harvest levels, federal government revenues account for \$13.5 million every year, of which 94% is paid in the form of personal income taxes and the balance is paid by corporations. Under Scenario 1, federal government revenues would drop by 10% in Decade 1, or about \$1.3 million per year.

4.2 Economic Impacts of Alternative Harvest Forecasts

This section reviews the socio-economic impacts of two alternative harvest forecasts.

4.2.1 Economic Impacts - Scenario 2

Scenario 2 assumes an immediate 210 000 cubic metres (23%) decline in the TSA harvest, or 121 000 cubic metres (15%) lower than the Scenario 1 initial harvest. Scenario 2 assumes that harvest levels in Decades 1 to 3 would be 15%, 15% and 9% lower, respectively, than under Scenario 1. These lower harvest levels in the early years would allow a harvest 1% higher than under Scenario 1 in Decade 4, 7% higher in Decades 5 to 11 and 5% higher in Decade 12. In Decades 13 to 25, both scenarios have the same LTHL of 633 000 cubic metres, 29% lower than the current harvest.

Table 27 describes the key economic impacts related to Scenario 2.

Table 27: Key Economic Impacts - Scenario 2

Decade	Harvest Level 000 m3	Person Years (1)				After-Tax Income (\$ millions)		B.C. Gov't Rev. \$mill.
		Direct	Indirect/ Induced		Total	Direct	Total B.C.(2)	
			TSA	Other B.C.				
Current (1994)	896	968	564	713	2245	\$31.4	\$59.4	\$19.2
1	687	741	432	545	1719	\$24.0	\$45.5	\$14.7
2	617	666	388	492	1546	\$21.6	\$40.9	\$13.2
3-11	596	644	375	475	1494	\$20.9	\$39.5	\$12.8
12	617	666	388	492	1546	\$21.6	\$40.9	\$13.2
13-25	633	684	398	504	1586	\$22.2	\$42.0	\$13.6

Notes:

- (1) Direct, indirect and induced person years are calculated by multiplying the coefficients in Table 22 with the harvest levels.
- (2) Total employment, income and government revenue impacts include TSA and provincial impacts. Please refer to Appendix D for methodology.
- (3) B.C. Provincial government revenue impacts include stumpage and rents, personal income taxes paid by direct, indirect and induced employees, corporate income taxes, provincial sales taxes, electricity taxes, logging taxes and corporate capital taxes. Federal taxes are excluded from this table. However, they can be easily estimated by multiplying the harvest level by an average rate of \$ 15.09 per m3. This includes an estimate of federal income taxes paid by individuals and corporations, excise, sales and withholding taxes. Federal revenues exclude Goods and Services taxes and contributions to the Unemployment Insurance Program and the Canada Pension Plan.

Scenario 2 would have the following impacts:

- Under Scenario 2, in Decade 1, TSA direct employment would decline by 226 PYs and 132 indirect/induced PYs. TSA total employment would therefore decline by 358 PYs from the current level of 1531 PYs, a level 23% lower than under the current harvest and 15% lower than under Scenario 1. The reduction includes 63 PYs lost in harvesting, 15 in silviculture, 119 PYs in wood products processing, 29 PYs in pulp processing, and 132 PYs in other businesses serving the forest industry and its employees.
- An additional 358 unemployed workers in the Cranbrook region would result in an increase in the unemployment rate from the current 9.9% to 11.4%, given the continuation of the current unemployment level. Employment increases (decreases) in other sectors will offset (compound) the unemployment rate.
- Under Scenario 2, total provincial employment income would decline by \$13.9 million from current level of \$59.4 million. TSA total after tax employment income would immediately

decline by \$10.1 million from the current level of \$43.6 million. The decline of \$10.1 million represents 1.7% of the total after tax income for the region of \$601 million (estimated for 1991/92 by the Ministry of Finance and Corporate Relations, see Table 11).

- Total provincial employment generated by the Cranbrook TSA forest industry would drop by 526 PYs from current levels, and in Decade 1 would be 15% lower than under Scenario 1 (1719 vs. 2022 PYs).
- In Decade 1, provincial annual government revenues from the Cranbrook TSA forest industry would be \$14.7 million, or \$4.5 million lower than the \$19.2 million generated under current harvest level levels.

The analysis above may be understating the economic impacts of an immediate 23% drop in harvest levels. Because of the size of the drop in the harvest under Scenario 2, there is a much greater chance that one of the sawmills in the Cranbrook area would shutdown. As indicated earlier, the closure of, for example, the CFI mill in Cranbrook would result in about 100 employees being terminated in the wood processing area alone, assuming that some employment is shifted to other TSA mills.

4.2.2 Economic Impacts - Scenario 3

Scenario 3 assumes that the current TSA harvest would remain the same for Decade 1, drop by 12% per decade in Decades 2 through 5, and remain at a level approximately 40% below the current harvest level until Decade 13 when the harvest would increase to the LTHL of 633 000 m3. Under Scenario 3, the harvest levels in Decades 1 through 4 would be higher than under Scenario 1 (by 11%, 9%, 6% and 4%, respectively). To compensate for these higher harvest levels, however, the harvest under Scenario 3 would then be set at a level about 6% lower than the Scenario 1 harvest for Decades 5 through 12, until the LTHL of 633 000 m3 is reached in Decade 13.

Table 28 shows the key economic impacts for Scenario 3.

Table 28: Key Economic Impacts - Scenario 3

Decade	Harvest Level 000 m3	Person Years (1)				After-Tax Income (\$ millions)		B.C. Gov't Rev. (\$mill.)
		Direct	Indirect/ Induced		Total	Direct	Total (2)	
			TSA	Other B.C.				
Current (1994)	896	968	564	713	2245	\$31.4	\$59.4	\$19.2
1	896	968	564	713	2245	\$31.4	\$59.4	\$19.2
2	789	852	496	629	1977	\$27.6	\$52.3	\$16.9
3	694	750	437	552	1739	\$24.3	\$46.0	\$14.9
4	611	660	384	487	1531	\$21.4	\$40.5	\$13.1
5	537	580	338	428	1346	\$18.8	\$35.6	\$11.5
6-11	525	567	330	419	1316	\$18.4	\$34.8	\$11.3
12	537	580	338	428	1346	\$18.8	\$35.6	\$11.5
13-25	633	684	398	504	1586	\$22.2	\$42.0	\$13.6

Notes:

- (1) Direct, indirect and induced person years are calculated by multiplying the coefficients in Table 22 with the harvest levels.
- (2) Total employment, income and government revenue impacts include TSA and provincial impacts. Please refer to Appendix D for methodology.
- (3) B.C. Provincial government revenue impacts include stumpage and rents, personal income taxes paid by direct, indirect and induced employees, corporate income taxes, provincial sales taxes, electricity taxes, logging taxes and corporate capital taxes. Federal taxes are excluded from this table. However, they can be easily estimated by multiplying the harvest level by an average rate of \$15.09 per m3. This includes an estimate of federal income taxes paid by individuals and corporations, excise, sales and withholding taxes. Federal revenues exclude Goods and Services taxes and contributions to the Unemployment Insurance Program and the Canada Pension Plan.

Under Scenario 3, employment would be maintained at higher levels in Decades 1 through 4 than under Scenario 1 (by 11%, 9%, 6% and 4% respectively, assuming a linear relationship between harvest levels and employment). However, in Decades 5 to 13, employment losses would be higher than under Scenarios 1 and 2. In Decade 5, the harvest level, thus employment and income, would be 4% lower under Scenario 3 than under Scenario 1. In Decades 6 to 11, the harvest level, employment and income would be 6% lower.

The main difference between Scenario 3 and Scenario 1 is that Scenario 3 maintains the current harvest for another 10 years. This would help assure the survival of the existing mills for a decade and would delay the rationalization until Decades 2 and 3. However, even under the current harvest level, there are significant wood supply shortages in the Cranbrook and

neighbouring TSAs. There are therefore no guarantees that the three major sawmills in the TSA would remain open throughout the next decade even if harvest levels from the Cranbrook TSA are maintained at current levels.

5.0 Social and Environmental Implications

This chapter presents the potential effects of TSA timber harvest forecasts on the Cranbrook TSA communities, First Nations and the environment.

5.1 Implications for Communities

Discussion of potential social effects of harvest reductions is focused on the first decade:

- Under Scenario 1, the harvest level would immediately be reduced by 10%, or 89 000 m³;
- Under Scenario 2, the harvest would be reduced by 23%, or 210 000 m³; and
- Under Scenario 3, the harvest would remain at the current level of 896 000 cubic metres for another 10 years.

Scenarios 1 and 2 would lead to significant job losses in harvesting and a proportional drop in the processing sector. One of the main issues however, is whether the drop in harvest under each Scenario would lead to a mill closure. Should one of the mills close, the immediate job losses would be larger than expected, but the job impacts in future years would be lower.

- Under Scenario 1, the 10% harvest reduction in Decade 1 is not likely to be sufficiently large to justify shutting down a mill. However, TSA mills already depend heavily on wood harvested on private lands in B.C. and Alberta (about 40% of the wood supply of the major sawmills come from private sources and other TSAs). Any reduction in that supply because of reduced availability or a change in government policy could amplify the reduction in the TSA harvest and precipitate a mill closure.
- Under Scenario 2, one of the Cranbrook TSA sawmills would likely close in Decade 1.
- Under Scenario 3, the timber harvest would remain at the current level throughout Decade 1, thereby helping secure the jobs at the existing mills for the next decade.

This section discusses the following:

- Effects of job losses on workers and their families;
- Employee transition following job loss;
- Effects on communities; and
- Opportunities for mitigation.

5.1.1 Effects of Job Losses on Workers and their Families

Unemployment can affect the mental and physical health of individuals. A recent study prepared for the Interior Lumber Manufacturers' Association, states that unemployment often precipitates numerous serious illnesses including cardiovascular-renal diseases, numerous stress-related diseases and diminished self esteem.³⁴ Another study prepared for the Ministry of Employment and Investment in 1993 describes how workers and families within the resource industry dependent communities may be affected by job losses.³⁵ Based on these and other studies, the effects of job losses on workers and their families may be as follows:

- Unemployment can increase domestic violence, substance abuse, suicide or threats of suicides and marital breakdown. This generally occurs where this tendency already exists.
- There could be a negative impact on children as a result of changes in parental roles and the economic stresses of job loss.
- Older and longer tenured workers (45 to 55 years old) are more affected than younger workers. Older workers are more vulnerable, still having substantial financial and family responsibilities but limited scope for finding alternate employment. On the other hand, older workers are more likely to be protected by seniority rights.
- There appears to be a definite pattern to the timing of the effects with two separate periods, one in the first two to three months following the lay-offs, and another about two years after the lay-offs, when the seriousness of the situation sets in and problems may peak. This may be partly due to the various government income support and training programs made available to unemployed individuals.
- Community representatives and laid-off workers often show scepticism regarding additional training and stress counselling services. This was noted in the above mentioned ARA Consulting study and was also observed in the case of the displaced Westar Mining employees.
- Employees whose jobs indirectly depend on the forest industry often suffer more than the ex-forest industry employees. The individuals who are likely to be affected by a loss of indirect and induced jobs are likely to have fewer skills and fewer financial resources than the displaced forest industry workers. They may therefore have fewer options.
- Average wage levels will decline in communities affected by the loss of high paying jobs in the forest industry. As lower paying jobs replace the higher paid forest industry jobs, the average wage level of these communities will be lowered permanently.

³⁴ Lee, Robert. Employee Transitions and Risks Following Timber Harvest Reductions: Preliminary Estimates and Suggested Methodology, prepared for the Interior Lumber Manufacturers Association. 1994.

³⁵ ARA Consulting Group Inc., Resource Based Community Adjustments, prepared for the B.C. Ministry of Employment and Investment. 1993.

5.1.2 Employee Transition Following Job Loss

Employee transition following job loss will be easiest if the displaced forest industry workers find alternate employment, even if the average wage levels may be lower. In order to assess the likelihood of the displaced forestry workers finding alternate employment, it is useful to review the case of the 1500 East Kootenay coal mining employees who lost their jobs in 1992 when Westar Mining ceased operations and other coal mines reduced employment because of market conditions. Because other mining companies re-employed part of the workforce, a review of what happened to the displaced workers who did not return to the mine provides some insight as to what might happen to displaced forest industry workers in the Cranbrook region:

- About 34% of the displaced workers re-located to other communities mainly because they found alternate employment.
- About 6% started their own businesses. Starting a business seemed to be one of the only options for those who wanted to remain in the community and continue working.
- About 10% are no longer in the labour force (retired, deceased or on Long-Term Disability).
- Two years after the lay-offs, 50% continue to reside in the community but are still unemployed and looking for work, or furthering their education and training.

A higher percentage of displaced forest industry employees may find alternate employment than was the case for the Westar Mining employees. Under Scenario 2, the harvest would drop by 23% immediately and result in a loss of 227 direct jobs and 138 indirect and induced jobs in the Cranbrook region. The number of direct jobs lost would be 15% of the 1500 direct coal mining jobs lost in 1992. The situation of the displaced mining workers was likely to have been worse than what will be experienced in the forest industry simply because of the number of lay-offs relative to the size of the labour force. On the other hand, the displaced mining workers were a well defined and easily targeted group who received significant attention from governments. The Forest Renewal Plan promises to do the same at least for the displaced direct forest industry workers. However, it may be more difficult to identify and assist the indirect and induced displaced workers whose jobs depended on the forest industry, particularly if the job losses occur gradually over a number of years.

The timing of the lay-offs will also affect the likelihood of workers finding alternate employment. Most of the forest industry lay-offs will occur in the Cranbrook/Kimberley region, rather than in the Elk Valley. The Cranbrook/Kimberley economy is much larger and more diversified than the Elk Valley economy. It has also recovered from the economic downturn of the mid-1980s and early 1990s. Should a mill closure occur within the next two to three years, there will be a higher chance of the displaced workers finding alternate employment than a few years ago. On the other hand, the Cominco-Sullivan mine is expected to close by the year 2002 which could

potentially lead to 662 lay-offs (the mine's employment level as of September 1994) less the teardown, reclamation and clean-up crews which will likely be required for several years thereafter. Any mill closure around that time will be more stressful to all those involved because of the compounding effects of having more than one major employer closing down.

Another factor which will affect the transition of displaced forest products workers following job loss is the availability of Unemployment Insurance for one year following the lay-offs and welfare payments for subsequent years. The results presented in the economic impact section assume that the income of individuals who lose their job will drop to zero, i.e. they either leave the area, or remain, but without a source of income. If the pattern of the displaced mine workers noted above is followed, 34% of the workers will leave the area, 16% will retire or find alternate employment and half will continue to live in the area and remain unemployed or seek further training (at least in the short term).

The fact that displaced workers can access government funds from the UIC or welfare programs help mitigate social impacts of job losses, particularly in the first one or two years following job losses. Unemployment insurance would help in the first year following job losses and welfare payments would continue to assist, although at a much lower rate in the years following that first year. The spending of safety net transfer payments on consumer goods and services would save some induced jobs during these first adjustment years. This helps save some of the jobs in the induced sector each time a reduction occurs. The safety nets will not affect the reduction of direct forestry employment, it only provides these workers and their families with a source of income with which to maintain their households in the short-term.

Table 22 shows that the Cranbrook TSA generates 1.08 direct PYs, 0.22 indirect PYs and 0.44 induced PYs per 1000 cubic metres of wood harvested. At the current rate of harvest, this represents 968 direct PYs, 194 indirect PYs and 396 PYs induced jobs, for a total of 1558 PYs in the Cranbrook TSA. The induced jobs therefore represent 25% of the Cranbrook TSA forestry related employment impacts and 67% of the indirect and induced employment impacts. It is the timing of these induced job losses that would be affected by the availability of safety nets.

5.1.3 Effects on Communities

Any job losses increase pressures on workers and their families and in turn increase pressures on community services. For example, additional resources would be needed for career counselling, training and social services for the displaced workers and their families. The infrastructure in the Cranbrook TSA is relatively well developed to handle the displaced workers:

- The **East Kootenay Community College (EKCC)** offers a variety of courses that may help re-train displaced forest employees. The EKCC also gained significant experience when re-training and counselling the Westar Mining ex-employees.

- **Human Resources Development Canada** centres located in Cranbrook and Fernie offer a variety of services and programs including career counselling.
- The Cranbrook TSA has various economic development initiatives. For example, the **Rocky Mountain Business Development Centre**³⁶ helps develop new local businesses (part of the Community Futures Program of Human Resources Development Canada). The ARA study, Resource Based Community Adjustments, provides evidence that, at the community level, organizations like the Community Futures offices play an important role in community adjustments. Not only do they help finance local community businesses and create much needed employment, but they also generate a sense of community pride.

The Cranbrook economy is gaining momentum and the infrastructure should be sufficient to handle the displaced workers, particularly if the drop in harvest levels does not lead to a mill closure. A mill closure is a possibility under Scenario 1 and it is a very likely development under Scenario 2. A mill closure will be particularly difficult to handle by local services if it coincides with the Cominco mine closure expected in 2002. The Cranbrook TSA communities need to be aware of the potential job losses and related problems so that adequate funding, staffing and resources are made available to the displaced workers on a timely basis.

5.1.4 Opportunities for Mitigation.1.4 Opportunities for Mitigation

Local communities would not have a lot of time to plan for job losses, particularly under Scenarios 1 and 2 which assume an immediate 10% and 23% drop in the current harvest, respectively. Scenario 3 is the most desirable from a community perspective because it assumes that the current harvest would remain stable for another decade, thereby allowing significant time for adjustment. There are a number of opportunities for mitigation:

- The recently announced **Forest Renewal Plan** (British Columbia, 1994), proposes to collect several million dollars per year of additional stumpage revenues from forest licensees and invest this money within forest-based communities throughout the province. Key activities include developing new silviculture programs, rehabilitating watersheds, eroded logging roads and other sites, promoting value-added companies, and increasing the participation of First Nations in the forest industry.
- The **tourism sector** is increasing in importance, particularly in the Cranbrook/Kimberley region. The Kimberley residents were very active in developing the tourism industry by developing a Bavarian theme, a golf course and other attractions. The same type of initiatives may be required in other communities, particularly in the long-term as employment in the forest industry declines.

³⁶ The Rocky Mountain Business Development Centre (BDC) covers the Golden area, Columbia Valley, Central Valley (Cranbrook/Kimberley) and the Elk Valley. In the last five years, the BDC have helped retain 313 jobs and create 168 jobs. At least two thirds of these are in the Cranbrook TSA.

- **The Cranbrook/ Kimberley economy is relatively diversified** and this is where most of the forest industry related lay-offs are likely to occur. Cranbrook, Kimberley and other communities will need to capitalize on the economic sectors which offer potential for expansion. The Elk Valley has developed an extensive community plan to identify economic development opportunities. Similar activities will be required in other communities, particularly under Scenario 2.
- **Value-added** wood products manufacturing may offer opportunities for economic development. For example, a particle board plant could utilize wood fines which are currently produced by the local sawmills but are burned or shipped to the U.S. Some key constraints which limit value added opportunities in the Cranbrook TSA, however, include the relatively long distance between the region and major Canadian and U.S. urban centres, the capital requirements, fibre shortages, and low fibre quality.
- There may be spin-offs flowing from the **Downstream Benefits Agreement**, which is being negotiated to compensate for the destruction of lands and wildlife from the construction of the Libby Dam.

5.2 Implications for Aboriginal Communities

This section outlines the implications of the harvest levels on the Cranbrook TSA Aboriginal population. For the most part, Aboriginal concerns outlined in Section 2.4, such as access to timber and forest licences are beyond the scope of this study. These concerns will need to be addressed within processes outside the Timber Supply Review. The implications for Aboriginal communities of the various Scenarios will be as follows:

- **Harvest levels.** Reduced harvest levels such as those proposed under Scenarios 1 and 2 are more consistent with Aboriginal environmental and cultural values. All three Scenarios ultimately result in a 29% drop in the current harvest to the LTHL of 633 000 m3.

Reduced or no logging in certain areas with Aboriginal significance will help preserve the cultural, heritage and religious values of First Nations. As noted earlier, these areas include the Top of the World Park and Upper Galbraith, Akamina-Kishinena, Flathead and Wigwam River area, St. Mary's Lake, Baker Mountain, the Galton Range and Joseph's Prairie.

- **Employment in the forest industry.** The forest industry generates between 20 and 25 PYs of employment for First Nations in the Cranbrook TSA. Because of the seasonality of the jobs, about twice as many Aboriginal workers are involved in the sector.

While Scenario 1 assumes a 10% immediate decline in the harvest and Scenario 2 assumes a 23% drop in current harvest levels, employment for the Aboriginal population is not likely to be affected significantly. Most First Nations are employed in silviculture or fire fighting. Their jobs are not directly tied to harvest levels particularly since the recently announced Forest Renewal Plan hopes to increase the participation of First Nations in silviculture programs.

From an employment standpoint, the more negative implications of the TSA harvest reductions relate to the interest of First Nations to access forest licences in the area. Declining harvest levels would only make it harder for First Nations to obtain forest licences within the TSA in the future.

5.3 Environmental Implications

This section comments on the potential effects of current and forecast timber harvesting levels on forests, freshwater habitats and wildlife species populations. This section is based on a review of publicly available reports and material from the Ministry of Forests (MOF), the Ministry of Environment Land and Parks (MELP) and the Commission on Resources and the Environment (C.O.R.E.). This section was then reviewed by MOF and MELP representatives.

Unlike discussions about community and First Nations effects which focus on the short-term, this section focuses on the long-term effects of harvesting. Also, this section is much more tentative and qualitative in nature than the previous sections of this chapter. There are several reasons for this, including the Timber Supply Review's narrow focus on aggregate changes in harvesting levels, a limited amount of time and financial resources and a lack of information about current wildlife populations and ecosystem processes and relationships. The effects of timber harvesting on the environment are explained in detail in the environmental profile section of the report and are summarized following:

- **Ungulate Winter Range.** Forest harvesting practices can reduce the quantity and quality of suitable winter range habitat if logging is conducted without consideration of the structural forest attributes which contribute to the habitat requirements of overwintering ungulates. These include forage availability in the form of litterfall or ground vegetation, security cover, thermal cover and snow interception. Conversely, removal of forest cover from specific aspects on winter ranges can enhance forage opportunities for wintering ungulates.
- **Caribou.** There is concern about the long term viability of the South Purcells caribou herd if liquidation of old growth forest habitat continues at the current rate.
- **Grizzly Bears.** Access development associated with logging activity accommodates increased public access to habitat frequented by grizzly bears. Human/grizzly bear interaction is incompatible and usually results in the displacement of grizzly bears from preferred habitats.
- **Riparian Habitats.** Riparian habitat is very important to a variety of fish and wildlife species. Logging conducted without recognition of the sensitivity of these ecosystems can adversely impact riparian habitat and subsequently the fish and wildlife species that rely on these sites.
- **Watershed Harvesting and Fish.** From an aquatic ecosystem management perspective, the rate, extent and method of forest harvesting in watersheds, and the effect of these activities on the release volume and velocity of water flow in streams and rivers remains a concern.
- **Connectivity.** The continuation of current forest harvesting practices may exacerbate habitat fragmentation. Consequently, wildlife species' genetic exchange and connectivity between seasonal habitats and watersheds may be increasingly impaired.
- **Biodiversity.** On a site specific, short term basis, biodiversity values have sometimes been

enhanced through logging activity. However perpetuation of current forest harvesting practices, which radically alter the ecosystems in which harvesting occurs, will result in an overall decline in biodiversity values over the long term.

- **Access Development.** Current forest harvesting practices require the construction of an extensive network of roads. This development has accommodated significant increases in public contact with wildlife in all habitats throughout the Cranbrook TSA. Consequently the elevated exposure of fish and wildlife to recreational and commercial activities has directly impacted wildlife populations by increasing their vulnerability to over exploitation, and through increased harassment or displacement from preferred habitats.
- **Forest Encroachment/ Fire Suppression.** Fire suppression has been a singularly important contributing factor in the encroachment of forest habitat on open grassland communities in the Cranbrook TSA . Consequently, competition for available forage has increased and the quality and quantity of suitable rangelands, which meet the needs of domestic livestock and wildlife, has declined.

The three harvest level forecasts will ultimately result in a 29% drop in harvest levels. Since Scenario 2 calls for an immediate 23% decline in harvest level, it may be the most compatible with environmental values.

6.0 Concluding Remarks

The purpose of this study is to identify the potential environmental, social and economic implications associated with adjustments to timber harvest levels in the Cranbrook Timber Supply Area (TSA). The key variable in this analysis is the rate of timber harvesting rather than the methods or locations of harvesting. As a result, the multitude of pressing land use and land management issues in the Cranbrook TSA are not addressed in this study.

This analysis assumes that factors such as the timber harvesting land base, forest management practices, harvesting and processing technology, and the relative value of timber remain static. In fact, these factors are not static, and some of them are likely to undergo substantial change in the future. This will require a re-analysis of harvest projections and associated socio-economic impacts to account for these changes once they are fully understood.

People living in the Cranbrook TSA appear to share a common sense of the critical elements which create an attractive environment in which to live and work. Common values include respect for the wealth of natural resources in the region, an experienced wariness of the social strains associated with unemployment, and a desire to maintain the diverse lifestyle possibilities which the region offers.

Most of the land use and resource management conflicts in the region are not the result of fundamental differences in core value assessments, but are more like friction points which have developed due to the wide diversity of economic and recreational activity, and the complexity of the region's ecosystems. While the rate of timber harvest is of vital concern to those directly involved in the forest industry, those not directly involved are more concerned with where and how the timber is harvested.

The Cranbrook Timber Supply Analysis Report (TSAR) suggests a long-term timber harvest level for the TSA which is 29% below the current harvest. This entails an ultimate reduction in the harvest of 263 000 cubic metres, which can be achieved by any one of a number of paths leading to the same stabilized long-term harvest of 633 000 cubic metres. Regardless of which path is taken, there will be substantial economic and social impacts in the Cranbrook TSA. Timber shortages are already causing capacity utilization problems for wood products manufacturers in the area, and the reductions in timber supply contemplated in the TSAR would likely result in the closure of one of the three large mills.

The Cranbrook TSA has already suffered some major economic shocks with the scaling down of operations at the Sullivan mine in Kimberley, and the massive lay-offs in the Elk Valley coal industry. The community of Cranbrook has fared better than others in the Cranbrook TSA, with a more diversified economic base and lesser direct dependence on the mining industry.

Reductions in forest sector dependent employment will likely be centred in the Cranbrook area, which in many respects is in a better position to handle the impacts than the other Cranbrook TSA communities. In choosing which harvest reduction path to take, consideration should be given to how the timing of likely job losses will affect mitigation planning and strategies. An important factor to consider is the substantial job losses expected in the Cranbrook/Kimberley area when the Sullivan mine ceases operation.

Appendix A

Glossary of Terms

Allowable Annual Cut

The volume of timber which may be cut each year from a forest management unit, i.e. a Timber Supply Area), set by the Chief Forester in accordance with Section 7.0 of the Forest Act.

Animal Unit Month

Grazing by one mature, 1000 pound cow, with or without unweaned calf at side, or equivalent (e.g. one two-year old horse or five deer) for one month.

Basic Sector Employment

Basic employment is created by the components of the economy that result in the flow of outside dollars into the area. This may originate from industrial or non-industrial sources, such as investment income, pensions, and government transfer payments.

Biogeoclimatic Zones

A broad geographic unit that has distinguished characteristics of climate, soil and vegetation.

Blue-listed species

The regionally identified sensitive/vulnerable species as identified by the Ministry of Environment, Lands and Parks.

Bone Dry Unit (BDU)

A Bone Dry Unit is equal to 2400 pounds of dry pulp chips.

Clear-cutting

A type of silviculture system in which the crop is cleared from an area at one time and an even-aged, replacement stand is established. Clear-cutting is designed so that most of the opening has full light exposure and is not dominated by the canopy of adjacent trees. The minimum size of a clear-cut opening is generally considered to be 1 hectare.

Commission on Resources and the Environment (CORE)

The B.C. government established CORE in 1992 to develop a land use strategy for the province, with an emphasis on sustainability, public participation, and respect for Aboriginal rights.

Ecoregion

A part of an ecoprovince characterized by regional interactions between the four major environmental components of the ecosystem: air, water, land and biota.

Ecosection

A part of an ecoregion characterized by sub-regional ecological interactions between the four major environmental components of the ecosystem: air, water, land and biota.

Ecosystem

A functional unit consisting of all living organisms (plants, animals and microbes) in a given area, and all non-living physical and chemical factors of their environment, linked together through nutrient cycling and energy flow. An ecosystem can be any size, a log, pond, field, forest, or an earth's biosphere - but it always functions as a whole unit. Ecosystems are commonly described according to the major type of vegetation, for example, forest ecosystems.

Environmentally Sensitive Areas (ESAs)

Areas requiring special management attention to protect important scenic values, fish and wildlife resources, historical and cultural values, and other natural systems or processes. ESAs for forestry include potentially fragile, unstable soils that may deteriorate unacceptably after forest harvesting, and areas of high value to non-timber resources such as fisheries, wildlife, water and recreation.

Forest Practices Code

A package of legislations, regulations and standards intended to govern forest practices in British Columbia.

Forest Licence

A type of forest tenure that provides the holder the right to harvest a specified volume of timber from within a TSA. It also bestows on the licence holder an obligation to reforest the land. A licence has a term of 15 to 20 years, and is generally replaceable every five years.

Indirect and Induced Employment and Income Impacts

Indirect employment and income impacts represent the spin-off effects of related sectors or industries which supply materials or equipment to an industrial sector, in the case of this report, the forestry sector. Induced employment and income impacts are the result of direct and indirect employees spending their incomes on 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 in order to protect or enhance timber and non-timber forest values.

Local Resource Use Plan (LRUP)

A plan for a portion of a Timber Supply Area (TSA) or Tree Farm Licence that provides management guidelines for resource use integration in this area.

Land and Resource Management Plan (LRMP)

A plan for a forest district (one or more) that provides broad resource management objectives and strategies, and direction for more detailed resource planning by government agencies and the private sector.

Long Run Sustainable Yield (LRSY)

Timber harvesting levels whereby the volume of timber harvested in any given period can be replaced by a similar volume from regenerated stands within the same period.

Multiplier

Ratio of total income or employment impacts relative to direct impacts. Multipliers are generally greater than 1.0 since 1.0 represents the direct component.

Not Satisfactorily Restocked (NSR)

Productive forest land that has been denuded and has failed, partially or completely, to regenerate by natural or artificial means.

Person-Year (PY)

A standard measure of employment that takes into account part-time or seasonal full-time work. For example, if an employee works full-time for six months, he or she accounts for 0.50 PYs of employment. Using PYs allows different types of employment to be compared on a similar basis.

Productive Forest Land

Forest land that is capable of producing a merchantable stand within a defined period of time.

Protected Areas Strategy (PAS)

The strategy put in place to meet British Columbia's commitment to develop and expand the provincial protected areas system to protect 12% of B.C.'s land base by the year 2000. The goals of the Strategy are to protect viable, representative examples of natural diversity in the province, characteristic backcountry recreational and cultural heritage features, and special natural, cultural heritage and recreational features.

Red-listed species

Threatened or endangered species as identified by the Ministry of Environment, Lands and Parks.

Riparian Zone

The land adjacent to the normal high water line in a stream, river, lake or pond and extending to the portion of land that is influenced by the presence of the adjacent ponds or channelled water. Riparian areas typically exemplify a rich and diverse vegetative mosaic reflecting the influence of available surface water.

Selection Silviculture System

A planned sequence of treatments designed to maintain and regenerate a stand with three or more age classes. There are two selection systems: single-tree and group selection.

Silviculture

The art of producing and tending a forest and the application of the knowledge of silviculture in the treatment of a forest: the theory and practice of controlling forest establishment, composition and growth.

Small Business Forest Enterprise Program (SBFEP)

This program permits the Forest Service to sell Crown timber competitively to individuals and corporations who are registered in the SBFEP. Approximately 10% of the province's timber allocation is directed towards that program.

Stand

A community of trees sufficiently uniform in species composition, age, arrangement, and condition to be distinguishable as a group from the forest or other growth on the adjoining area, and thus forming a silviculture or management entity.

Tree Farm Licence (TFL)

A stewardship agreement between an individual forest company and the Forest Service that allows the company to occupy, and continuously manage the forests of a specified area. The licence includes the right to harvest timber according to plans approved by the Forest Service and the obligation to carry out all phases of forest management.

Timber Harvesting Land Base

The portion of the total land area of a management unit considered to contribute to and be available for long term timber supply.

Timber Licence (TL)

A type of forest tenure that was issued in the early 1900s. It includes a right to harvest timber according to plans approved by the Forest Service and an obligation to reforest. After harvesting, the area is rolled back into either the TSA or a TFL.

Timber Sale Licence

A type of forest tenure offered to small business loggers and to timber processors who qualify for registration under the Small Business Forest Enterprise Program. These licences are short-term in nature (under ten years) and allow the tenure holder to harvest the timber within a specific area within a TSA. Under this form of tenure, the Forest Service assumes a lot of responsibility for forest management, including development planning, road construction to the licence area, timber cruising, timber sale layout, basic silviculture and program administration.

Timber Supply Area (TSA)

An integrated resource management unit established in accordance with the Area Section of the Forest Act.

Watershed

An area generally defined by heights of land that collect and discharge water into a single main stream through a series of small tributaries. A watershed may be defined as a major system such as the Fraser River watershed, or as a smaller tributary or stream.

Woodlot licence

An agreement entered into under Part 3, Division 5 of the Forest Act. It is similar to a Tree-Farm Licence but on a smaller scale, and allows for the practice of forestry including harvesting in a specified area including both Crown and private forest land.

Appendix B

List of Contacts

Elected Officials/Community Representatives

Jim Abbott	Member of Parliament, Kootenay East, Cranbrook
Mayor Todo Miller	District of Sparwood
Mayor A. Dick Mulholland	City of Fernie
Mayor Jim Ogilvie	City of Kimberley
Mayor Mike Paterson	City of Cranbrook
Robert Appleby	Councillor, District of Elkford
Danny L. Dwyer	Technical Planning Coordinator, District of Sparwood
Kathy Gilbert	Planner, Regional District of East Kootenay
Larry Haber	Economic Development Officer, City of Kimberley
Ed Kathol	Director - Electoral Area "A", Regional District of East Kootenay
R.D. Whetham	Director of Planning, Regional District of East Kootenay

Aboriginal Elected Officials/ Community Representatives

Chief Sophie Pierre	St. Mary's Band, chairman of Ktunaxa-Kinbasket Tribal Council
Chief Paul Sam	Shuswap Band
Dan Gravelle	Councillor, Tobacco Plains Band
Hugh Taylor	Ktunaxa-Kinbasket Tribal Council

Forest Licensees

Bob Kelp	Crestbrook Forest Industries Ltd. (CFI)
D. (Moke) Melenka	Advanced Planning/Environment Manager, CFI
J.G. Reith	Chief Accountant, CFI
Dennis Rounsville	Chief Forester, CFI
Bud Nelson	General Manager, Galloway Lumber Company Ltd.
Cecil Stoochnoff	Accountant, Galloway Lumber Company Ltd.
Barrie McDonald	McDonald Ranch and Lumber

Small Business Operators/ Contractors/ Labour unions - Forestry Sector

Rob Dozzi	Kootenay Wood Preservers
Jim Fennell	Canada Cedar Pole
Stan McMaster	1st Vice President, IWA Canada, local 1-405
Doug Singer	Financial Secretary, IWA Canada, local 1-405

Various smaller forest products operators including:

Bear Lumber
Custom Log and Timber Construction
Fab-Co Forest Products 1989 Ltd.
J.R. Blackmore and Sons Ltd. (Creston)
Kootenay Log Homes
Totten Logging
Valley Lumber Sales

Representatives of Other Economic Sectors

Gord Burns	Guide outfitter & CORE representative for Backcountry Commercial Recreation
Kathy Cooper	Rocky Mountain Visitors Association
Maurice Hansen	Kootenay Livestock Association
Brian Knox	Manager, Chamber of Commerce, Sparwood
Verna Kurschenska	Manager, Chamber of Commerce, Fernie
Tom Quirk	Kootenay Christmas Tree Association
Martin Ross	General Manager, Fort Steel Heritage Town, Fort Steele
Dr. Larry Szalanski	Acting President and Chief Executive Officer, East Kootenay Community College, Cranbrook
Barry Scott	Guide Outfitter, Fort Steele
Chris Sinhuber	Manager, Fernie Campus, East Kootenay Community College
Maureen Sexsmith-West	Manager, Chamber of Commerce, Elkford

Other Community Interest Groups/ Members

Jim Campbell	East Kootenay Environmental Society
Don Jacubec	Fernie Rod and Gun Club
Wally Maluta	East Kootenay Hunters Association
Rod Scarff	East Kootenay Hunters Association
Jeff Wilson	East Kootenay Environmental Society

Other organizations including:

British Columbia Forestry Association
Rocky Mountain Community Futures/ Business Development Centre

Ministry of Forests, Cranbrook Forest District (FD)/ Nelson Forest Region (FR)

Holly Aumack	GIS Operations Forester, Nelson FR
Rick Baker	Operations Manager IRM Cranbrook FD
Steve Byford	Resource Officer, Small Business, Cranbrook FD
Gary Darychuck	Planning Officer, Nelson FR
Rex Durell	Mapping, Cranbrook FD
Ian Johnston	District Planner, Cranbrook FD
Joe Maure	Timber Supply Analyst, Nelson FR
Tom Volkers	Resource Officer Planning, Cranbrook FD

Ministry of Forests - Victoria

Dave Coffey	Economist, Economics and Trade Branch
Sinclair J. Tedder	Research Officer, Economics and Trade Branch
Gary M. Townsend	Manager, Resource Economics, Economics and Trade Branch

Ministry of Environment, Lands and Parks

Lynn Damont	Wild Life Branch, Victoria
Anna Fontana	Cranbrook
Paul Haley	Wild Life Branch, Victoria
Rob McArthur	Water Resource Planner, Nelson
Rob Neil	Cranbrook
Dr. Roger Reid	Wild Life Branch, Victoria
Ed Shaw	Water Resources, Cranbrook
Bill Westover	Fisheries Biologist, Cranbrook

Other Federal and Provincial Officials

Maureen Belding	Labour Market Information Analyst, Human Resources Development Canada, Cranbrook
George Brosseau	Regional Economic Development Officer, Ministry of Small Business, Tourism and Culture, Cranbrook
Jo Buss	Government Agent, Ministry of Small Business, Tourism and Culture, Fernie
Stuart Gale	Associate, Commission on Resources and Environment (C.O.R.E.), Victoria
Dr. Garry Horne	Manager, Modelling and Statistical Services, Ministry of Finance and Corporate Relations
Karol Hossman	Human Resources Development Canada, Cranbrook
Jim McAllister	Ministry of Skills, Training and Labour, Cranbrook
Sylvia McIver	Human Resources Development Canada, Cranbrook
Dwight Tardiff	Ministry of Social Services

Appendix C

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Appendix D

Calculation of Economic Impacts

Direct forestry activity comprises all forestry related activities involved with harvesting, processing and silviculture. Indirect impacts result from the purchase of goods and services by direct forestry businesses. Induced impacts arise as a result of employees spending their wages and salaries on consumer goods and services. The methodology for assessing direct, indirect and induced impacts of job losses resulting from a decrease in harvest levels is as follows:

- To determine direct forest activity related to harvest levels, major forest licensees and other sources provided data on employment, wages and government revenues attributed to given harvest levels. This information was used to derive direct employment coefficients expressed in terms of Person Years (PYs) of employment per 1000 cubic metres harvested/processed.
- To determine indirect and induced impacts resulting from the direct forest activity, the Ministry of Finance and Corporate Relations (MFCR) and the Ministry of Forests (MOF) instructed the consultants to apply multipliers to the direct employment estimates derived from the survey of forest industry companies:
 - For regional impacts, MFCR divides the economy into basic and non-basic sectors¹ and provides multipliers (or employment ratios of indirect or induced impacts to direct impacts) to estimate economic impacts; and
 - For provincial impacts, MFCR provided a methodology for consultants to estimate provincial multipliers from the B.C. input-output model that would reflect forestry activity that takes place in a given region.

D-1 Labour Coefficients

Labour coefficients reflect the relationship between the number of workers and the quantity of timber harvested and processed. Labour coefficients are presented in the form of labour per 1000 cubic metres of timber cut. Multiplying the coefficients by each forecast harvest level provides a projection of the number of workers that would be employed in the forest

¹ Economic base analysis assumes that the regional economy is divisible into a basic, or export, sector and a non-basic, or service, sector. The basic sector is assumed to be the driver of the local economy. Thus, economic expansion is the result of growth in the basic sector, i.e., growth in the production of goods and services flowing out of the region. All activity producing and providing inputs to the production process is included in the base sector. The non-basic, or service sector captures all of the activity involved with the sale of goods and services for final consumer demand, thus the induced effects. The relationship between the basic and non-basic sectors is assumed to be linear, thus the non-basic sector will grow by a constant proportion of the growth of the basic sector.

industry at selected intervals of the forecast period. The following table details the Cranbrook TSA labour coefficients, key assumptions and data sources.

Table D-1: Cranbrook TSA Employment Coefficients

	Employment per 1000 m3 (1)	
	Regional	Provincial (2)
Direct employment:		
- Harvesting (3):	0.30	0.30
- Basic silviculture (4)	0.07	0.07
- Wood products (5)	0.57	0.57
- Pulp processing	0.14	0.14
Total direct employment	1.08	1.08
Indirect and induced (6):		
- Indirect/Induced	0.63	1.425
Total employment (7)	1.71	2.506

Notes:

- (1) The analysis assumes a linear relationship between the number of workers and the quantity of timber harvested. As a result, any adjustment to a change in harvest level is assumed to occur immediately and in a linear fashion. Direct harvesting activity would likely decline in concert with harvest levels. However, processing employment would likely adjust on a step by step basis as companies either operate fewer shifts or shutdown entire mills. Silviculture employment would likely not decline immediately as a result of a reduction in timber harvest because of the lag time between harvesting and the completion of silviculture.

For purposes of this analysis, all part-time and seasonal jobs are translated into Person Years (PYs) of employment. A PY is defined as any job with a normal work year ranging between nine and twelve months. Part time and seasonal employment was translated into PYs on the basis of an 1800 hour work year. Because of the seasonal nature of some forest industry activities, particularly silviculture, a significantly higher number of people may participate in the industry than the number of PYs indicate.

- (2) Provincial employment includes TSA employment.
- (3) Harvesting employment at the regional level includes company employees at logging divisions and harvesting contractors (excluding log hauling but including road construction and maintenance). TSA licensees and SBFEP operators provided harvesting employment data. All harvesting and silviculture employees are assumed to reside in the TSA.
- (4) Includes basic silviculture but not incremental silviculture. Basic silviculture includes surveys, site preparation, planting, brushing and some spacing and is assumed to be harvest dependent. Incremental silviculture involves spacing, fertilizing and pruning and is assumed to remain constant regardless of short-term harvest level. We estimate that incremental silviculture in the Cranbrook TSA generates about 18 PYs or about 0.02 PYs per 1000 m3 of harvest. Silviculture coefficients are based on data provided by major licensees and the Ministry of Forests.

- (5) Wood products processing includes all primary wood industry activities. The coefficient represents processing jobs in wood products manufacturing operations divided by wood consumed by the mills in the TSA. The wood products processing coefficient includes a proportion of the CFI head office employment in Cranbrook as well as secondary wood processing that occurs in the Cranbrook TSA (e.g. wood preservation, poles, log homes and other value added).

The analysis assumes that the provincial processing coefficients are the same as those for the region:

- The sawmill processing jobs are converted to a number of jobs per m³ of wood consumed; by extrapolating that coefficient to the total harvest level, we insure that we are capturing all of the sawmilling jobs linked to that timber;
 - All of the chips produced in the Cranbrook TSA are consumed in the area;
 - All of the remanufacturing jobs in the Cranbrook TSA that directly depend on wood from the TSA are included in the processing employment coefficient; and
 - Almost all of the lumber, pulp and remanufactured products are exported outside British Columbia and are not processed further in the Province outside the Cranbrook TSA.
- (6) Indirect activities includes an estimated 0.04 PYs per 1000 m³ for log hauling and another 0.04 PYs per 1000 m³ for the trucking of lumber and chips within the TSA. The balance represents jobs resulting from forest industry expenditures on other goods and services including rail transportation and in-bound trucking. Induced employment is the result of direct and indirect employees spending their incomes on goods and services. Indirect and induced employment are based on regional and provincial multipliers as described in section D-2 of this Appendix.
- (7) Excludes 60 PYs at the Ministry of Forests office in Cranbrook. These are not considered to be dependent on the harvest level.

The direct employment coefficient of 1.08 PYs per 1000 m³ for the Cranbrook TSA compares with a coefficient of 1.17 PYs per 1000 m³ for the East Kootenay region, as reported in the C.O.R.E. East Kootenay Land Use Plan. The difference may be explained by the larger area covered by the C.O.R.E. report.

D-2 Regional and Provincial Employment Multipliers

The following section describes the multipliers used to determine the regional and provincial indirect and induced impacts.

Regional Multipliers

The MFCR developed multipliers on a regional basis under two different assumptions:

- the "**no migration**" multipliers assume that everyone who becomes unemployed stays in the area and receives unemployment insurance benefits. Since UIC can be obtained for one year following job losses, this is generally regarded as a short-term scenario.

- the "migration" employment ratios assume that all the individuals who have lost their jobs leave the region.

The MFCR recognizes that even the migration employment ratios may understate the long-run impacts of job losses if alternative income sources are not available and if public sector activity in a region is reduced due to emigration and reduced government revenue. For this reason, and also because this report reviews the short and long-term impacts of job losses, we have opted to use the migration employment ratios when estimating the indirect and induced impacts of job losses.

It is likely that some combination of the two would actually occur. Using the case of the Westar Mining workers, two years after the lay-off, 50% of the workers who were not re-employed at the mines remain unemployed, 34% left the community and the balance either operate their own business (6%) or left the labour force (10%). In the longer term, the workers who remain unemployed may ultimately leave the area.

As a result of choosing the migration scenario, the loss of employment income in the first two years following the loss of jobs will be somewhat overstated. Unemployment insurance would help in the first year following job losses and welfare payments would continue to assist, although at a much lower rate in the years following that first year. Further, the spending of safety net transfer payments on consumer goods and services would save some induced jobs during these first adjustment years.

Table D-2 shows the employment multipliers provided for the Cranbrook TSA under both sets of assumptions, i.e the no-migration and migration assumptions.

Table D-2: Regional Employment Multipliers for the Cranbrook TSA (1)

	Logging and Forestry	Pulp and paper	Other wood manufacturing
No Migration	1.36	1.56	1.27
Migration	1.62	1.86	1.49

Notes Represents total jobs over direct jobs, i.e. if one direct job is lost in logging and forestry in the Cranbrook/Kimberley area, another 0.62 indirect and induced jobs will be lost for a total of 1.62 job losses.

Source: British Columbia Local Area, Economic Dependencies and Impact Ratios, Discussion Draft, Garry Horne and Charlotte Penner, Ministry of Finance and Corporate Relations, August 1994.

Provincial Multipliers

The MFCR designed an estimation procedure for the British Columbia Forest Sector for use in the socio-economic TSA analyses². The methodology is based on the British Columbia Input Output model. It is beyond the scope of this report to explain the methodology in detail and the reader is asked to refer to the above mentioned report. The following outlines the assumptions that are used in calculating the provincial multiplier.

- Direct employment coefficients for harvesting, silviculture, log hauling, wood products processing and pulp are based on our research and are as detailed in the above section.
- Wages and salaries are those used in section D-3.
- Sales, fibre costs and purchases of supply and services are assumed to be equal to the B.C. Interior averages detailed in the above mentioned MFCR report on provincial multipliers.

Based on the above assumptions and the MFCR methodology, we estimated that a multiplier of 2.32 is applicable for the Cranbrook TSA.

D-3 Estimation of Direct Income

Direct income is based on the following average levels per person year of employment.

Table D-3: Average Wages and Salaries By Activity

By Type of Activity:	Wages and Salaries (\$ per person year) (1)	
	Before Tax (2)	After Tax (approximate)
Direct Forest Industry (3)		
Harvesting	\$50 000	\$35 633
Silviculture	\$40 000	\$29 676
Wood products processing	\$40 600	\$30 034
Pulp	\$51 500	\$36 527
Indirect and induced:		
Log Hauling & trucking (chips/lumber (3))	\$50 000	\$35 633
Other Indirect (4)	\$28 600	\$22 745
Induced (5)	\$24 050	\$19 401

Notes:

- (1) Includes cash benefits like holiday pay (vacation and statutory holiday), overtime and payroll supplements like shift differential bonuses and other cash benefits. Excludes

² A Provincial Impact Estimation Procedure for the British Columbia Forest Sector, Discussion Draft, Garry Horne, David Riley and Lisa Singh, Ministry of Finance and Corporate Relations, August 1994.

all non-cash benefits like payments to pension plans, contributions to health and insurance plans, etc.

- (2) After tax incomes are based on the 1993 tax rates.
- (3) Based on survey of licensees, SBFEP operators and a variety of industry sources including the Price Waterhouse report titled "The B.C. Forest Industry, 1993".
- (4) Statistics Canada, Annual estimates of Employment and Average Weekly Earnings, Catalogue No. 72-002.
- (5) The MFCR provides an average non-basic after-tax income for 1991 for Fernie (\$19 938) and for Cranbrook/Kimberley (\$18 673). We estimated an average after-tax income based on the direct employment coefficients and assuming that 75% of the logging and forestry jobs and all of the processing and pulp jobs are in the Cranbrook/Kimberley region, and that 25% of the logging and forestry jobs are in the Fernie area. We also increased the after tax income by 1.5% a year for 2 years to account for wage inflation.

D-4 Government Revenues

For the purpose of this analysis, government revenues include corporate taxes (including corporate income tax and stumpage revenues) as well as income tax paid by individuals who are directly and indirectly employed in the B.C. forest industry. The analysis does not consider sales taxes (PST and GST) paid by employees and it does not consider taxes which are paid by employees who are based outside the province of B.C. but who depend on the B.C. forest industry.

Table D-4 shows our estimate of government revenues generated by the harvest from the Cranbrook TSA.

Table D-4: Estimated Government Revenues for the Cranbrook TSA

	Revenues in \$ per m3 of Timber Harvested		Total Revenues @ Current Harvest Level (\$ million)	
	TSA	Province	TSA	Province
Corporate Provincial Taxes (1):				
Stumpage Fees (2)	7.89	7.89	7.07	7.07
Rent	0.38	0.38	0.34	0.34
Other Revenues (3)	6.06	6.06	5.43	5.43
Personal Income Taxes (4)	<u>5.71</u>	<u>7.09</u>	<u>5.12</u>	<u>6.35</u>
Sub-total	20.04	21.42	17.96	19.19
Federal Taxes (2):				
Corporate Taxes (5)	0.90	0.90	0.81	0.81
Personal Income Taxes (4)	<u>11.43</u>	<u>14.18</u>	<u>10.23</u>	<u>12.71</u>
Sub-total	<u>12.33</u>	<u>15.08</u>	<u>11.04</u>	<u>13.52</u>
Total	32.37	36.50	29.00	32.71

Notes:

- (1) Provincial rents, other Provincial revenues and Federal corporate taxes represent an inflation adjusted five year provincial average (1989-1993), as published in The Forest Industry in British Columbia, 1993 by Price Waterhouse.
- (2) Provincial stumpage revenues are based on volumes billed information provided by the Ministry of Forests. We have chosen to use the 1993 average rate in calculating stumpage:
 - average stumpage rates increased by 49% in the Cranbrook TSA in 1993; and
 - average stumpage rates have continued to increase in 1994 and are likely to increase further because of policy changes and the recently announced B.C. Forest Renewal Plan.
- (3) Other provincial revenues include provincial export fees in lieu of taxes, corporate income taxes, provincial sales tax, electricity taxes, logging tax, and corporate capital tax.
- (4) Personal income taxes are based on the estimated direct, indirect and induced income levels and average tax rates for average salary levels (33% provincial and 67% federal).
- (5) Includes corporate income tax, excise and withholding taxes.

Appendix E: Incremental Economic Impacts of the Cranbrook TSA Timber Harvest Forecasts

Decade	Harvest '000m ³	TSA						Province						Government Revenues	
		Employment (PYs)			Income (\$ millions)			Employment (PYs)			Income (\$ millions)			Provincial (\$ millions)	
		Direct	Indirect/ Induced	Total	Direct	Indirect/ Induced	Total	Direct	Indirect/ Induced	Total	Direct	Indirect/ Induced	Total		
Current Level	896	968	564	1531	31.4	12.2	43.6	968	1277	2245	31.4	28.0	59.4	19.2	
Scenario 1															
1	-89	-96	-56	-152	-3.2	-1.7	-4.3	-96	-127	-223	-3.1	-2.8	-5.9	-1.9	
2	-81	-88	-50	-138	-2.8	-1.1	-3.9	-88	-115	-203	-2.9	-2.5	-5.4	-1.7	
3	-73	-79	-46	-125	-2.5	-1.1	-3.6	-79	-104	-183	-2.5	-2.3	-4.8	-1.6	
4	-65	-70	-41	-111	-2.3	-0.9	-3.2	-70	-93	-163	-2.3	-2.0	-4.3	-1.4	
5	-29	-31	-19	-50	-1.0	-0.4	-1.4	-31	-41	-72	-1.0	-0.9	-1.9	-0.6	
12	+29	+31	+19	+50	+1.0	+0.4	+1.4	+31	+41	+72	+1.0	+0.9	+1.9	+0.6	
13	+45	+49	+29	+78	+1.6	+0.6	+2.2	+49	+64	+113	+1.6	+1.4	+3.0	+1.0	
Total Change	-263	-284	-166	-450	-9.2	-3.6	-12.8	-284	-375	-659	-9.2	-8.2	-17.4	-5.6	
Scenario 2															
1	-209	-227	-132	-359	-7.4	-2.8	-10.2	-227	-299	-526	-7.4	-6.5	-13.9	-4.5	
2	-70	-75	-44	-119	-2.4	-1.0	-3.4	-75	-98	-173	-2.4	-2.2	-4.6	-1.5	
3	-21	-22	-13	-35	-0.7	-0.3	-1.0	-22	-30	-52	-0.7	-0.7	-1.4	-0.4	
12	+21	+22	+13	+35	+0.7	+0.3	+1.0	+22	+30	+52	+0.7	+0.7	+1.4	+0.4	
13	+16	+18	+10	+28	+0.6	+0.2	+0.8	+18	+22	+40	+0.6	+0.5	+1.1	+0.4	
Total Change	-263	-284	-166	-450	-9.2	-3.6	-12.8	-284	-375	-659	-9.2	-8.2	-17.4	-5.6	
Scenario 3															
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
2	-107	-116	-68	-184	-3.8	-1.4	-5.2	-116	-152	-268	-3.8	-3.3	-7.1	-2.3	
3	-95	-102	-59	-161	-3.3	-1.3	-4.6	-102	-136	-238	-3.3	-3.0	-6.3	-2.0	
4	-83	-90	-53	-143	-2.9	-1.2	-4.1	-90	-118	-208	-2.9	-2.6	-5.5	-1.8	
5	-74	-80	-46	-126	-2.6	-1.0	-3.6	-80	-105	-185	-2.6	-2.3	-4.9	-1.6	
6	-12	-13	-8	-21	-0.4	-0.2	-0.6	-13	-17	-30	-0.4	-0.4	-0.8	-0.2	
12	+12	+13	+8	+21	+0.4	+0.2	+0.6	+13	+17	+30	+0.4	+0.4	+0.8	+0.2	
13	+96	+104	+60	+164	+3.4	+1.3	+4.7	+104	+136	+240	+3.4	+3.0	+6.4	+2.1	
Total Change	-263	-284	-166	-450	-9.2	-3.6	-12.8	-284	-375	-659	-9.2	-8.2	-17.4	-5.6	