



Prince George TSA Timber Supply Analysis Public Discussion Paper

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Introduction

The British Columbia Ministry of Forests and Range regularly reviews the timber supply^a for all timber supply areas^b (TSA) and tree farm licences^c (TFL) in the province. This review, the fourth for the Prince George TSA, examines the impacts of current forest management practices on the timber supply, economy, environment and social conditions of the local area and the province. Based on this review the chief forester will determine a new allowable annual cut^d (AAC) for the Prince George TSA.

According to Section 8 of the *Forest Act* the chief forester must regularly review and set new AACs for all 37 TSAs and 33 TFLs in the Province of British Columbia.

The objectives of the timber supply review are to:

- examine relevant forest management practices, public input, and economic, environmental and social factors;
- set a new AAC; and
- identify information to be improved for future timber supply reviews.

This public discussion paper provides a summary of the results of the timber supply analysis for the timber supply review of the Prince George TSA. Details about the information used in the analysis are provided in a November 2008 data package and the technical details of the analysis will be available February 2010 on request from the Ministry of Forests and Range. The timber supply analysis should be viewed as a “work in progress”. Prior to the chief forester’s AAC determination for the TSA, further analysis may need to be completed and existing analysis reassessed as a result of inputs received during this review process.

Timber supply review in the Prince George TSA

The current AAC for the Prince George TSA, effective October 4, 2004, is 14 944 000 cubic metres. However, licensees have not harvested the full AAC and the actual volume harvested in 2008 was about 10 million cubic metres. The mountain pine beetle (MPB) infestation has continued since the last AAC determination and has now killed close to 70 percent of the pine volume, or 28 percent of the total volume, available for harvesting in this TSA.

^a **Timber supply**

The amount of timber that is forecast to be available for harvesting over a specified time period, under a particular management regime.

^b **Timber supply areas (TSAs)**

An integrated resource management unit established in accordance with Section 7 of the Forest Act.

^c **Tree farm licences (TFLs)**

Provides rights to harvest timber and outlines responsibilities for forest management in a particular area.

^d **Allowable annual cut (AAC)**

The rate of timber harvest permitted each year from a specified area of land, usually expressed as cubic metres of wood per year.

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On November 12, 2008, an information report with a data package was released for public review and to assist with First Nations consultation. This public discussion paper is being released to provide an overview of the timber supply review process and to highlight the results of the timber supply analysis, including harvest forecasts for the Prince George TSA.

Before setting a new AAC, the chief forester will review all relevant information, including the results of the timber supply analysis, and input from government agencies, the public, licensees and First Nations. Following this review, the chief forester's determination will be outlined in a rationale document that will be publicly available. The actual allowable annual cut determined by the chief forester during this timber supply review may differ from the harvest projections presented in this analysis, as the chief forester must consider a wide range of information including the social, economic and environmental implications associated with a given harvest level. His considerations are ultimately a professional judgment based on the legal requirements set out in Section 8(8) of the *Forest Act*.

Once the chief forester has determined the new AAC, the Minister of Forests and Range will apportion the AAC to the various licence types and programs. Based on the minister's apportionment, the regional executive director will establish a disposition plan that identifies how the available timber volume is assigned to the existing forest licences and, where possible, to new opportunities.

Description of the Prince George Timber Supply Area

The Prince George TSA, as shown in Figure 1, is in north-central British Columbia and covers approximately 7.97 million hectares of the Northern Interior Forest Region. Ranging from the Blackwater River in the south to the headwaters of the Skeena River in the north, the TSA is a diverse landscape of mountains and interior plateau.

The forest and range resources of the TSA are administered by the Fort St. James, Prince George and Vanderhoof Forest Districts.

Fort St. James Forest District

The Fort St. James Forest District comprises 3.18 million hectares, which represents approximately 40 percent of the Prince George timber supply area. Of this area, 2.01 million hectares are provincial Crown forest land and, assuming a continuation of recent practices, 0.98 million hectares may eventually be harvested.

The town of Fort St. James is the primary community within the Fort St. James Forest District, along with numerous smaller aboriginal communities including Nak'azdli (Nak'azdli First Nation), Binche, Tache, Middle River (Tl'azt'en First Nation), Yekooche (Yekooche First Nation), Takla Landing and Buckley House (Takla Lake First Nation).

The Fort St. James Forest District presents a diversity of landscapes, from the rolling plateaux in the southern portion of the district to the extremely mountainous and largely roadless landscapes of the north. Large lake systems include Takla, Trembleur, Stuart, Inzana, Pinchi, Tezzeron and Nation (Tsayta, Indata, Tchentlo, and Chuchi) Lakes.

The Fort St. James Forest District covers parts of the headwaters of three major river basins: the Skeena, the Fraser, and the Peace. The first two drain to the Pacific Ocean while the Peace River flows, via the Mackenzie River, to the Arctic Ocean.

Forests are mostly lodgepole pine and spruce, with balsam at higher elevations and scattered patches of aspen. There are some areas of Douglas-fir, particularly along the shores of Stuart Lake. A history of frequent wildfires has left a mosaic of forest ages. Old- and mature-balsam stands predominate in the northern portion of the district.

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Prince George Forest District

The total area within Prince George Forest District is 3.40 million hectares, which is 43 percent of the Prince George timber supply area. Of this area, 2.19 million hectares are considered provincial Crown forest land and, assuming a continuation of recent practices; 1.38 million hectares may eventually be harvested.

The City of Prince George is the largest community within the district and is situated at the junction of highways 16 and 97. Smaller communities include Hixon, Bear Lake, McLeod Lake, Willow River and Dome Creek. First Nations communities include the Lheidli T'enneh and McLeod Lake.

Landscapes within the district are diverse and include rugged alpine terrain and sub-alpine forests in the Cariboo and Rocky Mountains, ancient cedar-hemlock rainforests in the Rocky Mountain Trench, spruce forests in wetter ecosystems east of Prince George and dry pine-dominated forests on the interior plateau. The predominant tree species in the district include white spruce, lodgepole pine, sub-alpine fir and Douglas-fir. Deciduous species include aspen, cottonwood and birch.

The recent mountain pine beetle epidemic has caused significant mortality in pine forests and timber harvesting has been directed to these stands which are located, for the most part, south and west of the City of Prince George.

Vanderhoof Forest District

The total area within the Vanderhoof Forest District is 1.39 million hectares which represents about 17 percent of the Prince George TSA. Of this area, 1.04 million hectares are considered provincial Crown forest land and assuming a continuation of recent practices 0.74 million hectares may be eventually harvested.

The area is marked by the landscapes of the central interior plateau and the Nechako valley. The lacustrine soils in the valley bottom are fertile agricultural lands while the low-rolling to upland terrain of the plateaux is mostly forested with sub-boreal pine and spruce.

The largest community in the district is Vanderhoof. First Nations communities include Saik'uz, Stelat'en and Nadleh Whut'en.

A history of frequent wildfires helped to maintain a forested state dominated by lodgepole pine which has since succumbed to the mountain pine beetle epidemic. Old forests are relatively uncommon except for scattered groves of Douglas-fir and the few higher elevation mature Engelmann spruce sub-alpine fir forests. Small patches of trembling aspen, black cottonwood and white birch occur throughout the district.

Land-use planning

Fort St. James Forest District

The Fort St. James Land and Resource Management Plan (LRMP) was approved by the provincial government in 1999 to be the guiding document for the management of land and natural resources for a 10-year period, which has now elapsed. The most notable outcome of this plan was the creation of multiple protected areas, which have been designated as provincial parks. These include: Stuart River, Mount Pope, Rubyrock Lake, Nation Lakes, Mount Blanchet, Omineca, and Sustut Parks. To date, the plan has not undergone any major revision or renewal, but remains the only provincially acknowledged strategic resource plan for the Fort St. James Forest District.

Under the Canadian Standards Association Sustainable Forest Management Standard, BC Timber Sales (BCTS) and a group of multiple forest licensees within the Fort St. James Forest District developed the Fort St. James Sustainable Forest Management Plan. The overall purpose of this plan is 'to maintain and enhance the long-term health of forest ecosystems, while providing ecological, economic, social, and cultural opportunities for present and future generations'. As such, the plan identifies multiple values to be managed, along with objectives for those values and related indicators and targets by which to measure on-going performance in achieving the plan's objectives. A public advisory group, composed of interested local individuals, works with the forest licensees and BCTS to monitor plan implementation and to seek continuous improvement of the plan. The plan was certified in 2006 and remains the only sustainable forest management plan applicable to the Fort St. James Forest District.

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Prince George Forest District

The Prince George Land and Resource Management Plan was approved by government in 1999. This strategic plan provides policy guidance for land use and resource management within the Prince George Forest District. All of the protected areas recommended in the LRMP were established either as class 'A' provincial parks or protected areas under the *Environmental and Land Use Committee Act*. Some of these parks and protected areas include: Sugarbowl/Grizzly Den, Ptarmigan Creek, Evanoff, Arctic/Pacific Lakes, Kakwa, and Bobtail Mountain. A number of the important values identified in the LRMP, including ungulate winter ranges for caribou and mule deer, landscape-level biodiversity and visual quality, have legally-established management objectives, which have been reflected in the timber supply analysis.

In 2004, BC Timber Sales, Canadian Forest Products Ltd., Carrier Lumber Ltd., Lakeland Mills Ltd. and Winton Global Lumber Ltd. developed the Prince George Sustainable Forest Management Plan to achieve Canadian Standards Association (CSA) certification to the CSA Z809-02 standard. These organizations are committed to the CSA goals of sustainable forest management and to a process aimed at continually improving environmental performance. This plan was last updated in December 2007.

Vanderhoof Forest District

Various land use projects were initiated and completed after approval of the 1997 Vanderhoof Land and Resource Management Plan. Provincial parks evolved from direction provided in the LRMP. Parks in the Vanderhoof Forest District include: Sutherland River, Stuart River, Francois Lake, Nechako Canyon, Finger, Tatuk, and Entiako. More recent initiatives include the Prince George TSA Old Growth Order, Ungulate Winter Range Orders for both caribou and mule deer and the scenic area and access management plans, which were updated in 2008. Another initiative to designate the heritage trails in the district is underway and is planned for completion in 2011.

Four licensees operating in the Vanderhoof Forest District initiated the Vanderhoof Sustainable Forest Management Plan, which began implementation in 2005. Canadian Forest Products Ltd. (Vanderhoof) and the Stuart Nechako Business Area of BC Timber Sales have achieved certification under the CSA Z809-02 standard. Lakeland Mills Ltd. has received certification but has opted not to continue with the CSA process. This company will be reviewing other opportunities to achieve certification in the future. West Fraser Timber Ltd., another major licensee operating in the district, is certified under the Sustainable Forestry Initiative (SFI).

First Nations

First Nations within the Prince George TSA are Carrier and Sekani. The asserted territories of the Carrier and Sekani comprise approximately 76,000 square kilometres in the Interior Plateau Region, which is bound to the east by the Rocky Mountains, to the north by the Omineca Mountains, and to the west by the Coast Mountains. The asserted territories of the Carrier surround the Nechako, Stuart, and Fraser River watersheds, while those of the Sekani coincide with the Finlay, Parsnip and Peace Rivers. The asserted traditional territories of their Southern Carrier neighbours surround the basins of the Dean, Blackwater, and Quesnel Rivers.

First Nations communities within the Prince George TSA include: the Nak'azdli, Takla Lake, Tl'azt'en, Nadleh Whut'en, Stelat'en, Saik'uz, Lheidli T'enneh, Yekooche and McLeod Lake. Each First Nation has its own distinct traditional territory, usually corresponding to a watershed or lake system. Other First Nations whose communities are outside of the Prince George TSA but whose territories extend into the Prince George TSA include: the Cheslatta, Lhoosk'uz Dene, Ulkatcho, Toosey, Anaham, Skin Tyee, West Moberly, Halfway River, Gitxsan, Lake Babine, Kaska Dena, Tsay Key Dene, Red Bluff, Nazko, and Tahltan First Nations.

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Some First Nations in the Prince George TSA have held non-replaceable forest licences for the salvage of mountain pine beetle infested stands. At least 70 percent of the volume harvested in these licences has consisted of lodgepole pine. This harvesting has been an important part of the efforts to salvage dead pine.

First Nations land-use planning protects the values placed on land, water, and air. Forests provide ideal habitat for ungulates, fur-bearing animals and a diversity of bird life. First Nations have expressed concerns about the change in forest ecology due to the mountain pine beetle infestation. As the ecology of forests change, so does the habitat of wildlife and fish, which in turn may affect traditional practices of the First Nation people in the Prince George TSA.

The Ministry of Forests and Range has been communicating with First Nations about this timber supply review and intends to continue to fulfil its legal obligations to consult with First Nations in conjunction with the release of this public discussion paper.

Natural resources

The diverse forests and landscapes of the Prince George TSA are home to a wide variety of wildlife species. Although best known for its moose population, the TSA also supports mule deer and, to a lesser extent, whitetail deer, grizzly and black bear, mountain goat, wolves, coyotes and small herds of caribou. Significant populations of small mammals also exist, with pine marten, beaver and lynx being the most common. The rivers and lakes of the TSA support many fish species, including four species of salmon, steelhead, rainbow trout, Kokanee, lake trout, Dolly Varden, bull trout, cutthroat trout, and whitefish. Numerous lakes in the TSA also provide a range of fishing opportunities. Many of these fish and wildlife species are regionally or provincially significant while others are commercially important.

The Prince George TSA has a wide range of forest resources, including timber and non-timber forest products, forage, minerals, recreation and tourism amenities, and fish and wildlife habitats. In addition, the cattle ranching industry depends heavily for summer forage on Crown range land. Good access to a diversity of landscapes, including lakes and rivers, provides a variety of recreation opportunities for both residents and tourists. Summer activities include: camping, hiking, fishing, boating, canoeing, wildlife viewing and back-country recreation. Hunting for mule deer, mountain goat, moose, black bear and grizzly bear is popular in the spring and fall. Recreational activity in winter is high, including snowmobiling, ice fishing, and cross-country and back-country skiing.

Mountain pine beetle epidemic

Mountain pine beetle is native to B.C. and usually occurs at endemic levels. Epidemic outbreaks have occurred repeatedly throughout B.C.'s natural history and have played a vital role in the natural disturbance of pine forests contributing to biodiversity and variation across the landscape.

Prior to the current epidemic, the largest outbreak in recorded history occurred between 1930 and 1936 on the Chilcotin Plateau where that infestation affected 650 000 hectares. In 2008 it was estimated that the total area of the province affected by this current epidemic was about 14.5 million hectares. It was also projected that by 2009 the mountain pine beetle would have killed approximately 620 million cubic metres of pine or about 46 percent of the pine volume on the timber harvesting land base in B.C. It is currently projected that about 70 percent of the pine on the timber harvesting land base across the B.C. interior will be killed by 2017.

The magnitude of the current outbreak has been attributed to two factors. First, due to the success of fire suppression over the past century, the area of mature lodgepole pine – the beetle's preferred host – has increased six fold since 1910. The second factor is climate change. Historically, beetle populations have been limited by cold winters; however, the absence of sufficiently cold temperatures in the Interior has allowed large populations of beetles to survive the winter under the bark of the pine trees.

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In the Prince George TSA it appears that the infestation peaked in the Vanderhoof and Prince George Forest Districts in the summer of 2004 and peaked in the Fort St. James Forest District in the summer 2006. By 2008, approximately 28 percent of the forest stands available for harvesting in this TSA had been killed by mountain pine beetle. By 2020, this figure is projected to increase to 33 percent. These current and future projected impacts due to mountain pine beetle were included in all the forecasts presented in this paper.

Ministry and licensees response to the beetle infestation

Lodgepole pine comprises about 43 percent of the total mature volume on the timber harvesting land base of the TSA. There has been a sustained effort by government and forest licensees within the Prince George TSA to salvage mountain pine beetle infested stands. According to data from the Ministry of Forests and Range harvest billing system, since 2005, lodgepole pine has comprised at least 70 percent of the actual harvested volume in the TSA.

This has been accomplished due to following beetle management strategy:

- BCTS allocating 75 percent or more of its timber sales volume to pine-leading stands and Operations Division issuing new non-replaceable forest licences that focus on dead pine;
- restricting all new non-replaceable forest licence awards to operating areas with an appropriate distribution and age-since-mortality of damaged timber, ensuring the earliest beetle-attacked timber is salvaged first;
- amending non-replaceable forest licences to allow harvesting in the southern portion of supply block 'C' in Fort St. James Forest District, which is dominated by pine-leading stands. This has allowed harvest to be transferred from areas with low levels of beetle damage to areas with extensive beetle-damaged timber;
- regular monitoring of individual licensee harvesting to ensure total district harvesting exceeds 70 percent pine by volume;
- developing forest tenure offers to harvest immature damaged pine stands that are not expected to be harvested under conventional forest tenures;
- identifying (through the Forests For Tomorrow program) immature beetle-damaged stands within the Prince George TSA and rehabilitating identified stands in the Prince George and Vanderhoof Forest Districts; and
- amending the previous regulatory regime to allow faster administration and harvest of beetle-infested stands and, where appropriate, protecting the understory of dead pine stands to minimize the decrease in the mid-term timber supply.

Environmental values

All forested lands, whether they contribute to timber supply or not, help to maintain critical habitats for many species. Therefore, the timber supply analysis includes constraints or forest cover requirements for biodiversity, visual quality, community watersheds, recreation features, riparian management and protection of environmentally-sensitive areas.

Current forest management must be consistent with the requirements of the *Forest and Range Practices Act* (FRPA) and associated regulations, which are designed to maintain a range of biodiversity and wildlife values. In the Prince George TSA approximately 50 percent of the productive forest land is excluded from harvesting because it occurs in a park, reserve, or on unstable terrain. Other forested areas are excluded from harvesting because the volume of wood per hectare is too low or they are too distant from milling facilities. Although this land is not commercially suitable for timber harvesting, it does provide for other values.

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Recent history of the allowable annual cut

Since its creation in 1978, the Prince George TSA's AAC has been re-determined several times. On January 23, 1996 the chief forester set the AAC for the Prince George TSA at 9 363 661 cubic metres. This AAC included a partition of 290 000 cubic metres for harvesting cedar and hemlock stands. Of this, 250 000 cubic metres per year was for the salvage of stands heavily damaged by the hemlock looper over five years. The remaining 40 000 cubic metres was for stands with lower levels of looper infestation for an indefinite period of time to control future outbreaks.

Effective June 1, 2002, the AAC for the Prince George TSA was increased by about 30 percent to 12 244 000 cubic metres per year. This increase of three million cubic metres per year was to facilitate the salvage of timber damaged by mountain pine beetle and diminish the extent of further damage. Of the total AAC, 110 000 cubic metres were attributable to cedar and hemlock stands, 160 000 cubic metres to deciduous-leading stands, and 400 000 cubic metres to supply block 'A' located in the northwest portion of the Fort St. James Forest District.

Effective October 1, 2004, the current AAC was set at 14 944 000 cubic metres or 22 percent above the previous level. The purpose of this large increase in AAC was to salvage timber killed by the mountain pine beetle. Of this total AAC, 160 000 cubic metres were attributable to deciduous-leading stands, 110 000 cubic metres to cedar- and hemlock-leading stands, and 400 000 cubic metres to Supply Block "A".

Innovative Forestry Practices Agreement

Forest companies operating in the Vanderhoof Forest District entered into an Innovative Forestry Practices Agreement (IFPA) with government in 2002. In recognition of the innovative forestry practices contained in their forestry plan the Vanderhoof IFPA holders received an AAC increase of 415 400 cubic metres per year for September 2002 to December 2007. In granting this uplift the regional executive director stated "*...in the event that this, or a revised AAC uplift is to be sustained past the period I have granted in this letter, timber supply analysis will be required that takes into account the depletions for harvesting and unsalvaged beetle damaged timber that will have occurred in the Vanderhoof Forest District*".

In 2008, the Vanderhoof IFPA holders, which includes Canadian Forest Products Ltd., Lakeland Mills Ltd., Fraser Lake Sawmills (West Fraser Timber Ltd.), and Plateau Forest Products Ltd., submitted a new forestry plan and timber supply analysis with a request for a 507 400-cubic metre AAC increase. The regional executive director decided to delay consideration of this request until after the chief forester makes a new AAC determination.

Timber supply forecast scenarios

The purpose of the current timber supply review is to provide the chief forester with information to consider in determining a new AAC for the Prince George TSA. One of the key issues in this, and potentially subsequent determinations, is how to manage the remaining mature, non-pine forests that remain following the mountain pine beetle infestation until currently immature stands are suitable for harvesting.

In previous timber supply analyses one harvest forecast is presented which is an outcome of the best available data and current management practices. This forecast is referred to as the 'base case'. However, the extent of the damage caused by the mountain pine beetle epidemic has increased the uncertainty regarding the effect of forest management practices on timber supply. Therefore, no single timber supply forecast is being presented as the base case. Instead, using a common data set, three timber supply scenarios, which are based on different management assumptions, were prepared to explore the implications of a range of forest management choices. An assessment of the harvest forecasts from these scenarios should serve to stimulate discussion and guide future management practices. These scenarios include:

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1. In scenario 1, the salvage of dead pine continues at the level of the current AAC until all of the salvageable pine in the Prince George TSA has been harvested. The harvest of non-pine leading stands – predominately spruce – does not exceed the sustainable long-term level throughout the entire forecast period.
2. In scenarios 2A and 2B, the initial harvest level is set at about the average level harvested during the past five years, about 12.5 million cubic metres per year. In both scenarios 2A and 2B, the salvage of dead pine continues at average rate observed over the last five years. However, in order to minimize the projected decrease in mid-term harvest levels, the harvest of non-pine stands is temporarily increased above the level that is sustainable in the long term.

The difference between scenarios 2A and 2B, is that in scenario A harvesting operations in the Prince George and Vanderhoof Forest Districts are assumed to shift to the Fort St. James district, once all of the salvageable pine in the Prince George and Vanderhoof Forest Districts has been harvested. The increased harvesting capacity in the Fort St. James Forest District is used to increase the rate of pine salvage, which will continue until all of the available dead pine in this forest district has been harvested.

In contrast, in scenario 2B the harvesting capacity that was being used in the Prince George and Vanderhoof Forest Districts to salvage pine is not shifted to the Fort St. James district in order to increase the rate of pine harvest in this district. Instead the additional harvesting capacity is used to increase the rate of non-pine harvest. As a consequence, the increase in the non-pine harvest happens earlier in scenario 2B than it does in scenario 2A.

3. In scenario 3, the salvage of dead pine stops immediately and the harvest of non-pine leading stands increases to the 2008 harvest level.

These scenarios were prepared using a computer model that projects the future availability of timber for harvesting based on the growth of the forest and level of harvesting, while staying within the legal objectives established by the provincial government under higher level plans (see *land use planning*). The major forest management assumptions common to all the scenarios are discussed in Appendix 1.

Figure 2 shows the first 100 years of the 250-year harvest forecasts resulting from scenarios 1 and 2A and 2B.

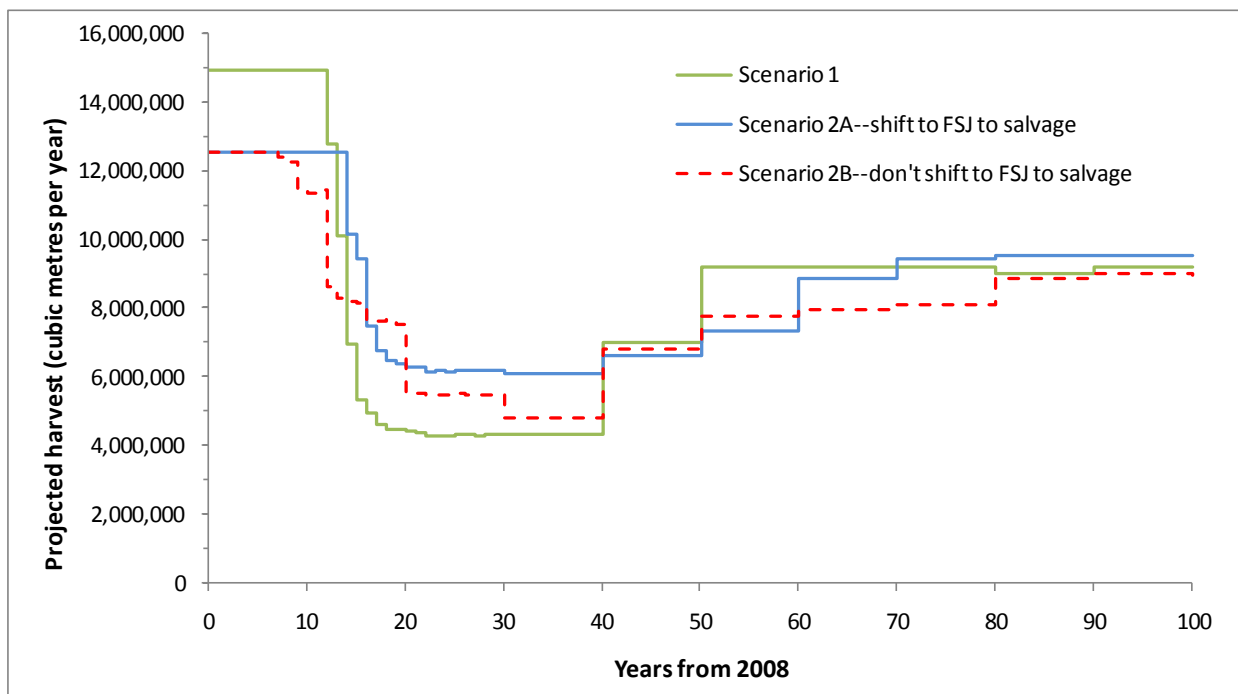


Figure 2. Harvest forecasts from scenarios 1, 2A and 2B – Prince George TSA 2009.

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Scenario 1: Maintain the current focus on pine salvage and then decline to a sustainable harvest level comprised mainly of non-pine

In scenario 1, the initial harvest level is set at 14.9 million cubic metres per year, which is the same as the current AAC. Spruce-leading stands[°] contribute 875 000 cubic metres per year to this harvest level, which is about the recent level of harvesting in this stand type. After the first 12 years of this harvest forecast, all of the pine-leading stands have either been salvaged or have fallen over and are no longer merchantable. Then, the harvest from spruce-leading stands increases to about 4.1 million cubic metres per year, a level that is maintained throughout the remainder of the 250-year forecast period. Accounting for the harvest of cedar and deciduous stands results in a mid-term harvest level of about 4.3 million cubic metres per year. After 40 years, the harvest level increases to about 6.5 million cubic metres as regenerating stands become harvestable again. A decade later, a harvest level of about nine million cubic metres per year is obtained.

In the harvest forecast, a maximum sustainable harvest of 55 000 cubic metres per year from cedar-leading stands could be achieved – 50 percent less than the current partition of 110 000 cubic metres per year. The reason for this decrease is due to a combination of both revised inventory estimates for cedar-leading stands and the change in old-growth management requirements since 2004. In the case of deciduous-leading species, the current partition of 160 000 cubic metres per year was sustainable.

In the 2004 analysis, the timber harvesting land base associated with supply block 'A' included approximately 160 000 hectares of low-volume, long-haul distance, predominately balsam-leading stands. This area in the northern part of the Fort St. James Forest District supports little harvesting activity, as evidenced by cutting permit information for the TSA submitted between 1992-2007. Using operability assumptions based on actual harvesting activity in supply block 'A' results in a maximum sustainable harvest of 67 000 cubic metres per year. Because supply block 'A' contributes so little to the overall projected timber supply of the TSA, it is not treated separately in the scenarios presented in this paper.

The data on the pine-leading stands harvested in the TSA between 2004 and 2008 showed that 45 percent of the harvest originated in the Prince George Forest District, 36 percent from Vanderhoof Forest District and 19 percent from Fort St. James Forest District. For scenarios 1, 2A and 2B the contribution to the harvest of pine-leading stands from each forest district was initially set to the proportions observed between 2004 and 2008.

Under scenario 1 all available pine-leading stands in Prince George Forest District will have been harvested after year six and it is assumed that harvesting operations will then shift to the Fort St. James Forest District. In Vanderhoof Forest District, the pine-leading stands will all be harvested after year 10 and then harvesting operations shift to Fort St. James. During years 7 to 12 most of the pine harvest is projected to come from the Fort St. James Forest District. As seen in Figure 3, the majority of pine-leading stands targeted for harvest in Fort St. James after year seven will have been dead for more than eight years.

It is worth noting the projected mid- and long-term contribution from each forest district to the overall harvest forecast in scenario 1. During the mid-term (years 15 to 40), Vanderhoof Forest District contributes less than 10 percent to the overall harvest forecast whereas Prince George and Fort St. James Forest Districts contribute about 45 percent each. During the longer term, Prince George Forest District contributes about 50 percent to the harvest forecast, Vanderhoof Forest District about 25 percent and Fort St. James Forest District about 25 percent.

[°] In this analysis, spruce-leading stands includes a small minority of stands which are either balsam leading or Douglas-fir leading and very occasionally larch leading.

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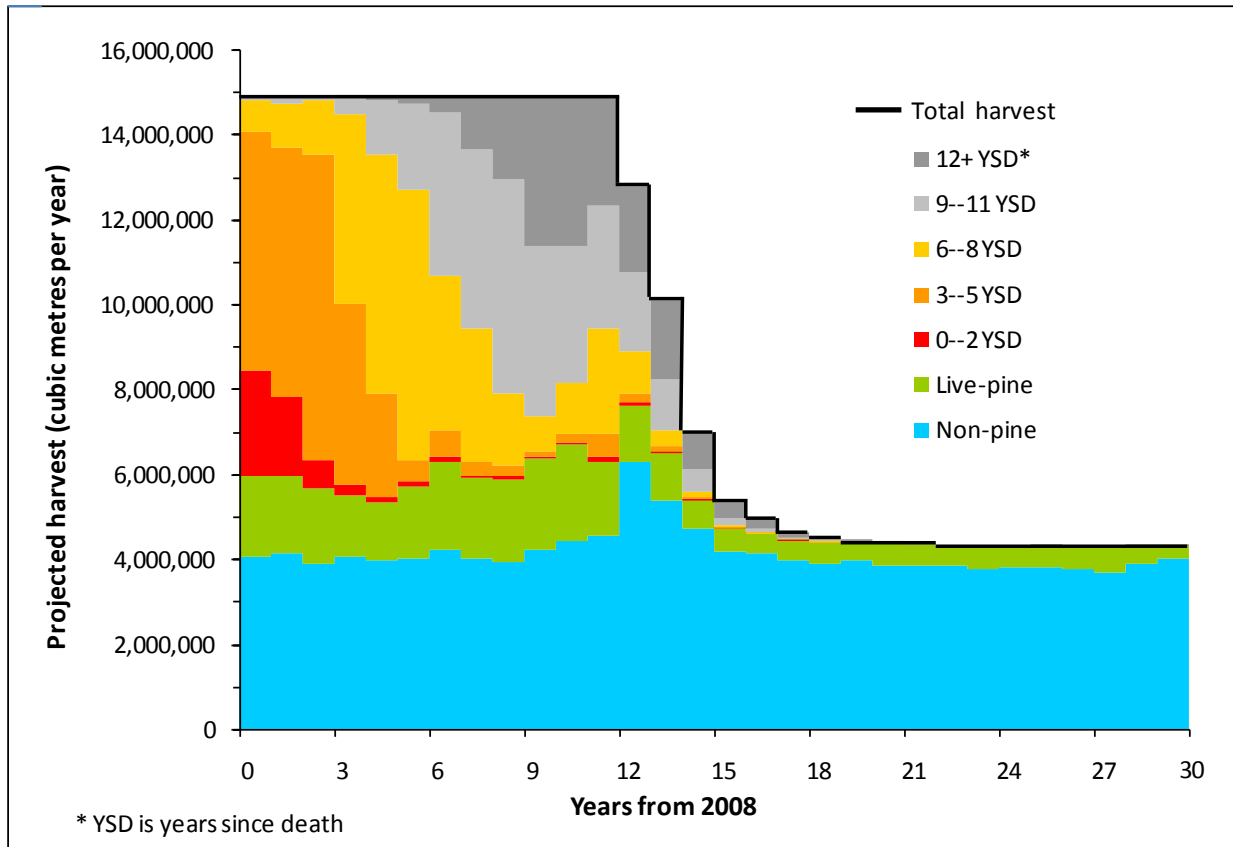


Figure 3. The first 30 years of the scenario 1 harvest forecast showing the contribution of non-pine, live pine and dead pine to the harvest forecast.

Figure 3 provides an expanded view of the first 30 years of the harvest levels forecast in scenario 1 depicted in Figure 2. In Figure 3, the black line represents the projected total harvest for scenario 1. The various bands of colour represent the volume of non-pine, live pine and dead pine that makes up the total harvest. This figure provides a picture of the change in composition of the total harvest over time.

For example, at year zero (i.e., 2008) the total harvest level is 14.9 million cubic metres. Of this total volume, non-pine (blue) contributes 4.1 million cubic metres, live pine (green) contribute 1.9 million cubic metres, pine that has been dead for two years or less (red) contributes 2.5 million cubic metres, pine dead for three to five years (orange) contribute 5.6 million cubic metres, pine that has been dead for six to eight years (yellow) contributes 0.7 million cubic metres and pine that has been dead for 9 to 11 years (light grey) contributes about 100 000 cubic metres. In 2008, no pine has been dead for 12 or more years (dark grey).

At year nine (i.e., 2017) while the non-pine and live pine harvests are essentially unchanged, now about seven million cubic metres of the total harvest is comprised of stands that have been dead for more than eight years. By 2022 (14 years from 2008), the harvest is comprised almost entirely of live trees as the dead pine has either been salvaged or has decayed.

As mentioned above, in 2008 the non-pine harvest is approximately four million cubic metres per year or 27 percent of the total harvest. This proportion of non-pine is quite close to the actual proportion of non-pine harvested between 2004 and 2008. For the first 12 years of the scenario 1, approximately three million cubic metres of non-pine volume is incidental harvest from pine-leading stands where non-pine species comprise about 25 percent of the stand. This incidental volume will be less if pine-leading stands are not harvested at the levels assumed in the analysis. Spruce-leading stands account for 875 000 cubic metres, and approximately 200 000 cubic metres of the four million cubic metres is from the cedar and deciduous partitions modelled in this analysis.

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As discussed in Appendix 1, for this timber supply review, shelf-life is defined as the length of time a tree is assumed to remain standing after attack by the mountain pine beetle. All scenarios presented in this analysis assume that beetle-killed trees will remain standing for 15 years. No assumption is made about the potential end use of the dead pine (i.e., whether or not the fibre is of sufficient quality for use as sawlog, pulp or bioenergy).

Scenario 2: Mitigate the projected decline in mid-term timber supply by harvesting higher levels of non-pine leading stands

In this scenario two alternatives are presented for mitigating the decline in mid-term harvest flows. In both alternatives the harvest from the deciduous and cedar partitions were modelled the same as in scenario 1 where they contribute about 200 000 cubic metres per year. In scenario 2A (see *Figure 2*), it was assumed that as the availability of pine in the Prince George and Vanderhoof Forest Districts decreases, harvesting shifts to the Fort St. James Forest District to salvage the remaining dead pine in the TSA. The initial harvest level in scenario 2A was set at about 12.5 million cubic metres per year — about the average harvest level in the TSA during the past five years.

As in scenario 1, in scenario 2A spruce-leading stands initially contribute 875 000 cubic metres per year. However, after 12 years, the projected harvest level decreases to a mid-term level of about 6.2 million cubic metres per year rather than 4.3 million cubic metres as in scenario 1. About six million cubic metres per year of this harvest is attributable to spruce-leading stands with cedar and deciduous stands contributing the remainder. The result of this higher rate of harvest of spruce-leading stands during years 12 to 40 is a lower rate of spruce harvest during years 40 to 60.

Salvaging all of the pine in the Fort St. James Forest District assumes that the forest industry is able to economically process and market pine fibre that has been dead for more than eight years. In scenario 2B, it was assumed that salvage harvesting of pine does not shift from Vanderhoof and Prince George Forest Districts to Fort St. James Forest District after the salvage is completed in those districts. Instead, spruce-leading stands are harvested while gradually lowering the harvest to approximately 5.5 and 4.8 million cubic metres per year in the third and fourth decades, respectively. Scenario 2B may be a more likely outcome in this TSA since shifting to Fort St. James to harvest may not occur because of the long hauling distances, and low economic value of the dead pine. Like scenario 2A, the projected recovery is slower than in scenario 1. However, due to the earlier transition to harvesting spruce-leading stands, and less salvaging of pine-leading stands, the projected total harvest between years 60 and 80 is lower than both scenarios 1 and 2A.

Any scenario in which spruce-leading stands are harvested earlier than scenario 1 (or less pine-leading stands are harvested) will increase the length of time for the harvest to recover to pre-mountain pine beetle epidemic levels (year 50 and beyond). In scenario 1, beetle-killed stands harvested during the first 12 years become eligible for harvesting again earlier than if they were not harvested and left to regenerate naturally.

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Scenario 3: Abandon the salvage of pine-leading stands

In the current AAC decision, there is no partition limiting the harvest of non-pine. Instead, the chief forester specified that the majority of the harvest should be dedicated to the salvage of dead pine. Although this objective has been achieved in Prince George TSA, the Ministry of Forests and Range is aware of requests elsewhere in the province for increased access to non-pine leading stands.

In the unlikely event that pine salvage ceased in the Prince George TSA, a ‘worst case’ scenario was prepared to show the impact on harvest levels. Scenario 3 explores the implications on timber supply of discontinuing the salvage of pine without reducing the initial harvest level below the 2008 harvest level for five years. After five years, it is assumed that the harvest level would be reduced to the mid-term level that was assumed to be sustainable in scenario 1. The deciduous and cedar partitions were modelled the same as scenario 1. The harvest forecast from this course of action is shown in Figure 4.

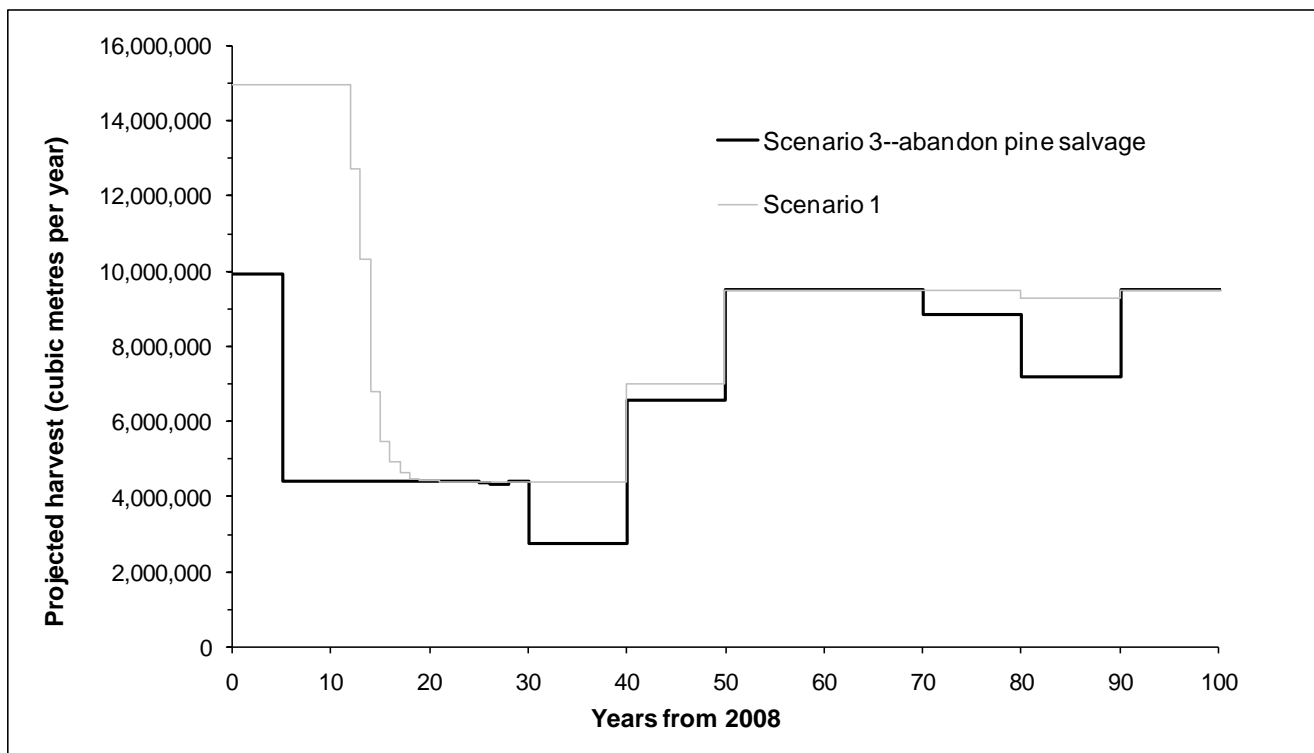


Figure 4. Scenario 3 — Impact of discontinuing the salvage of pine-leading stands with an initial harvest level of 10 million cubic metres per year for five years before decreasing the harvest to the scenario 1 mid-term harvest level. Scenario 1 is provided for reference.

Figure 4 shows that the effect of abandoning the salvage of pine-leading stands and harvesting at about 10 million cubic metres per year in non-pine leading stands, even for as short a period as five years, results in a decrease in mid-term timber supply below the level obtained in either scenarios 1, 2A or 2B. The greater the harvest of non-pine leading stands, the faster this growing stock is depleted and the more adversely the mid-term harvest levels are impacted.

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Opportunities for improving mid-term timber supply

While mid-term harvest levels in the TSA will be well below the current harvest level of about 10 million cubic metres, there are opportunities and options available to improve timber supply in the mid-term. As shown in Figure 2 (scenario 2A), the mid-term timber supply can be increased from 4.3 million cubic metres per year to 6.0 million cubic metres per year by harvesting pine as long as possible followed by a choice to harvest spruce at higher levels in the third and fourth decade.

The timber supply scenarios depicted in Figure 2 are predicated on management practices of an industry largely focused on sawlogs and pulpwood. Opportunities to improve mid-term timber supply include moving into mature stands of lower volume than traditionally utilized, accessing stands further afield than historically accessed, encouraging new industries capable of utilizing fibre not currently considered merchantable and promoting silviculture investments in appropriate stands to yield additional mid-term volume.

In all the scenarios presented, it was assumed that the minimum criteria for a road-accessible stand to be harvested were that it should have at least 182 cubic metres/hectare and a round trip transport time of 7.7 hours. For rail-accessible stands, the minimum criteria were 246 cubic metres/hectare and 3.9 hours of road transport (round trip) to the railhead. If the volume criterion was lowered by 20 percent to 145 cubic metres/hectare and 197 cubic metres/hectare respectively, and the round trip time increased by 20 percent to 9.2 hours and 4.7 hours respectively, mid-term timber supply could be increased by eight percent. If the volume criterion was lowered by 30 percent and the round trip time was increased by 30 percent, then mid-term timber supply could be increased by 18 percent. It was noted that most of this increased volume was from balsam-leading stands. Currently, balsam comprises about four percent of the total harvest or 16 percent of the non-pine harvest. If these low-volume, long-haul distance stands could be harvested economically then they could contribute to timber supply.

Summary

In this analysis there was no base case that showed a timber supply forecast resulting from current forest management practices. Because of the depletion in growing stock caused by the mountain pine beetle infestation, choices made about managing both the pine and non-pine resource could dramatically affect timber supply. The scenarios presented in this public discussion paper were intended to span a range of possible management choices and stimulate discussion about future forest practices. The following conclusions could be made about the scenarios presented:

1. Maintaining an elevated initial harvest level in the range of 12.5 to 15 million cubic metres per year until about 2020 depends on the ability of the forest sector to move salvage operations into the Fort St. James Forest District and to utilize significant quantities of timber that has been dead for longer than eight years.
2. Spruce-leading stands could be used to mitigate the projected sharp decline in timber supply shown in scenario 1. The trade-off is that these stands will not be available for harvest later.
3. If the salvage of pine is abandoned and spruce-leading stands are harvested at a rate of about 10 million cubic metres per year for even as short a time as five years, the mid-term timber supply is severely affected.
4. Minimum harvestable volumes or maximum haul distances would have to change substantially from observed practice to have a significant positive impact on mid-term timber supply.

The provincial chief forester's AAC determination is a judgment based on his professional experience and his consideration of a wide range of information as required under Section 8 of the *Forest Act*. An AAC is neither the result of a calculation nor limited to the results of timber supply analysis; therefore, the new AAC may not be the same as any of the initial harvest levels depicted in any of the scenarios included in this document.

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Implications of changes in the AAC

Environmental implications

The impacts of the current mountain pine beetle infestation in the Prince George TSA will inevitably affect forest values such as wildlife habitat, stream hydrology and visual quality. While some wildlife will lose habitat, dead trees will provide habitat for other species of wildlife. New forests will also provide habitat for those species that utilize young forests.

Trees affect stream flow mainly through evapotranspiration, shading and interception of precipitation. Beetle-killed trees cease transpiration and are less effective in providing shade. Therefore, it is important to consider hydrological impacts during salvage harvesting in watersheds impacted by the beetle epidemic.

The Prince George, Fort St. James and Vanderhoof Forest Districts, in collaboration with forest licensees and BCTS, are revising forest management strategies where necessary to consider values related to First Nations, watershed hydrology, old-growth management areas, visual quality objectives, harvesting priorities, non-susceptible species retention and wildlife trees.

Regardless of the AAC determined by the chief forester, the districts will monitor the beetle epidemic, effectiveness of management strategies, and licensee responsiveness to the epidemic, and report the findings periodically to the chief forester.

First Nations implications

At the time of writing the Saik'uz, Stellaten, Nadleh Whuten, Yekooche, Lheidli T'enneh, Tl'azt'en First Nations have non-replaceable forest licences providing tenure and revenue sharing.

In accordance with the recent *Tsilhqot'in Nation v. British Columbia* decision government is instructed to consider First Nations' wildlife needs in decisions. A pilot project developed in conjunction with this timber supply review is examining the wildlife habitat implications of the scenarios presented in this document. The pilot is being conducted by Ministry of Forests and Range staff and Ministry of Environment staff in consultation with area First Nations.

The Ministry of Forests and Range will continue consultation efforts with respect to this timber supply review and intends to continue to fulfil its legal obligations to consult with First Nations in conjunction with the release of this public discussion paper.

Community implications

The implication of changes in the allowable annual cut for local communities is an important consideration in the timber supply review.

In 2008, the Prince George TSA had a population of 102,428 people. This includes Prince George, Fort St. James, Vanderhoof, and Fraser Lake. Other smaller communities and First Nations reserves are spread throughout the TSA. From 1999 to 2008, the population of the TSA declined by about six percent, with the communities of Fort St. James and Vanderhoof experiencing the largest declines of 34 percent and 16 percent, respectively. The population is expected to grow by a modest two percent by the year 2020.

The labour force in the Fort St. James and Vanderhoof Forest Districts is dominated by the forestry sector, which accounts for 49 percent and 45 percent of basic employment, respectively. Prince George is the supply and service hub for northern B.C. so is more diversified, but the forest district still relies on the forest sector for about 26 percent of its employment.

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Census data indicates that forest sector activity declined by about four percent between 2001 and 2006. Most of that decline was in the Fort St. James Forest District, where forest sector employment dropped by 24 percent. Forest sector employment increased in the Vanderhoof Forest District by about six percent. Most of the forest sector declines occurred in the manufacturing sub-sectors. Forestry and logging services increased in all forest districts.

Since 2006, the decline in the U.S. housing market and the economic recession has led to significant reductions in forest sector activity. The volume harvested from the TSA's forests declined from a high of about 13.4 million cubic metres in 2006 to about 10 million cubic metres in 2008. The total harvest of timber from private land and provincial and federal crown forest within the Fort St. James, Prince George and Vanderhoof Forest Districts peaked at 16.7 million cubic metres in 2005. Mills have reduced operations since 2006. For example, the volume of lumber produced in the Prince George TSA declined by 29 percent from 2006 to 2007.

If licensees can use pine that has been dead for more than eight years, the forecasts indicate that timber supply in the Prince George TSA could be maintained for the next 12 years and could support the current level (five-year average) of activity. After 12 years, the analysis indicated that the supply of timber will begin to decline by year 20 and could be about 40 to 60 percent of current harvest levels. This magnitude of reduction in the timber supply would reduce the level of employment supported by the forest sector, based on the current focus on solid wood and pulp-based products.

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Your input is needed

Public input is a vital part of establishing the AAC. Feedback is welcomed on any aspect of this public discussion paper or any other issues related to the urgent timber supply review for the Prince George timber supply area. Ministry staff would be pleased to answer questions to help you prepare your response. Please send your comments to the local forest district offices at the addresses below.

Your comments will be accepted until March 24, 2010.

You are reminded that responses will be subject to the *Freedom of Information and Protection of Privacy Act* and may be made public. If the responses are made public, personal identifiers will be removed before the responses are released.

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Appendix A: Major assumptions

Assumptions common to most of the scenarios presented in this public discussion paper are outlined in the sections that follow. For more of the details and information regarding other modelling assumptions please refer to the Prince George TSA technical report available February 2010 on request from the Ministry of Forests and Range. The assumptions used strive to represent the best available information regarding observed forest management.

Projection of the beetle epidemic

For this analysis, the progression of the epidemic in the Prince George TSA was projected using the computer model (BCMPB.v5) developed by scientists in the Ministry of Forests and Range, the Canadian Forest Service and consultants. The computer model was calibrated using provincial infestation maps from 1999 to 2007. Unless otherwise stated, the scenarios presented in this public discussion paper assume that MPB-infestation in the TSA will continue as projected.

However, BCMPB.v5 only projects the progression of the epidemic in stands 60 years old or greater. During 2007 and 2008 additional data was collected by a combination of ground and aerial surveys regarding the extent of mortality in pine stands less than 60 years old. The observed young stand mortality to date was included in the timber supply projections presented in this public discussion paper. However, young pine mortality in the future is unknown and is not expected to increase significantly.

Finally, data from approximately 468 ground plots established by the University of Northern British Columbia (UNBC) indicate that within the Prince George Forest District in 2007, 93 percent of the pine volume in stands 60 years old or greater was dead (either red- or grey-attack) rather than the 63 percent indicated by the provincial infestation maps. Within the Prince George Forest District the BCMPB.v5 projections were adjusted to reflect the mortality observed in the UNBC ground data.

Best estimates indicate that in 2008, approximately half of the timber harvesting land base across the entire TSA had been impacted by mountain pine beetle.

Shelf-life

A major assumption impacting the efficacy of any salvage program is the shelf-life of the dead lodgepole pine, or the length of time it will remain commercially viable. After that period the dead pine is considered a non-recovered loss.

There is great uncertainty regarding shelf-life. It depends on market conditions, the price of the timber and available milling technology. In this analysis the only assumption that was made was that the dead trees may have some commercial use (e.g., sawlogs, chips, bioenergy) as long as the tree is standing. Once the trees fall to the ground it was assumed the stem would quickly rot. It was assumed the trees would remain standing for 15 years after attack. Given this departure from previous thoughts around shelf-life, graphs are presented that show the contribution to the forecast of trees dead for two years or less, three to five years dead, six to eight years dead, 9 to 11 years dead and 12-plus years dead. In this way, people's opinions and knowledge regarding shelf-life for various commercial products can be solicited at any time in the future and the timber supply projections can be interpreted accordingly without the requirement to rerun the timber supply model.

Balsam decline

Significant mortality has occurred in mature balsam stands within the Fort St. James Forest District. Between 2006 and 2007 district staff extensively surveyed the extent of the problem.

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Of the approximately 1.2 million hectares of balsam-leading stands within the Fort St. James Forest District approximately one million hectares has experienced, on average, 28 percent mortality. Within the Fort St. James Forest District this mortality is reflected in the timber supply projections presented in this public discussion paper.

Minimum economics required to access timber as evidenced by past performance

In this analysis past harvest preferences have been used as a surrogate for knowledge regarding whether a stand is economic to harvest. In the assessment of past harvest preferences, tree species and volume per hectare were assumed to capture the variation in value across the TSA and cycle time (the time taken to travel to and from town from the cutblock plus one hour for loading and unloading) was assumed to represent variation in cost across the TSA. The TSA has two fundamentally different cost structures; one where logs are hauled solely by road; the other where logs are hauled first by road to a railhead, then hauled the remaining distance by rail. The rail portion of the TSA is limited to approximately the top half of the Fort St. James Forest District. For this reason “economics” were examined separately for the “road-only” and “road and rail” portion of the TSA.

Data from the Ministry of Forests and Range’s harvest billing, stumpage appraisal, and silviculture tracking systems were used to assess past harvest preferences. From these data and observations of district staff it was decided stands with the following leading species were not economic:

- deciduous-leading stands that were neither aspen, birch nor cottonwood;
- black spruce; and
- hemlock.

Information from 1,613 logged timber marks was used to determine a reasonable upper limit to cycle times and a lower limit to volume per hectare harvests. This data spanned 1992 to 2007 with 81 percent, 64 percent and 23 percent of the harvest experience having occurred since 1998, 2000 and 2005, respectively.

On the road portion of the TSA the maximum cycle time recorded was 13 hours, however 99 percent of the harvest experience recorded cycle times of 7.7 hours or less. On the rail portion of the TSA transport times were 4 and 3.9 hours, respectively by road to the railhead.

Due to the significant difference between the 99th percentile of cycle time and the absolute maximum (on the road portion of the TSA) it was decided to base the cycle time limit on 99th percentile—7.7 and 3.9 hours for the road and rail portions of the TSA respectively. By basing the upper limit on the 99th percentile, the overwhelming majority of the harvest experience was used while protecting against possible ‘one-off events’ or possible errors in the dataset.

Similarly, minimum volumes per hectare were based on 99 percent of the harvest experience excluding the absolute minimum observed (which again may be ‘one-off events’ or errors in the data). Based on 99 percent of the harvest experience the minimum volume per hectare harvest was 182 cubic metres per hectare and 246 cubic metres per hectare for the road and rail portions of the TSA, respectively.

The resulting timber harvesting land base (THLB) is presented in Figure 5. The last 30 years of harvest has been superimposed on the THLB to show how well the THLB resulting from the cutoffs described above represents the extent of actual harvesting.

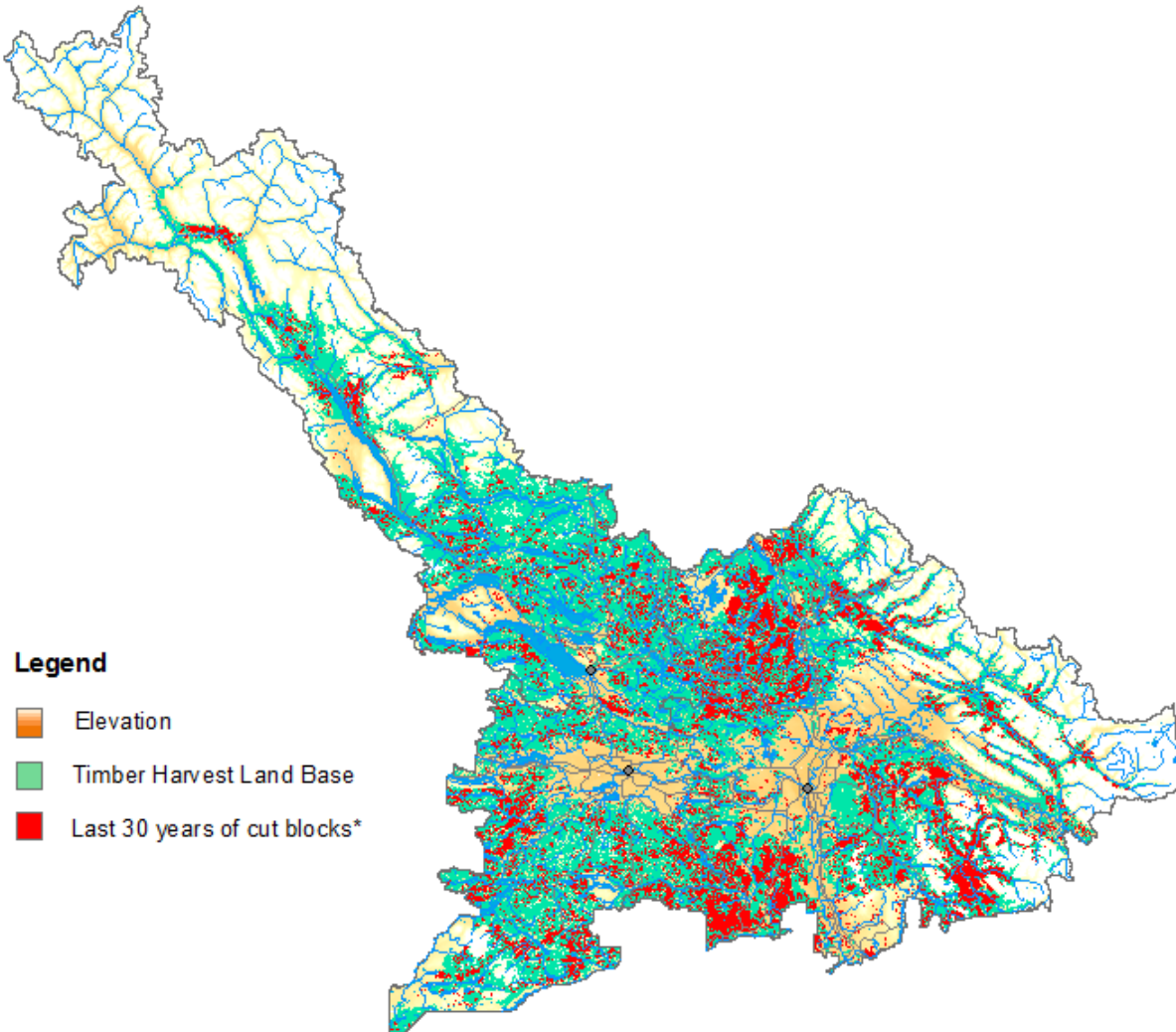


Figure 5. The timber harvesting land base compared to the extent of harvesting over the past 30 years.

Proximity to an existing road

For this analysis, it was assumed a stand had to be within 1.5 kilometres of a road to be a candidate for harvest. Once harvested that stand was considered roaded and stands within 1.5 kilometres of that harvested stand could be considered candidates for harvest. In the past, licensees have built up to 30 kilometres of road to access a drainage harvesting about 20 blocks in the first pass.

Management for non-timber objectives

All forest cover constraints required to manage for visual quality, wildlife habitat, old growth as well as any area specific management objectives were respected in this analysis. These constraints are listed in the Prince George TSA data package November 2008.

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Appendix B: Socio-economic analysis

1. Introduction

The socio-economic assessment (SEA) that follows provides a profile of the region, its demographic and labour force trends, a focus on development efforts in the region, and the potential forest sector activity and employment changes that may result from the forecast declines in the Prince George TSA timber supply.

1.1. Demographic trends

In 2008, the Prince George TSA had a population of 102,428 people (see Table 1). The City of Prince George is the largest community in the TSA and acts as the northern hub for transportation, supply and services. In 2008, the City of Prince George had an estimated population of 74,000 people, accounting for about 72 percent of the total TSA population. Vanderhoof is the second largest community with an estimated 2008 population of 3,865 people. Fort St. James and Fraser Lake have populations of about 1,350 people and 1,120 people, respectively. Combined, these communities account for close to 78 percent of the TSA's population. Since the 2006 Census period, the population of the TSA has increased marginally. The region has yet to return to population levels of the late 1990s and early 2000s.

Table 1. Prince George Timber Supply Area population estimates, by community, 1999-2008*

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Change 1999-2008	Annual average change
Fort St. James	2,035	2,023	1,968	1,832	1,718	1,614	1,500	1,362	1,361	1,351	-34%	-3.4%
Fraser Lake	1,264	1,299	1,277	1,233	1,164	1,214	1,176	1,129	1,136	1,118	-12%	-1.2%
Prince George	76,800	76,762	75,206	74,066	74,554	74,880	73,389	72,889	73,846	74,092	-4%	-0.4%
Vanderhoof	4,617	4,597	4,560	4,447	4,309	4,270	4,214	4,172	3,920	3,865	-16%	-1.6%
Community sub total	84,716	84,681	83,011	81,578	81,745	81,978	80,279	79,552	80,263	80,426	-5%	-0.5%
Prince George TSA*	108,884	108,306	106,231	104,479	104,003	104,309	102,237	101,182	101,946	102,428	-6%	-0.6%
TSA Annual % change		-0.5%	-1.9%	-1.6%	-0.5%	0.3%	-2.0%	-1.0%	0.8%	0.5%		

* The population estimates are based on information from BCStats, query date May 1, 2009. BCStats does not provide estimates by forest district or TSA, subsequently the TSA's population estimate in Table 1 is a combination of the Fraser-Fort George and Bulkley-Nechako Regional Districts pro-rated by the % of regional district area in each forest district, from the 2001 Economic dependency table for forest districts http://www.for.gov.bc.ca/HET/tsr_sea/index.htm

There are numerous other smaller communities located in each district, including many First Nations communities. Annual population data for these communities are not available, but 2006 census data does provide an indication of rural populations. In the Fort St. James Forest District, the First Nations communities of Nak'azdli, Pinchi, and Tachie have populations of 495, 110, and 375, respectively. The Fort St. James Forest District also has an additional rural population of about 1,355 people (Bulkley-Nechako Regional District Area C). Additional areas in Vanderhoof include Fort Fraser and the adjacent Nautley First Nations community with a combined population of about 325, and Dog Creek with a 2006 population of 157 people. Other First Nations communities include Stellaten and Saikuz. The Vanderhoof Forest District also has an additional rural population of about 4,792 people (Bulkley-Nechako Regional District Areas D and F). Rural areas and a small First Nation's reserve population in the Prince George Forest District accounted for about 13,300 people in 2006.

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BCStats estimates a slow rate of growth in the region's population to 2020, with the TSA population increasing by about two percent from the 2008 level. Provincially, the population is expected to increase 16 percent by the year 2020.^f The BCStats population projections are based on an understanding of historical in- and out-migration from the region and an assessment of events that may change that pattern. In the Prince George region, net out-migration has been the prevailing trend and an expectation of declining timber supply puts further downward pressure on growth expectations. However, opportunities in other sectors may help to reverse or at least mitigate this trend.

1.2. The TSA economy

Census labour force data for the Prince George TSA indicates that in 2006 the total number of people in the labour force (i.e., either employed or unemployed but waiting to return to or looking for work) was 59,965 people. Between 2001 and 2006, the total labour force increased by a modest 0.2 percent. However, growth was restricted to the Prince George Forest District portion of the TSA. Table 2 provides a summary of this data by forest district.

Table 2. Total employment by forest district, 2001-2006 census

	Fort St James FD		Prince George FD		Vanderhoof FD		Prince George TSA	
	2001	2006	2001	2006	2001	2006	2001	2006
All Industries - Total	2,330	1,845	47,565	48,455	5,935	5,665	55,830	55,965
Total percent change 2001-2006		-21%		2%		-5%		0.2%

Source: Census of Canada, 2001, 2006.

^f For additional information go to the BCStats website at <http://www.bcstats.gov.bc.ca/>

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In Fort St. James the labour force declined by 21 percent to 1,845 positions from 2,330. In the Vanderhoof Forest District the decline was five percent to 5,665 positions from 5,935. The largest industrial sector decline was in the forest sector with a 4.5 percent decline across the TSA, although this trend was not equal across the three districts. The largest decline occurred in the Fort St. James Forest District where forest sector jobs declined by 24 percent between 2001 and 2006. Vanderhoof experienced a six percent increase in its forest sector labour force. The TSA declines indicated in Table 2 were offset by the large 38 percent employment increase in the mining/oil and gas sector, and a seven percent increase in health and education related employment. However, much has happened since 2006. Non-Census data can be used where available and anecdotal information from local communities helps to supplement the statistical picture and bring the profile more up to date and relevant. The forestry section to follow provides some of this update.

Table 3 provides this labour force data for the 2006 Census year by total employment in each basic sector.⁸ Employment estimates by basic sector combine not only the direct employment supported by, for example the forest or agriculture sector, but also the so called indirect and induced employment related to the direct business and employee spending. Thus, employment in wholesale/retail trade, transportation, and other supply and service employment is allocated to each basic sector. The allocation of this indirect and induced employment is based on the level of income associated with each basic sector, thus for example the forest sector will have a larger number of indirect and induced jobs associated with forestry activity than the tourism sector which brings a lower per job level of income into the region.

The indirect/induced employment ratios in Table 3 show this spending effect by direct sector, where available. A direct sector with a larger ratio indicates higher income and spending levels, thus generally supports more indirect and induced spending, hence jobs in the region. Employment and income ratios for each forest district can be found at http://www.bcstats.gov.bc.ca/pubs/econ_dep.asp.

⁸ An economy can be divided into two components: basic and non-basic. The basic sector is supported by income flowing into the region and includes direct activity associated with a particular sector (forestry, agriculture for example) and the resulting indirect activity supported by company purchases of goods and services. The non-basic sector is supported by employees in the basic sector spending their incomes at local stores for example. Total employment as provided in Table 2 includes both basic and non-basic components. The basic sector is considered the driver of economic activity and growth in a region. For a more in-depth discussion of the methodology used to generate these figures and the publications on which this discussion is based see http://www.bcstats.gov.bc.ca/pubs/econ_dep.asp

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Table 3. Total employment by basic sector and indirect/induced employment ratios for the Prince George TSA, 2006

Forest District Sector	Fort St. James	Prince George	Vanderhoof	Prince George TSA	TSA Indirect/ induced ratios*
LOGGING	354	4,096	1,004	5,454	1.23
PULP AND PAPER	14	3,383	76	3,473	1.63
OTHER WOOD MFG	545	5,346	1,412	7,303	1.29
MINING (& PROC.)	13	671	369	1,053	1.36
OIL & GAS(& PROC)	-	641	-	641	(incl. mining)
HIGH TECH	-	738	-	738	1.04
FISHING & TRAPPING	-	33	1	34	NA
AGRICULTURE & FOOD	52	767	395	1,214	1.12
TOURISM	102	3,880	432	4,414	1.07
PUBLIC SECTOR	662	17,695	1,483	19,840	1.14
CONSTRUCTION	41	4,467	242	4,750	1.30
FILM & SOUND PROD.	12	65	-	77	NA
OTHER (UNALLOCATED)	40	4,589	104	4,733	NA
NON-EMPLOYMENT	30	3,430	157	3,617	NA
TOTAL	1,865	49,801	5,676	57,342	NA

Source: Horne, Garry. 2009. 2006 Economic Dependency Tables for Forest Districts, February 2009. Victoria, BCStats.

*The indirect/induced employment ratio are weighted averages of the forest district ratios.

NA=not available

The labour force data used to develop the information in Tables 2 and 3 can also be used to delve into the specific components of each basic sector, such as changes in transportation related sectors (included in some basic sectors), wholesale or retail trade (included in all basic sectors), health care (included with other public sector related jobs under 'public sector'), education or federal and provincial public sector jobs. Comparisons can be made with the 2001 Census year to see which sectors have been experiencing employment increases or decreases. Appendix 1 provides the labour force data for Census years 2001 and 2006 so the reader can examine any particular employment category. The following analysis of changes in employment levels uses that information where classifications appear relatively consistent.^h

^h Comparing Census labour force information can be problematic as employment sector definitions change. For example, the 2001 Census uses an employment classification system based on the North American Industrial Classification System (NAICS) from 1997 while the 2006 Census uses 2002 definitions. While for some sectors the changes can be minimal, for others the differences can lead to incorrect analyses of change.

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In terms of non-forest sector direct employment, the Vanderhoof Forest District experienced the largest absolute non-forest sector decline followed by Fort St. James Forest District; however, while smaller in absolute terms the Fort St. James Forest District decline accounted for 18 percent of its total non-forest labour force versus nine percent in the Vanderhoof Forest District. Direct non-forestry manufacturing employment declined about 10 percent across the TSA. Wholesale/retail trade experienced an overall increase across the TSA growing by about two percent; however, that growth was confined to the Prince George area and the wholesale sub-sector. The retail sub-sector declined by about 8.5 percent across the TSA. Wholesale/retail trade related employment declined by about 22 percent in Vanderhoof Forest District (a decline to 535 from 685), while Fort St. James Forest District experienced a 61 percent decline in its wholesale/retail trade sector (to a labour force of 85 from 220).

The transportation sector includes jobs related to air, water, truck and rail transport, and also sub-sector specific transportation such as pipeline transport, transit and other ground related transportation, and scenic and sightseeing related transport. There is no specific transportation sub-sector for the forest sector; some log transport is included in the logging sub-sector while other activity is included in rail and truck transport. The census data indicates a five percent increase (150 jobs) in total transport-related employment. Individual sub-sectors vary; however, with rail transport declining in the TSA by 47 percent – a labour force reduction of 405. Truck transport grew by 27 percent or 370 jobs. Each forest district experienced different changes as well. Fort St. James Forest District had the largest increase, mostly in support services for transport. The Prince George Forest District transportation-related labour force increased by five percent, while the Vanderhoof Forest District sector declined by two percent, mainly in the rail and truck transport sub-sectors.

Health and education increased by about seven percent across the TSA, with the largest increase in Fort St. James of 19 percent. Prince George's health and education labour force increased by about eight percent, while it declined by eight percent in Vanderhoof. Federal government employees were also not immune to reductions with 17 percent, or 165 positions removed from the TSA's labour force between 2001 and 2006.

There are no regional forest district labour force statistical data available from either Statistics Canada or BCStats since 2006. More recent forestry processing data is available and is discussed in the forestry section below. From the 2006 Census period to 2008, the population across the TSA increased by a very modest one percent. However, Fort St. James and Fraser Lake declined at more significant levels of eight percent and four percent, respectively. This population decline suggests that employment opportunities have likely declined precipitating this out-migration.

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1.3. Economic dependency and community vulnerability

Another way of looking at this employment data is in terms of how a local economy depends on any one basic sector in terms of the level of income introduced into the local economy. Table 4 provides the latest economic dependency data for forest districts based on the 2006 Census of Canada. In terms of basic employment, the forest sector remains the single most important sector in the TSA's economy. While the Prince George Forest District depends to a much lesser extent on forestry, it is still the largest industrial sector in the district, and the second largest employer behind the public sector.

Table 4. Prince George TSA forest district basic employment dependency ratios, 2006.

Forest District	Forestry	Mining & Min Proc	Agric. & Food	Tourism	High Tech	Public Sector	Construc- tion	Other
Fort St. James	49%	1%	3%	6%	0%	36%	2%	3%
Prince George	26%	3%	2%	9%	2%	38%	10%	10%
Vanderhoof	45%	6%	7%	8%	0%	27%	4%	2%

Source: Garry Horne (2009) Economic dependency tables for forest districts.

Note: percentages may not add due to rounding.

The basic employment dependency data can also be used to measure forest district economic diversity and its subsequent level of vulnerability to changes in forest sector employment. Table 5 shows two indices, one showing the diversity of the forest district, the other its forest sector vulnerability. Diversity measures how dependent a forest district is on each of its sectors. An index of 100 indicates that the forest district depends equally on each sector for its income. Thus, the higher the number the more diverse the economy and the more able it may be to rely on other sectors in times of sectoral downturns. The forest vulnerability index is based on the dependency and diversity data. A higher number indicates that when the forest sector experiences a downturn, the communities are more likely to experience greater economic difficulties than other areas with lower scores. None of these indicators suggest that a particular district is any more likely to experience reductions in forestry activity; the data helps understand which forest districts may experience greater difficulty if or when a downturn occurs.¹

Table 5. Basic sector diversity and forest sector vulnerability, 2006.

	Diversity	Forest Vulnerability
Northern Interior Forest Region by Forest		
Fort Nelson	68	43
Fort St. James	48	132
Kalum	69	20
Mackenzie	28	264
Nadina	55	100
Peace	72	13
Prince George	68	39
Skeena Stikine	69	32
Vanderhoof	60	79

Source: Horne, Garry. 2009. 2006 Economic Dependency Tables for Forest Districts, February 2009. Victoria, BCStats.

¹ For a more detailed discussion of these indices and associated methodology see Horne, Garry. 2009. British Columbia Local Area Economic Dependencies, 2006. BCStats. http://www.bcstats.gov.bc.ca/pubs/econ_dep/2006/2006_all.pdf

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A 2005 study by MacKendrick and Parkins expands on the diversity and vulnerability indicators shown in Table 5. Table 6 shows the aggregated results of their study. The study bases its evaluation of vulnerability on four dimensions: physical, socio-economic, political, and economic. A community with a high vulnerability score will experience greater difficulty adapting to sudden or catastrophic changes, such as the mountain pine beetle.

The study found that communities within or on the fringe of mountain pine beetle affected forests have a relatively higher level of community vulnerability than communities located farther from affected areas. The communities of Cheslatta, Burns Lake and Quesnel have the highest vulnerability scores. Vanderhoof is the only community from the Prince George TSA represented in this study and was found to have medium to high vulnerability. For Vanderhoof, however, the measure of susceptible pine used in the physical vulnerability analysis is based on the Prince George TSA and does not reflect the more pine-dominated timber profile of the Vanderhoof Forest District and the source of supply for Vanderhoof mills. Nearby Burns Lake and Quesnel provide some regional diversity to the study's results. Dimensions of the vulnerability index may suggest similar results for Fort St. James and Fraser Lake given their level of dependence on the forest sector and proximity to mountain pine beetle affected areas. Conclusions from this study are not surprising: smaller, less diversified communities within beetle damaged areas are more vulnerable to economic shocks. The challenge for communities revolves around having the local capacity to support and seek economic opportunities to maintain populations and local services.

Table 6. Community vulnerability index scores

Community	Final vulnerability scores	Vulnerability level
Cheslatta	7.4	High
Burns Lake	7.3	
Quesnel	7.2	
Vanderhoof	6.5	Medium
Williams Lake	6.4	
Mackenzie	6.3	
100 Mile House	6.2	
Cache Creek	5.7	
Houston	4.9	Low
Salmon Arm	4.4	
Invermere	4.2	

Source: MacKendrick and Parkins 2005.

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2. Forest sector activity

2.1. Forest sector labour force

The following table provides forest sector labour force data for the two most recent census periods for the three Prince George TSA Forest Districts. The labour force data in Table 7 indicates a decline in forest sector employment for the TSA as a whole, but an increase in Vanderhoof. Only logging and forestry services show an increase across the TSA. Processing employment experienced a decline despite increases in harvesting and processing activity (see Figure 2).

Table 7. Labour force statistics, direct forest industry by sub-sectors, 2001, 2006 Census

	Fort St James FD		Prince George FD		Vanderhoof FD		Prince George TSA	
	2001	2006	2001	2006	2001	2006	2001	2006
All Industries - Total	2,330	1,845	47,565	48,455	5,935	5,665	55,830	55,965
Forest Industries - Total	980	740	6,940	6,650	1,625	1,730	9,545	9,120
Forest industries by sub-sector								
Forestry and logging	200	210	1,460	1,575	465	505	2,125	2,290
Support activities for forestry	80	80	1,005	770	150	170	1,235	1,020
Wood product manufacturing	685	440	3,005	2,855	970	1,010	4,660	4,305
Pulp and paper manufacturing	15	10	1,415	1,340	10	45	1,440	1,395
Total forest sector percent change 2001-2006		-24%		-4%		6%		-4%

Source: BCStats. 2001, 2006 Census of Canada.

This forest sector activity depends not only on the harvest of timber from the Prince George TSA, but also tree farm licences, community forest tenures, woodlots, federal and private timber lands. Table 8 provides a summary of these harvests from 2000 to 2008. Table 9 shows this harvest by forest district. The increase in the volumes harvested among all land types follows the pine beetle harvest strategy and market demand. Declining demand for wood products clearly affected the region after markets peaked in 2005. Note the responsiveness to market demand in the Crown-other (mainly woodlots and Community Forests Agreements), federal Crown and private volumes harvested.

Table 8. Volume of timber harvested from all sources in the Prince George, Fort St. James and Vanderhoof Forest Districts, 2000-2008

Tenure/Land type	2000	2001	2002	2003	2004	2005	2006	2007	2008	Average 00-08
Crown - TSA	9,139,982	9,569,161	11,081,993	12,134,241	10,777,598	12,908,461	13,371,078	10,070,341	9,396,844	10,938,855
Crown - TFL	640,590	556,346	824,455	1,038,295	770,809	1,082,598	784,372	1,086,787	680,570	829,425
Crown - other	208,292	314,026	495,840	1,078,121	1,534,189	1,633,419	941,962	1,106,527	678,556	887,881
Federal Crown	1,232	-	2,363	3,879	90,534	99,118	124,285	12,699	1,328	37,271
Private	327,488	619,590	704,460	740,183	878,225	1,012,184	659,858	665,323	431,403	670,968
Total	10,317,585	11,059,123	13,109,109	14,994,718	14,051,355	16,735,780	15,881,556	12,941,677	11,188,701	13,364,401

Source: Revenue Branch, B.C. Ministry of Forests and Range, Victoria.

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Table 9. Volume of timber harvested from all sources by forest district of origin, 2000-2008

Forest District	2000	2001	2002	2003	2004	2005	2006	2007	2008	Average 00-08
Fort St James	2,723,360	3,163,869	3,292,570	3,327,028	2,937,634	3,002,202	3,303,483	2,666,526	2,175,869	2,954,727
Prince George	5,364,686	5,376,720	5,773,447	7,156,040	6,900,943	8,783,838	8,459,940	7,054,435	5,645,692	6,723,971
Vanderhoof	2,229,539	2,518,534	4,043,092	4,511,650	4,212,778	4,949,740	4,118,133	3,220,716	3,367,141	3,685,703
Total	10,317,585	11,059,123	13,109,109	14,994,718	14,051,355	16,735,780	15,881,556	12,941,677	11,188,701	13,364,401

Source: Revenue Branch, B.C. Ministry of Forests and Range, Victoria.

The timber harvested in each district supports processing operations in a number of forest districts. Figure 1 provides an indication of the destination of timber cut in the three forest districts. The dominant presence of Prince George as a processing centre is illustrated with about 90 percent of the timber harvested in the Prince George Forest District remaining there for processing. About 22 percent and 27 percent of the timber harvested in Fort St. James and Vanderhoof districts, respectively, flows to the Prince George district for processing.

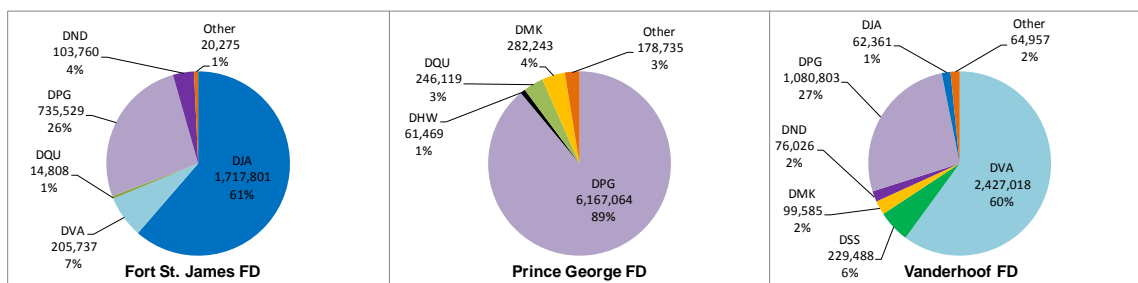


Figure 1. Fibre flow – destination of timber cut by forest district, average harvest 2003-08. Timber volumes from any source Crown or private.

Legend: DHW = Headwaters Forest District; DJA = Fort St. James; DMK = Mackenzie; DND = Nadina; DPG = Prince George; DQU = Quesnel; DSS = Skeena-Stikine; DVA = Vanderhoof.

Source: Revenue Branch, Ministry of Forests and Range.

The data in Figure 1 shows where timber harvested in each of the TSA's forest districts was on average scaled from 2003 to 2008.^j However, the average volumes mask the trends that have occurred over the last 10 years. Appendix B2 provides more detailed annual fibre flow data, with the main trends discussed here. The flow of timber harvested in the Fort St. James Forest District has shifted from over 75 percent scaled within the district to less than 20 percent. The share flowing to the Vanderhoof and Prince George Forest Districts has correspondingly increased. In the Prince George Forest District the volume remaining in the district for processing has increased slightly, with 85-90 percent being scaled in the district. The timber harvested in the Vanderhoof Forest District has increasingly concentrated in the Vanderhoof and Prince George districts, with about 69 percent and 29 percent scaled in each district in 2008, respectively.

2.2. Primary processing

The processing sector in the Prince George TSA has been historically diverse including manufacturers of solid wood products, pulp and paper and other product types such as log homes and pellets. The past decade has been characterised by a consolidation of milling activity, mainly in the solid wood processing sector. In 1998, the Economics and Trade Branch identified 30 processing facilities in the TSA. By 2007, that number had dropped to 26 operations. However, lumber production increased by 31 percent over the 10-year period to 3,577 million board feet from 2,726 million board feet. While harvests in the mid-2000s also increased, mills have become more productive and on average are producing more volume per mill. In the Prince George TSA, since late 2007 mills have been experiencing temporary and permanent shutdowns, as well as reductions in the number of shifts.

^j It is assumed in this analysis that the timber is processed in the same district where it is scaled.

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The Prince George Forest District has 11 lumber mills, three pulp mills, a log home operation, utility mill and two pellet operations. In 2007, the mills consumed over 8.5 million cubic metres of timber. However, recent curtailments in operations have significantly reduced output. Canfor Ltd.'s North Central Plywood mill closed permanently following a fire in May 2008 and the mill will not be replaced. Other Canfor mills in the Prince George Forest District have undergone temporary shutdowns and shift reductions throughout 2007-2009 to reduce total production. On May 29, 2009, Canfor announced the indefinite closer of its Prince George Rustad lumber mill. Other operators such as Dunkley and Carrier Lumber have reduced the number of daily operating shifts. Lumber production peaked in 2006 at about 6.14 million cubic metres, declining to 5.90 million cubic metres in 2007.

The Fort St. James Forest District is home to four mills, including Stuart Lake Lumber, TI'oh Forest Products, Conifex and Apollo. Each of these mills has adjusted to the economic downturn by operating reduced shifts and days to meet the sporadic demand in the market. Stuart Lake has remained closed since May, 2007. Conifex reopened in March 2009 after an extended shutdown. TI'oh, being dependent on trim ends relies on local producers. Combined these mills could consume from 1.7 to 2 million cubic metres of timber per year. In 2007 these mills operated well below capacity consuming a total of about 550 000 cubic metres.

The Vanderhoof Forest District has three large lumber mills: Canfor's Plateau mill and L&M Lumber near Vanderhoof, and West Fraser's Fraser Lake Division near Fraser Lake. One other small lumber mill, log home builder and Premium Pellet Ltd. are also in the Vanderhoof Forest District. Combined, under normal conditions these mills can consume close to three million cubic metres of logs per year. In 2007, these mills consumed about 2.5 million cubic metres of timber.

Since 2006, harvest rates and the volume of logs being processed into lumber have declined (see Figure 2). These trends in both harvesting and processing activity indicate that there will be or has been downward pressure on employment in these sectors as well. Between the 2006 and 2007, lumber manufacturing across the Prince George TSA declined by about 29 percent. No district was spared with Prince George lumber production declining by 26 percent, Vanderhoof by 19 percent, and Fort St. James by 65 percent. These declines are due to the severe downturn in the US housing market and economic recession, resulting in mill closures and temporary shutdowns. Note that Figure 2 includes only lumber manufacturing; as such the difference between the volume harvested and processed in Figure 2 includes wood used in other manufacturing processes such as pulp and other residual based processing, panel products, and log homes.

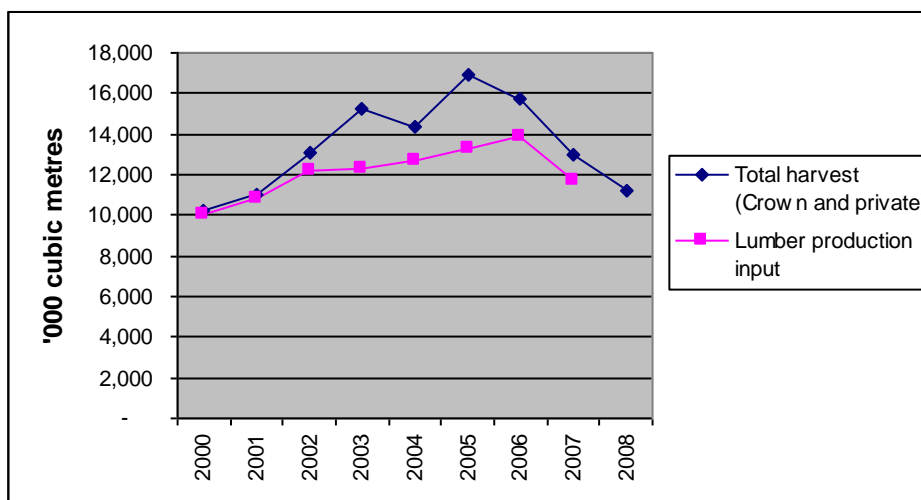


Figure 2. Prince George TSA – total lumber mill input and total timber harvest, 2000-2008.

Source: Economics and Trade Branch, Ministry of Forests and Range, Revenue Branch Ministry of Forests and Range.

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2.2.1 Sectoral trends – lumber

B.C.'s forest industry is currently experiencing one of the worst cyclical downturns in its history. The period 2001-2008 reflects highs and lows in prices and market conditions province-wide. In 2007-2008, access to U.S. lumber markets was affected by the strong Canadian dollar, a weak U.S. housing market in the wake of the sub-prime mortgage crisis, subsequent low lumber prices and continuing softwood lumber export duties that exist when lumber markets are low.

Though exchange rates have been amenable to trade (\$1CDN= 0.813\$US as of Jan. 28, 09; and \$1CDN = 0.783\$US as of Mar. 4, 09), lumber sales have remained stalled with significantly reduced demand in North America – US softwood lumber consumption is closely tied to US housing starts which for December 2008 were reported at 550,000 units^k (the lowest on record since reporting began at the national level in January, 1959). Recent price increases have been offset by a rising Canadian dollar (0.97\$US as of January 18, 2010).

Though not as strong a market for BC lumber, housing starts in Canada to December 2008 remained fairly stable at over 211,000 units, down from 227,400 units in 2007 and 228,300 in 2006. Seasonally adjusted annual rates of housing starts in Canada have fallen in January to 153,500 units, and further reduced in February to 136,400 units.^l Some analysts expect North American lumber prices to remain low through 2009/10 because of continuing uncertainty in financial and housing markets, and expect to see markets begin to pick up again in 2011.

2.2.2 Sectoral trends – pulp

The pulp and paper industry in Canada employed an estimated 84,400 workers and contributed over \$9.5 billion in gross domestic product (GDP) in 2008 – significantly less than in 2003 by 14,000 workers and \$4 billion.^m In 2005, Pricewaterhouse Coopers reported the pulp and paper industry was responsible for over \$1 billion in wages and benefits to over 10,500 workers and over \$600 million in payments to municipal, provincial and federal governments.ⁿ

In pulp markets, current supply and demand are now in close proximity due to closures of Canadian capacity over the past several years. Growth in key end-uses for northern bleached softwood kraft pulp (NBSK), although maturing in North America and Western Europe, is robust in developing regions. Core demand for NBSK is forecast to grow at about 1.6 percent per year over the medium term.

Newsprint mills in BC represent moderate capacity and newer technology in comparison with the rest of Canada; however, they lag behind Scandinavia in capacity and significantly behind Western Europe in the age of technology employed. Between 2000 and 2006 consumption of newsprint in North America has fallen about 25% (3.2MM metric tons) and consequently industry capacity has been reduced on average by 630,000 metric tons per year. Demand is forecast to fall by a further 3.7 million metric tons by 2020, thereby creating serious viability challenges for the higher cost facilities in BC and elsewhere in North America.

k Source: U.S. Department of Commerce: Census Bureau, Monthly New Residential Construction, Seasonally Adjusted Annual Rate, Date Range: 1959-01-01 to 2008-12-01, Last Updated: 2009-01-22 10:01 AM CST.

^l <http://www.cmhc-schl.gc.ca/en/corp/nero/nere/2009/2009-03-09-0815.cfm>, accessed 2009-03-09

^m Conference Board of Canada, *Canadian Industrial Outlook*, Autumn 2008.

ⁿ Pricewaterhouse Coopers, *Report on the Economic Impact of the BC Pulp and Paper Industry*, Prepared for BC Pulp and Paper Industry Task Force, November 2007.

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2.2.3 Sectoral trends – bio-energy and wood waste

An indication of the development potential of wood waste in the manufacture of energy related products is the pellet market. There are three manufacturers in the Prince George TSA: Premium Pellet Ltd. in Vanderhoof, Pacific Bioenergy Corp. Pellet in Prince George, and Pinnacle Pellet Inc. in Strathnaver. The market for pellets is strongest in Europe. Prices in Europe peaked in 2006 at 250 Euros/tonne; prices paid by German and Austrian buyers fell over 30 percent in 2007 as a result of increased production capacity in the two countries. Prices started to increase in the third quarter of 2008. Prices in Sweden remained far more stable during this period, but in the fourth quarter of 2008 prices began to fall, closing the price differential. Investments in additional energy producing capacity in Europe are leading to increased demand in 2009 which is forecast to lead to higher prices.^o

Biomass is also being considered by many jurisdictions in the production of electricity. Stennes and McBeath (2005)^p provide an economic analysis of electricity generation using biomass. They found that with 2005 alternative energy prices, at any delivered wood cost above \$0, other financial assistance would be required for a positive net return. Carbon credit markets may provide one option for this other financial assistance. With a modelled delivered wood cost of \$117/Mwh a carbon credit value in the range of \$80-130/credit may be necessary to broach profitability. They found that using biomass from forests for the production of the range of energy options is hampered in B.C. by several factors: 1) the low cost use of residual fibre from nearby facilities is limited; 2) the cost of biomass delivery to a mill gate is high and energy prices are too low, 3) the large area from which biomass may need to be collected; 4) the availability of low cost biomass alternatives; 5) the short-term nature of the supply of beetle-killed timber and the need for a dedicated supply source. Increasing energy prices and new technologies may eventually overcome these obstacles, but any development is subject to the relative cost changes and available supply of biomass.

The EPCOR Power L.P. bioenergy power plant in Williams Lake has been in operation since 1993, indicating that electricity can be produced efficiently when sufficient biomass is available nearby. Currently, local supply of residuals is significantly lower as a result of the current downturn in production in the Williams Lake area, indicating the dependence of this type of energy production on the supply of residuals from the traditional lumber producing sector. Accessing standing timber or biomass located further away would significantly add to electricity generating costs making profitability a challenge. For new developments, the costs associated with new plant construction, access to a secure supply of cheap fibre within a competitive and finite supply market (with pulp, pellet, panel and other potential competitors), and obtaining a favourable price for the electricity output remain key factors of profitability. Citing new facilities in areas where alternative demand for residuals is low may offer the best opportunity for future bio-energy projects.

^o Wood Resources International. www.woodprices.com

^p See http://bookstore.cfs.nrcan.gc.ca/searchpubs_e.php?AuthorIDs=AU15709 to obtain a full copy of the Stennes/McBeath report.

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Investment in bio-energy projects has significantly declined in recent months. CIBC World Markets reports that global investments declined from \$5 billion in the 3rd quarter of 2008 to \$0.5 billion in the first quarter of 2009. CIBC Wood markets reports that most investment has occurred in Brazil in the development of ethanol production, but low prices have led to financial losses even among the lowest cost producers. In the U.S. about 20 percent of its ethanol production capacity has been shut down.

2.3. Prince George Timber Supply Area allowable annual cut, timber harvest and fibre flows

The previous section focused on all forest activity within the three forest districts, including harvesting and processing associated with TSA timber from the Prince George and other TSAs, tree farm licences, community forest agreement tenures, woodlots and other federal or private sources of timber. This section focuses on the Prince George TSA only. The TSA land base as indicated in the timber supply section comprises a portion of the Fort St. James, Prince George and Vanderhoof Forest Districts.

The mountain pine beetle infestation led to significant increases in the allowable annual cut (AAC) in the Prince George TSA. The AAC has had two significant increases since 2002 to allow for the expedited salvage of pine stands. In 2002, the AAC was increased to 12 244 000 cubic metres, then in 2004 to 14 944 000 cubic metres. See Table 10 for the allocation of the current AAC, by tenure type.

Table 10. Allocation of Prince George timber supply area allowable annual cut

Tenure type	AAC	% of total
Replaceable Forest Licences	5,695,441	38.1%
Non-replaceable forest licences	5,471,488	36.6%
BC Timber Sales	3,485,106	23.3%
Timber Sale Licences < 10,000	5,859	0.04%
Community Forest Agreement	50,975	0.34%
Woodlot Licence	84,000	0.56%
Forest Service Reserve	151,131	1.01%
Total AAC	14,944,000	

Source: Resource Tenure and Engineering Branch, Ministry of Forests and Range, Report date 2009-01-09.
<http://www.for.gov.bc.ca/hth/apportionment/Documents/APTR011%2024.PDF>

Harvest rates in the TSA initially reflected the increases in the allowable annual cut, climbing to 13.3 million cubic metres in 2006 from about 9.2 million cubic metres in 2000 (see Table 11). The Vanderhoof and Prince George Forest Districts experienced the largest increases in harvest rates. After 2006, however, rates began to decline rather sharply. The outlook for the forest sector in 2009 is for a continuation of the current downturn in demand for forest products.

Table 11. Prince George TSA harvest, by forest district, 2000-2008.

Forest District	2000	2001	2002	2003	2004	2005	2006	2007	2008	Average 00-08
Fort St. James	2,491,466	2,962,524	2,974,515	2,803,105	2,479,124	2,648,283	2,998,574	2,145,500	1,834,162	2,593,028
Prince George	4,557,732	4,268,076	4,223,096	5,238,801	4,597,580	5,979,388	6,474,685	5,103,021	4,352,303	4,977,187
Vanderhoof	2,090,784	2,338,561	3,884,381	4,092,335	3,700,893	4,280,790	3,897,820	2,821,820	3,210,379	3,368,640
Total Prince George TSA	9,139,982	9,569,161	11,081,993	12,134,241	10,777,598	12,908,461	13,371,078	10,070,341	9,396,844	10,938,855

Source: Revenue Branch, BC Ministry of Forests and Range.

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2.4. Forest sector development strategy and opportunities

The provincial government's 2006-2011 Mountain Pine Beetle Action Plan contains seven main objectives:

1. encourage immediate and long-term economic stability for communities;
2. maintain and protect worker and public health and safety;
3. recover the greatest value from dead timber before it burns or decays, while respecting other forest values;
4. conserve the long-term forest values identified in land use plans;
5. prevent or reduce damage to forests in areas that are susceptible by not yet experiencing epidemic infestations;
6. restore the forest resources in areas affected by the epidemic; and
7. maintain a management structure that ensures the effective and co-ordinated planning and implementation of mitigation measures.

The Mountain Pine Beetle Action Plan focuses on the ecological, economic and social rejuvenation of pine beetle affected forests and the communities relying on those forests. This section will provide a summary of a variety of efforts that have evolved from this Plan. For additional information on the Mountain Pine Beetle Action Plan go to www.gov.bc.ca/pinebeetle

As part of the timber supply review process, the Omineca Beetle Action Coalition (OBAC) has provided a submission for consideration within the timber supply review process. It stresses the need to incorporate as best as possible an understanding of community needs into the AAC determination process. The submission sets out a series of recommendations to support and increase community benefits, sector diversification, forest management that supports current and future needs, and using beetle-attacked timber in the production of bio-energy. OBAC complete submission is included as Appendix B3.

A significant number of reports have been prepared examining various implications of the pine beetle related to wood products manufacturing (see the references section at the end of this report). In December, 2008, the Omineca Beetle Action Coalition (OBAC) released its "Future Forest Products and Fibre Use Strategy."⁹ The OBAC report is a high-level strategy document outlining six central objectives and four recommendations that focus on positioning the forest sector to have a continuing presence in the region. The recommendations are further divided into specific actions. While primary responsibilities are identified, such as the provincial government, local communities, First Nations and the forest sector, the greatest influence will come from market opportunities. Identifying the means to ensure the region is positioned to take advantage of those opportunities is at the core of the strategy.

⁹ <http://www.ominercoalition.ca/Strategies/ForestAndFibre/StrategyDocs.html>

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Forestry Innovation Investment Ltd. is supporting research on the performance of mountain pine beetle affected timber in manufacturing (see Wang et al 2008; Cai and Oliveira 2008; Chang and Lam 2008; and Wang and Dai 2008). For access to and an up-to-date listing of these and other MPB product development research projects go to the FII website: http://www.bcfii.ca/industry_resources/mpb/product_development.htm. A few examples of that research follow.

The studies examine the impacts of mountain pine beetle killed wood on drying characteristics, use in veneer processing, plywood manufacturing, and wood-cement composite materials. The veneer and plywood studies found that mountain pine beetle wood does have a place in plywood production and can provide a specialty product where strength and stiffness is required in subsequent use. Drying time for veneer is shorter; however, material loss is higher and appearance-based characteristics may be affected. The more specialty based nature of the product could offset any losses if sufficient volume is available and manufacturing is properly adjusted (see Wang et al, 2008). However, material loss and associated downtime hampered Canfor's Prince George veneer mill (prior to its burning down) from using more pine.

The use of wood fibres from mountain pine beetle timber in cement board manufacture could utilize more of the additional residue resulting from the processing of mountain pine beetle wood. Chang and Lam (2008) tested the use of mountain pine beetle fibres in the manufacture of cement board and found that mountain pine beetle wood performed better than other species in some mixtures, but that further study was required to test these conclusions under real processing conditions. In terms of structural lumber, Lum (2005) found that the bluestain left by the beetle does not impact the mechanical properties of lodgepole pine.

The abundance of pine beetle killed timber has led to a significant amount of effort to find alternative uses for that timber. The production of pellets for use in heating and the focus on the potential for dead pine and other slash as bio-fuels in the production of energy has received a significant amount of interest both here and in the U.S.

To help foster the development of the emerging bio-energy sector, in January 2008 the provincial government introduced the *BC Bio-energy Strategy*. Affiliated with that strategy and to encourage the development of energy projects using bio-fuels, BC Hydro has embarked on a two phase call for proposal process. Phase I proposals are for electricity generating projects that could be developed immediately and would not need the allocation of any new forest tenure as its fuel source. On February 6, 2008, BC Hydro announced the accepted proposals under Phase I: two located in Prince George, one in Kamloops and the fourth in Castlegar. The two Prince George projects are the Canfor Pulp Ltd. Partnership PGP bio-energy project and the PG Interior Waste to Energy Project.

On March 5, 2009, BC Hydro announced Phase II of its bio-energy development process. This second phase involves a two-stream process, the first of which is seeking larger scale projects, and the second is seeking proposals for smaller community-level electricity supply projects using forest biomass. Final selection of Phase II projects is scheduled for 2010.

Forest sector development not only focuses on post-harvest production activities, but also on investment in the forest resource itself. In response to the mountain pine beetle epidemic and the 2003 – 2004 wildfires, the provincial government introduced the *Forests for Tomorrow Program* to reforest the most devastated areas that would remain unharvested. The program emphasizes surveying, site preparation and planting. These treatments are guided by strategic level program planning, seed supply planning, silviculture strategies and timber supply analyses. The overview surveys and program planning, will formulate a clear and full picture of a cost-effective program and budget profile. See the *Forests for Tomorrow* website for further information: <http://www.forestsfortomorrow.com/fft/>.

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Assisting workers to transition from the forest sector to other job opportunities is another focus of the Mountain Pine Beetle Action Plan through the Community Development Trust. The Trust has three components: *Transitional Assistance Program* for workers over 55 years of age who wish to pursue opportunities in other sectors; *Tuition Assistance Program* providing assistance with tuition and books, and the *Job Opportunities Program* providing up to six months funding to forest dependent communities and organizations for local recreation, fuel management and restoration projects. As of December 31, 2009 about \$26.29 million has been spent in the Fraser-Fort George Regional District and about \$9.32 million in the Bulkley-Nechako Regional District. See <http://www.cd.gov.bc.ca/cdt/> for further information on the Community Development Trust.

The downturn in demand has resulted in immediate wood processing curtailments rather than the originally forecasted mid-term wood supply declines related to the deterioration of mountain pine beetle infested trees. Market demand improvement is not expected until at least 2011^r. It is possible the recovery in demand may coincide with declining availability of merchantable pine. The timing of the forestry sector downturn has exacerbated already challenging and changing operating conditions in communities like Fort St. James.

2.5. Other sector development opportunities

Forestry is not the only economic sector being examined for development potential. OBAC has also commissioned studies looking at the contributions of the minerals and mining sector (OBAC 2008) and the alternative energy sector (OBAC 2008). In June and July, 2009, OBAC recently released its tourism and agriculture strategies, respectively. The focus of the tourism strategy is to promote activities beyond the region's traditional focus on forests, to diversify the tourism experience, and attract investment in alternative opportunities and tourism related infrastructure. The agriculture strategy is based on the objectives to increase opportunities and to attract greater interest in the agricultural sector as a source of employment and locally grown food.

Other development assistance comes from the Northern Development Initiative Trust (NDIT). The NDIT was developed in 2005 by the provincial government to provide funding and economic development support for northern communities. The NDIT has seven regional and cross-regional funding envelopes. The economic development agency focuses on 10 priority areas: agriculture, economic development, energy, forestry, mining, Olympic opportunities, pine beetle recovery, small business, tourism, and transportation. In 2008, the NDIT released a manufacturing strategy that surveyed the region's strengths and identified promising manufacturing industries that could take advantage of the north's transportation corridor to markets in the east and west through to the Port of Prince Rupert. The report focused on a variety of metal processing, energy production, wood industries and most interestingly a whisky distillery in the Northeast. The report also sets out a strategy for attracting investment.

An example of a forthcoming development is the March, 2009, announcement that Terrane Metals Corp. was granted a provincial Environmental Assessment Certificate to develop its Mount Milligan copper-gold mine about 90 kilometres north of Fort St. James. Other federal and provincial approvals are required but the project could eventually employ about 400 people in its construction and operational phases.

^r Equity Research. December 2008. Forest Products Price-Forecast Monthly.

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3. Employment coefficients

Employment coefficients are used to calculate estimates of employment that would be supported by alternative harvest levels. The coefficients indicate the number of person-years of employment supported by each 1000 cubic metres of timber harvested (see Table 12).^s These ratios can be applied to a timber harvest forecast to estimate the level of employment supported by a particular timber supply estimate or AAC decision. Employment coefficients were recently updated for the Prince George TSA (see Pierce Lefebvre Consulting, 2008).

Table 12. Prince George TSA direct employment coefficients

Forestry sub-sector	Direct Impacts Within PG Region:	Direct Impacts Outside PG Region	Total Direct Impacts in BC
Harvesting	0.21	0.01	0.22
Silviculture	0.01	0.03	0.04
Sub-total - Land Based Activity	0.22	0.04	0.26
Wood Products Processing	0.26	na	0.28
Primary Pulp and Paper	0.07	na	0.07
Sub-Total - Primary Processing	0.33	0.02	0.35
Total (Harvesting, Silviculture & Processing) in Prince George Region	0.55	0.06	0.61

Source: Pierce Lefebvre Consulting. 2008. Prince George Region: Timber Harvesting and Processing Employment Survey. Final Report, December 15, 2008. The report and background information to this table can be found on-line at the Economics and Trade Branch website <http://www.for.gov.bc.ca/het/>.

The coefficients represent the direct employment supported by the forest sector; that is, jobs supported in timber harvesting, planting, planning, and at lumber and pulp mills for example. To determine the number of person-years associated with a particular timber supply, the coefficients are multiplied by the timber supply. For example, if 1 500 000 cubic metres were harvested from the land base, the harvest would support 330 person-years of harvesting and silviculture person-years ($[1,500,000/1000] * 0.22 = 330$).

These employment coefficients do not include the indirect employment supported by the purchases of supplies and services by forestry-related companies, or the induced jobs supported by employees spending their salaries on food, housing, and other products and services. These “spin-off” jobs as they are often called can be determined using employment multipliers. While they reflect a static or snapshot of these spending effects, multipliers can be used to indicate (1) the magnitude of employment supported by a particular sector, or (2) the positive or negative employment impacts resulting from a change in a sector. For example, for the Prince George Forest District the 330 logging and silviculture jobs would be multiplied by 1.43 to determine the total (direct + indirect + induced) number of person-years supported by 1 500 000 cubic metres ($330 * 1.43 = 472$). The number of indirect and induced person-years is found by subtracting the direct employment from the total employment ($472 - 330 = 142$). Alternatively, one could multiply the direct jobs by the indirect/induced portion of the multiplier (e.g., $330 * [1.43 - 1] = 142$).

^s A person-year is defined as a job lasting at least 180 days per year. Part-time jobs of less than 180 days are converted to full time person-years prior to the calculation of the employment coefficient.

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The most recent employment multipliers available are based on the 2006 census. See Table 13. These ratios will be used to estimate the indirect and induced impacts associated with timber supply levels.

Table 13. Short-term employment multipliers for the Prince George TSA

	Logging	Pulp and paper	Wood mfg.
Fort St. James	1.18	1.39	1.26
Prince George	1.43	2.03	1.55
Vanderhoof	1.25	1.47	1.33

Source: Horne, Garry. Economic dependency tables for forest districts. BCStats, 2009.

4. Economic impact analysis of Prince George TSA timber supply scenarios

The timber supply scenarios for the Prince George TSA indicate that the current volume of timber available for harvest could be maintained for close to 10 years. Table 14 shows employment levels, in person-years, associated with selected time periods of the timber supply scenarios. Under scenario 1, after 11 years the timber supply begins declining to the level shown in Year 15 then declines the following year eventually reaching the Year 20 level. The Year 20 level stays about the same until Year 40. The scenario 2A Year 20 assumes that mature spruce is available for harvest to soften the pine related mid-term impact.

This magnitude of reduction in the timber supply would significantly reduce the level of activity in the TSA's traditional forestry sector and its associated employment. These scenarios assume a continuation of the forest sector's current focus on solid wood and pulp based products, and its level of productivity. The table shows the number of person-years that the timber supply would support, not the number of person-years lost as a result of the declining supply.

The estimates presented in Table 14 show the employment supported by the volume of timber harvested from the Prince George TSA only. Other sources of timber also support these mills. For example, from 2004-2008 an average of about 10% (360 000 cubic metres) of the logs scaled in the Vanderhoof Forest District came from outside the Prince George TSA, mainly from the Nadina Forest District. About 7% (575 000 cubic metres) of the logs scaled in the Prince George Forest District came from outside the Prince George TSA, mainly from the Quesnel Forest District. Timber also comes from TFLs 30, 42, and 53 accounting for about 6% of the total volume scaled in the Prince George, Vanderhoof and Fort St. James Forest Districts. Nonetheless, the Prince George TSA supplies from 85-90% of local mill requirements. To maintain current employment levels (i.e., those supported by TSA and non-TSA timber), other sources of timber would have to make up the shortfall forecast for the Prince George TSA.

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Table 14. Prince George timber supply area forest sector employment, in person-years

Forestry sub-sector	Pre-2002 AAC	5-year avg. harvest 04-08	Scenario 1* Years 1-11
Timber supply volume (cubic metres)	9,363,661	11,398,299	14,946,316
Employment (person-years)			
Harvesting and silviculture	2,038	2,481	3,254
Wood Products Processing	2,448	2,980	3,907
Primary Pulp and Paper	671	817	1,072
Direct employment in the Prince George TSA	5,158	6,278	8,232
Direct impacts outside Prince George TSA	566	689	903
Total direct impacts in BC (TSA plus NON- TSA)	5,723	6,967	9,136
Indirect and induced impacts	2,150	2,617	3,432
Total direct, indirect and induced impacts	7,873	9,584	12,567

* The scenario 1 timber supply levels are points in time as the timber supply reduces to its mid-term level by year 20. The timber supply begins declining in Year 12 to the level shown in Year 15 then in Year 16 begins to decline to the Year 20 level. The Year 20 level stays about the same until Year 40. The scenario 2A Year 20 assumes that mature spruce is available for harvest to soften the pine related mid-term impact.

In terms of chip production, from 2005 to 2007 TSA mills produced close to 1.7 million bone dry units (BDUs) of chips per year; three large mills would produce about 500-600 thousand BDUs, a reduction of at least one million BDUs of chips. This level of chip supply will significantly reduce the availability of cheaper chip, hog fuel and sawdust by-products now being used in and envisioned for a variety of products, from pulp, to wood pellets and various forms of bio-energy production. Prince George's three pulp mills alone consume over two million BDUs per year, or about 5.8 million cubic metres of chips.

The pulp employment levels shown in Table 14 are those supported by the Prince George TSA timber supply. The employment is related to the traditional production and use of residual chips from sawmilling operations, supplemented by a portion of whole log chipping. As the supply from the TSA declines so too does the number of person-years that the TSA supports. To maintain employment at current levels, other sources of fibre would be needed to offset TSA related declines. When the residual chip supply is low, and pulp prices sufficiently high, mills will source more of their supply through whole log chipping. As a result, the pulp employment reductions outlined in Table 14 may be offset by these alternate sources of fibre. For example, Canfor is currently supplying its pulp mills with a larger proportion of whole log chipping.

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If chip supply shortages intensify, Canfor has three Pulpwood Agreements (PAs) located within and adjacent to the Prince George TSA that could form part of a fibre supply strategy to offset reductions in traditional sources of residual chips. Combined these Pulpwood Agreements may provide access to about four million cubic metres of deciduous fibre. Additional supplies of fibre could also come from dead pine stands that have been removed from the timber harvesting land base in the Prince George TSA. As with all non-residual sources, however, the costs of accessing, harvesting, and transporting the fibre to the mill gate in addition to chipping the logs will influence the profitability, thus attractiveness of those sources at an alternative supply.

The federal Pulp and Paper Green Transformation Program provides a tax credit based on the amount of black liquor produced in the pulping process and is intended to encourage capital investments and may contribute to the way in which pulp mills source and use fibre inputs. This may help the future productivity and profitability of these mills, which may subsequently influence the fibre supply strategy.

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Appendix 1: Census labour Force Data 2006

2006 Census Population 15 Years and Over by Industry - NAICS 2002, Labour Force Activity for BC Forest Districts (northern region), 2006 Census, 20% Sample-based Data

Source: Statistics Canada, 2006 Census, Custom Tabulation CRO0101646

Prepared by: BC Stats, January 2009

Both Sexes, 15 years and over	Fort St. James Forest District			Prince George Forest District			Vanderhoof Forest District			Prince George TSA		
	Total - Labour Force Activity	In the labour force	Employed	Total - Labour Force Activity	In the labour force	Employed	Total - Labour Force Activity	In the labour force	Employed	Total - Labour Force Activity	In the labour force	Employed
Industry												
Total - Industry - NAICS 2002	3035	1910	1640	68150	49130	45305	8325	5740	5205	79510	56780	52150
Not applicable	945	60	0	14680	675	0	2125	80	0	17750	815	0
All Industries - Total	2090	1845	1640	53470	48455	45300	6200	5665	5205	61760	55965	52145
Forest Industries - Total	775	745	670	7185	6650	5850	1845	1730	1520	9805	9125	8040
113 Forestry and logging	225	215	180	1780	1575	1065	555	505	355	2560	2295	1600
1131 Timber tract operations	0	0	0	20	15	15	0	0	0	20	15	15
1132 Forest nurseries and gathering of forest products	15	15	15	45	35	15	0	0	0	60	50	30
1133 Logging	210	195	170	1715	1525	1030	555	500	355	2480	2220	1555
1153 Support activities for forestry	85	85	75	825	765	655	175	170	120	1085	1020	850
321 Wood product manufacturing	455	440	410	3020	2855	2700	1055	1010	1000	4530	4305	4110
3211 Sawmills and wood preservation	410	400	380	2385	2250	2135	1020	975	970	3815	3625	3485
3212 Veneer, plywood and engineered wood product manufacturing	10	0	10	355	345	320	0	0	0	365	345	330
3219 Other wood product manufacturing	30	30	25	280	265	240	30	35	35	340	330	300
322 Paper manufacturing	10	0	0	1440	1340	1325	45	45	45	1495	1385	1370
3221 Pulp, paper and paperboard mills	10	10	10	1445	1340	1325	40	40	40	1495	1390	1375
3222 Converted paper product manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
3371 Household and institutional furniture and kitchen cabinet manufacturing	0	0	0	105	100	95	15	0	0	120	100	95
3372 Office furniture (including fixtures) manufacturing	0	0	0	10	10	0	0	0	0	10	10	0
Non-Forest Industries - Total	1315	1105	965	46285	41810	39450	4355	3935	3680	51955	46850	44095
111-112 Farms	45	45	45	555	510	485	320	320	310	920	875	840
114 Fishing, hunting and trapping	10	0	10	15	15	10	0	0	0	25	15	20
1151 to 1152 Support activities for farms	0	0	0	25	25	25	25	25	25	50	50	50
211 Oil and gas extraction	0	0	0	65	65	50	0	0	0	65	65	50
212 Mining (except oil and gas)	0	10	10	125	110	105	200	185	185	325	305	300
213 Support activities for mining and oil and gas extraction	0	0	0	205	195	175	20	15	15	225	210	190
219 Mining-unspecified	0	0	0	0	0	10	0	0	0	0	0	10
221 Utilities	0	0	0	250	235	235	10	10	10	260	245	245
236 Construction of buildings	25	20	20	1215	1050	980	60	45	45	1300	1115	1045
237 Heavy and Civil Engineering Construction	15	0	10	480	430	375	60	65	60	555	495	445
238 Specialty Trade Contractors	20	15	15	1745	1635	1525	165	160	125	1930	1810	1665

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Both Sexes, 15 years and over - 2006 continued	Fort St. James Forest District			Prince George Forest District			Vanderhoof Forest District			Prince George TSA		
2006 Census Population 15 Years and Over by Industry - NAICS 2002, Labour Force Activity for BC Forest Districts (northern region), 20% Sample-based Data	Total - Labour Force Activity	In the labour force	Employed	Total - Labour Force Activity	In the labour force	Employed	Total - Labour Force Activity	In the labour force	Employed	Total - Labour Force Activity	In the labour force	Employed
311 Food manufacturing	0	0	0	65	50	50	0	0	0	65	50	50
312 Beverage and Tobacco Product Manufacturing	10	10	10	95	80	80	0	0	0	105	90	90
313 Textile Mills	0	0	0	0	10	0	0	0	0	0	10	0
314 Textile Product Mills	0	0	0	0	0	0	10	10	10	10	10	10
315 Clothing Manufacturing	0	0	0	25	25	25	0	0	0	25	25	25
316 Leather and Allied Product Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
323 Printing and related support activities	0	0	0	85	85	85	0	0	0	85	85	85
324 Petroleum and coal products manufacturing	0	0	0	80	75	80	0	0	0	80	75	80
325 Chemical Manufacturing	0	0	0	120	115	115	0	0	0	120	115	115
326 Plastics and Rubber Products Manufacturing	0	0	0	40	40	40	0	0	0	40	40	40
327 Non-Metallic Mineral Product Manufacturing	0	0	0	55	55	55	20	15	15	75	70	70
331 Primary Metal Manufacturing	0	0	0	30	30	20	0	0	0	30	30	20
332 Fabricated Metal Product Manufacturing	10	10	0	290	275	250	35	40	35	335	325	285
333 Machinery Manufacturing	25	20	20	150	150	145	25	25	0	200	195	165
334 Computer and Electronic Product Manufacturing	0	0	0	20	20	20	0	0	0	20	20	20
335 Electrical Equipment, Appliance and Component Manufacturing	0	0	0	15	0	0	0	0	0	15	0	0
336 Transportation Equipment Manufacturing	0	0	0	110	110	105	0	10	10	110	120	115
3379 Other furniture-related product manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
339 Miscellaneous Manufacturing	0	0	0	85	80	75	10	10	15	95	90	90
411 Farm product wholesaler-distributors	0	0	0	0	10	10	0	0	0	0	10	10
412 Petroleum product wholesaler-distributors	0	0	0	80	75	65	20	10	10	100	85	75
413 Food, Beverage and Tobacco Wholesaler-Distributors	0	0	0	250	210	200	10	10	10	260	220	210
414 Personal and Household Goods Wholesaler-Distributors	0	0	0	50	55	55	0	0	0	50	55	55
415 Motor Vehicle and Parts Wholesaler-Distributors	0	0	0	320	290	290	15	15	15	335	305	305
416 Building Material and Supplies Wholesaler-Distributors	20	15	10	410	370	375	30	30	25	460	415	410
417 Grossistes-distributeurs de machines, de matériel et de four	0	0	0	975	895	890	10	10	0	985	905	890
418 Miscellaneous Wholesaler-Distributors	10	10	0	275	250	235	10	0	0	295	260	235
419 Wholesale agents and brokers	0	0	0	35	30	25	15	0	0	50	30	25
441 Motor Vehicle and Parts Dealers	0	0	0	805	750	715	20	20	20	825	770	735
442 Furniture and Home Furnishings Stores	0	0	0	205	195	190	25	25	30	230	220	220
443 Electronics and appliance stores	0	0	0	210	190	175	20	25	25	230	215	200
444 Building Material and Garden Equipment and Supplies Deale	0	0	0	430	365	350	65	70	65	495	435	415
445 Food and Beverage Stores	70	45	40	1325	1205	1130	90	85	85	1485	1335	1255
446 Health and personal care stores	0	0	0	440	400	390	40	40	40	480	440	430
447 Gasoline stations	15	15	10	395	345	315	50	55	50	460	415	375
448 Clothing and Clothing Accessories Stores	0	0	0	440	390	350	0	0	0	440	390	350
451 Sporting Goods, Hobby, Book and Music Stores	0	0	0	325	285	265	25	25	20	350	310	285
452 General Merchandise Stores	15	15	15	865	790	720	80	75	75	960	880	810

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Both Sexes, 15 years and over - 2006 continued	Fort St. James Forest District			Prince George Forest District			Vanderhoof Forest District			Prince George TSA		
2006 Census Population 15 Years and Over by Industry - NAICS 2002, Labour Force Activity for BC Forest Districts (northern region), 20% Sample-based Data	Total - Labour Force Activity	In the labour force	Employed	Total - Labour Force Activity	In the labour force	Employed	Total - Labour Force Activity	In the labour force	Employed	Total - Labour Force Activity	In the labour force	Employed
453 Miscellaneous Store Retailers	0	0	0	445	385	365	30	25	25	475	410	390
454 Non-Store Retailers	0	0	0	205	135	115	30	30	30	235	165	145
481 Air transportation	10	10	10	175	170	175	10	10	10	195	190	195
482 Rail transportation	10	0	0	510	450	445	10	10	10	530	460	455
483 Water Transportation	0	0	0	15	15	20	0	0	0	15	15	20
484 Transport par camion	35	30	20	1750	1610	1425	120	110	75	1905	1750	1520
485 Transit and Ground Passenger Transportation	10	10	10	330	330	330	35	30	35	375	370	375
486 Pipeline Transportation	0	0	0	30	30	25	0	10	10	30	40	35
487 Scenic and Sightseeing Transportation	0	0	0	0	0	0	0	0	0	0	0	0
488 Support Activities for Transportation	25	20	15	290	280	260	60	50	45	375	350	320
491 Postal service	0	0	0	235	220	225	15	15	15	250	235	240
492 Couriers and Messengers	0	0	0	240	225	205	0	10	0	240	235	205
493 Warehousing and storage	0	0	0	80	75	65	0	0	0	80	75	65
511 Publishing Industries (except Internet)	0	0	0	275	255	250	10	10	10	285	265	260
512 Motion Picture and Sound Recording Industries	10	10	0	45	35	30	0	0	0	55	45	30
515 Broadcasting (except Internet)	0	0	0	135	140	130	10	10	10	145	150	140
516 Internet publishing and broadcasting	0	0	0	0	0	0	0	0	0	0	0	0
517 Telecommunications	0	0	0	315	290	285	10	0	10	325	290	295
518 Data Processing, Hosting, and Related Services	0	0	0	35	35	30	0	0	0	35	35	30
519 Other information services	0	0	0	100	95	90	10	10	0	110	105	90
521 Monetary authorities - central bank	0	0	0	0	0	0	0	0	0	0	0	0
522 Credit Intermediation and Related Activities	20	20	20	685	655	625	60	60	60	765	735	705
523 Securities, Commodity Contracts, and Other Financial Inves	0	0	0	240	210	210	0	0	0	240	210	210
524 Insurance Carriers and Related Activities	10	0	0	495	460	450	25	20	25	530	480	475
526 Funds and Other Financial Vehicles	0	0	0	15	15	15	0	0	0	15	15	15
531 Real Estate	20	20	20	420	390	385	80	75	75	520	485	480
532 Rental and Leasing Services	0	0	0	255	245	235	15	15	15	270	260	250
533 Lessors of non-financial intangible assets (except copyright	0	0	0	0	0	0	0	0	0	0	0	0
541 Professional, Scientific and Technical Services	50	50	40	2680	2410	2275	130	125	120	2840	2585	2435
551 Management of companies and enterprises	10	0	0	60	60	60	0	0	0	70	60	60

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Both Sexes, 15 years and over - 2006 continued	Fort St. James Forest District			Prince George Forest District			Vanderhoof Forest District			Prince George TSA		
2006 Census Population 15 Years and Over by Industry - NAICS 2002, Labour Force Activity for BC Forest Districts (northern region), 20% Sample-based Data	Total - Labour Force Activity	In the labour force	Employed	Total - Labour Force Activity	In the labour force	Employed	Total - Labour Force Activity	In the labour force	Employed	Total - Labour Force Activity	In the labour force	Employed
561 Administrative and support services	65	25	10	1960	1615	1510	105	90	90	2130	1730	1610
562 Waste Management and Remediation Services	0	0	0	130	125	120	10	10	10	140	135	130
611 Educational Services	250	235	220	3875	3435	3355	500	475	450	4625	4145	4025
621 Ambulatory health care services	60	50	50	1475	1410	1355	80	65	65	1615	1525	1470
622 Hospitals	50	35	30	1885	1755	1685	140	135	125	2075	1925	1840
623 Nursing and residential care facilities	0	0	0	795	760	685	45	45	45	840	805	730
624 Social assistance	40	35	40	1345	1270	1215	125	110	110	1510	1415	1365
711 Performing Arts, Spectator Sports and Related Industries	0	0	0	145	95	80	10	10	10	155	105	90
712 Heritage institutions	0	0	10	105	95	80	0	0	0	105	95	90
713 Amusement, Gambling and Recreation Industries	15	15	15	665	590	530	35	30	30	715	635	575
721 Accommodation Services	30	25	0	785	700	610	120	90	80	935	815	690
722 Food Services and Drinking Places	40	30	15	3530	3130	2815	325	275	230	3895	3435	3060
811 Repair and Maintenance	35	30	30	1285	1195	1155	135	110	100	1455	1335	1285
812 Personal and Laundry Services	10	10	10	545	450	440	70	65	60	625	525	510
813 Organismes religieux, fondations, groupes de citoyens et org	15	10	10	600	505	450	50	50	50	665	565	510
814 Private households	0	0	0	290	185	180	50	30	20	340	215	200
911 Administration publique fédérale	20	15	10	865	745	720	80	70	65	965	830	795
912 Provincial and territorial public administration (9121 to 9129)	55	45	45	1265	1170	1150	145	115	115	1465	1330	1310
913 Local, municipal and regional public administration (9131 to 9139)	10	10	10	670	625	605	50	45	45	730	680	660
914 Aboriginal public administration	135	110	100	180	135	105	120	90	75	435	335	280
919 International and other extra-territorial public administration	0	0	0	0	0	0	0	0	0	0	0	0

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Appendix 1: Census labour Force Data 2001

2001 Census Population 15 Years and Over by Industry - NAICS 1997, Labour Force Activity for BC Forest Districts (northern region), 2001 Census, 20% Sample-based Data

Source: Statistics Canada, 2001 Census, Custom Tabulation CRO0101647

Prepared by: BC Stats, January 2009

Both Sexes, 15 years and over	Fort St. James Forest District			Prince George Forest District			Vanderhoof Forest District			Prince George TSA		
	Total - Labour Force Activity	In the labour force	Employed	Total - Labour Force Activity	In the labour force	Employed	Total - Labour Force Activity	In the labour force	Employed	Total - Labour Force Activity	In the labour force	Employed
Total - Industry - NAICS 1997	3445	2400	2095	67660	48815	43220	8895	6050	5250	80000	57265	50565
Not applicable	830	65	0	15705	1250	0	2310	115	0	18845	1430	0
All Industries - Total	2615	2330	2100	51955	47565	43225	6585	5935	5250	61155	55830	50575
Forest Industries - Total	1065	985	855	7500	6940	5895	1785	1625	1330	10350	9550	8080
113 Forestry and logging	240	200	145	1655	1460	805	530	465	275	2425	2125	1225
1131 Timber tract operations	0	0	0	15	15	15	0	0	10	15	15	25
1132 Forest nurseries and gathering of forest products	0	0	0	135	75	60	0	0	0	135	75	60
1133 Logging	240	195	145	1505	1365	725	525	460	270	2270	2020	1140
1153 Support activities for forestry	90	80	40	1080	1005	770	165	155	120	1335	1240	930
321 Wood product manufacturing	710	685	650	3200	3005	2875	1055	970	920	4965	4660	4445
3211 Sawmills and wood preservation	660	635	610	2600	2465	2365	1025	935	890	4285	4035	3865
3212 Veneer, plywood and engineered wood product manufacturing	0	0	0	260	240	235	0	0	0	260	240	235
3219 Other wood product manufacturing	50	50	40	340	300	280	35	35	35	425	385	355
322 Paper manufacturing	20	15	10	1505	1415	1390	0	0	0	1525	1430	1400
3221 Pulp, paper and paperboard mills	20	15	15	1505	1415	1395	10	10	0	1535	1440	1410
3222 Converted paper product manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
3371 Household and institutional furniture and kitchen cabinet manufacturing	0	0	0	45	40	40	25	30	20	70	70	60
3372 Office furniture (including fixtures) manufacturing	0	0	0	10	15	15	0	0	0	10	15	15
Non-Forest Industries - Total	1550	1350	1245	44455	40625	37325	4800	4310	3915	50805	46285	42485
111-112 Farms	15	15	15	635	565	480	340	310	310	990	890	805
114 Fishing, hunting and trapping	0	0	0	40	35	20	10	0	0	50	35	20
1150 Support activities for farms (1151 to 1152)	0	0	0	25	25	25	0	0	0	25	25	25
211 Oil and gas extraction	0	0	0	35	35	25	10	0	10	45	35	35
212 Mining (except oil and gas)	0	0	0	135	110	75	185	185	165	320	295	240
213 Support activities for mining and oil and gas extraction	0	0	0	95	70	50	10	0	0	105	70	50
219 Mining-unspecified	0	0	0	0	0	0	0	0	0	0	0	0
221 Utilities	0	10	10	320	290	280	35	30	30	355	330	320
231 Prime contracting	40	35	20	1390	1220	995	225	220	180	1655	1475	1195
232 Trade contracting	20	20	20	1745	1585	1315	185	185	165	1950	1790	1500
311 Food manufacturing	10	10	0	95	65	55	45	35	25	150	110	80
312 Beverage and tobacco product manufacturing	0	0	0	95	90	90	0	0	10	95	90	100
313 Textile mills	0	0	0	15	15	15	0	0	0	15	15	15
314 Textile product mills	0	0	0	10	10	10	0	0	0	10	10	10
315 Clothing manufacturing	0	0	0	20	15	20	0	0	0	20	15	20
316 Leather and allied product manufacturing	0	0	0	10	0	10	0	0	0	10	0	10

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2001 Census Population 15 Years and Over by Industry - NAICS 1997, Labour Force Activity for BC Forest Districts (northern region), 20% Sample-based Data	Total - Labour Force Activity			Total - Labour Force Activity			Total - Labour Force Activity			Total - Labour Force Activity		
	In the labour force	Employed		In the labour force	Employed		In the labour force	Employed		In the labour force	Employed	
323 Printing and related support activities	10	10	10	155	145	125	0	0	0	165	155	135
324 Petroleum and coal products manufacturing	0	0	0	45	50	45	0	0	0	45	50	45
325 Chemical manufacturing	0	0	0	155	145	135	0	0	0	155	145	135
326 Plastics and rubber products manufacturing	0	0	0	30	30	20	0	0	0	30	30	20
327 Non-metallic mineral product manufacturing	0	0	0	70	70	65	10	10	10	80	80	75
331 Primary metal manufacturing	0	0	0	15	10	0	20	20	20	35	30	20
332 Fabricated metal product manufacturing	0	0	0	465	430	380	25	15	10	490	445	390
333 Machinery manufacturing	0	0	0	135	140	120	0	0	0	135	140	120
334 Computer and electronic product manufacturing	0	10	10	10	0	10	0	0	0	10	10	20
335 Electrical equipment, appliance and component manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
336 Transportation equipment manufacturing	0	0	0	65	65	55	0	0	0	65	65	55
3379 Other furniture-related product manufacturing	0	0	0	0	0	0	0	0	0	0	0	0
339 Miscellaneous manufacturing	0	0	0	105	90	80	10	0	0	115	90	80
411 Farm product wholesaler-distributors	0	0	0	15	10	10	0	0	0	15	10	10
412 Petroleum product wholesaler-distributors	10	10	0	50	50	50	0	0	0	60	60	50
413 Food, beverage and tobacco wholesaler-distributors	0	0	0	135	115	110	0	0	0	135	115	110
414 Personal and household goods wholesaler-distributors	10	10	10	20	15	10	0	0	0	30	25	20
415 Motor vehicle and parts wholesaler-distributors	10	10	0	365	355	325	80	50	45	455	415	370
416 Building material and supplies wholesaler-distributors	0	0	0	365	345	325	20	20	10	385	365	335
417 Machinery, equipment and supplies wholesaler-distributors	0	0	10	685	645	635	20	20	15	705	665	660
418 Miscellaneous wholesaler-distributors	0	0	0	165	155	145	10	0	0	175	155	145
419 Wholesale agents and brokers	10	0	0	60	55	55	0	0	0	70	55	55
441 Motor vehicle and parts dealers	10	0	10	760	725	695	40	40	40	810	765	745
442 Furniture and home furnishings stores	0	0	0	160	155	155	10	0	10	170	155	165
443 Electronics and appliance stores	0	0	0	135	130	115	15	15	15	150	145	130
444 Building material and garden equipment and supplies dealers	0	10	0	370	360	340	55	35	30	425	405	370
445 Food and beverage stores	85	80	75	1580	1360	1210	190	185	165	1855	1625	1450
446 Health and personal care stores	20	20	20	420	405	390	45	45	45	485	470	455
447 Gasoline stations	25	25	25	380	315	280	95	65	55	500	405	360
448 Clothing and clothing accessories stores	0	0	0	555	480	430	10	10	10	565	490	440

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Both Sexes, 15 years and over - continued	Fort St. James Forest District			Prince George Forest District			Vanderhoof Forest District			Prince George TSA		
2001 Census Population 15 Years and Over by Industry - NAICS 1997, Labour Force Activity for BC Forest Districts (northern region), 20% Sample-based Data	Total - Labour Force Activity	In the labour force	Employed	Total - Labour Force Activity	In the labour force	Employed	Total - Labour Force Activity	In the labour force	Employed	Total - Labour Force Activity	In the labour force	Employed
451 Sporting goods, hobby, book and music stores	10	10	10	265	235	200	70	65	55	345	310	265
452 General merchandise stores	25	25	25	925	855	770	55	50	40	1005	930	835
453 Miscellaneous store retailers	30	20	20	555	515	440	60	50	45	645	585	505
454 Non-store retailers	10	10	10	255	225	220	0	0	10	265	235	240
481 Air transportation	0	0	0	205	175	165	10	10	10	215	185	175
482 Rail transportation	10	10	10	855	840	820	15	15	15	880	865	845
483 Water transportation	0	0	0	0	10	10	0	0	0	0	10	10
484 Truck transportation	60	50	40	1265	1165	970	175	165	110	1500	1380	1120
485 Transit and ground passenger transportation	0	0	0	295	285	265	10	0	0	305	285	265
486 Pipeline transportation	0	0	0	10	0	0	0	0	0	10	0	0
487 Scenic and sightseeing transportation	0	0	0	0	0	0	0	0	0	0	0	0
488 Support activities for transportation	0	0	0	275	265	255	50	35	35	325	300	290
491 Postal service	0	0	10	255	240	245	40	35	30	295	275	285
492 Couriers and messengers	0	0	0	165	155	155	0	0	0	165	155	155
493 Warehousing and storage	0	0	0	50	50	50	0	0	0	50	50	50
511 Publishing industries	0	0	0	315	255	220	15	10	15	330	265	235
512 Industries du film et de l'enregistrement sonore	10	0	10	75	65	50	10	10	0	95	75	60
513 Broadcasting and telecommunications	0	0	0	755	715	705	10	10	10	765	725	715
514 Information services and data processing services	0	0	0	170	165	145	0	10	0	170	175	145
521 Monetary authorities - central bank	0	0	0	0	0	0	0	0	0	0	0	0
522 Credit intermediation and related activities	20	20	15	675	655	625	85	85	85	780	760	725
523 Securities, commodity contracts, and other financial investment and related activities	0	0	0	285	265	240	10	0	10	295	265	250
524 Insurance carriers and related activities	10	10	10	565	525	495	15	15	15	590	550	520
526 Funds and other financial vehicles	0	0	0	0	10	10	0	0	0	0	10	10
531 Real estate	10	10	0	365	340	315	20	20	15	395	370	330
532 Rental and leasing services	0	0	0	285	260	240	10	10	10	295	270	250
533 Lessors of non-financial intangible assets (except copyrighted works)	0	0	0	0	0	0	0	0	0	0	0	0
541 Professional, scientific and technical services	30	25	25	2525	2300	2140	255	210	195	2810	2535	2360
551 Management of companies and enterprises	0	0	0	25	20	20	10	0	0	35	20	20

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Both Sexes, 15 years and over - continued	Fort St. James Forest District			Prince George Forest District			Vanderhoof Forest District			Prince George TSA		
2001 Census Population 15 Years and Over by Industry - NAICS 1997, Labour Force Activity for BC Forest Districts (northern region), 20% Sample-based Data	Total - Labour Force Activity	In the labour force	Employed	Total - Labour Force Activity	In the labour force	Employed	Total - Labour Force Activity	In the labour force	Employed	Total - Labour Force Activity	In the labour force	Employed
561 Administrative and support services	45	40	35	1570	1375	1270	130	85	80	1745	1500	1385
562 Waste management and remediation services	10	10	10	90	85	90	40	30	30	140	125	130
611 Educational services	195	170	170	3470	3250	3145	570	545	530	4235	3965	3845
621 Ambulatory health services	75	65	65	1375	1295	1255	120	115	110	1570	1475	1430
622 Hospitals (6221 to 6223)	20	20	25	1575	1475	1455	80	70	70	1675	1565	1550
623 Nursing and residential care facilities	0	0	10	785	755	685	50	45	45	835	800	740
624 Social assistance	60	55	50	1310	1155	1095	185	165	160	1555	1375	1305
711 Performing arts, spectator sports and related industries	0	0	0	215	175	130	10	10	10	225	185	140
712 Heritage institutions	0	0	0	70	65	55	10	0	0	80	65	55
713 Amusement, gambling and recreation industries	60	40	40	620	535	500	65	50	50	745	625	590
721 Accommodation services	30	15	15	660	570	495	100	100	95	790	685	605
722 Food services and drinking places	90	75	65	3390	3025	2705	230	175	145	3710	3275	2915
811 Repair and maintenance	60	60	55	1300	1220	1100	95	95	80	1455	1375	1235
812 Personal and laundry service	30	20	25	550	510	470	55	60	60	635	590	555
813 Religious, grant-making, civic and professional and similar organizations	35	20	20	610	525	475	85	75	75	730	620	570
814 Private households	10	10	0	360	260	205	45	30	20	415	300	225
911 Federal government public administration	65	65	60	960	875	850	50	50	40	1075	990	950
912 Provincial and territorial public administration	100	90	90	1135	1095	1060	110	100	80	1345	1285	1230
913 Local, municipal and regional public administration	10	0	0	725	685	650	40	35	35	775	720	685
914 Aboriginal public administration	150	130	110	100	85	80	110	100	90	360	315	280
919 International and other extra-territorial public administration	0	0	0	0	0	0	0	0	0	0	0	0

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Appendix 2. Prince George TSA timber flows, by forest district, 2003-2008

Fort St James Forest District timber flows, total harvest from Crown and private.								
Scale site district	2003	2004	2005	2006	2007	2008	2003-08 avg	% by scale district
DJA	2,536,060	2,148,938	2,190,143	2,027,787	1,138,556	355,729	1,732,869	60.6%
DPG	545,123	410,040	447,611	820,602	956,256	1,270,410	741,674	25.9%
DVA	91,563	170,434	154,255	259,642	315,140	464,141	242,529	8.5%
DND	50,435	128,790	107,516	94,997	195,067	47,424	104,038	3.6%
DQU	73,968	30,425	1,988			1,620	18,000	0.6%
DHW	2,158	938	2,155		71,351	40,038	19,440	0.7%
DMK	3,966						661	0.0%
DMH	3,050	652	263				661	0.0%
DSS	184						31	0.0%
DOS	45						8	0.0%
Grand Total	3,306,554	2,890,218	2,903,932	3,203,028	2,676,370	2,179,362	2,859,911	100.0%

Fort St James Forest District percent timber flows, total harvest from Crown and private.							
	2003	2004	2005	2006	2007	2008	Average %
DJA	76.7%	74.4%	75.4%	63.3%	42.5%	16.3%	60.6%
DPG	16.5%	14.2%	15.4%	25.6%	35.7%	58.3%	25.9%
DVA	2.8%	5.9%	5.3%	8.1%	11.8%	21.3%	8.5%
DND	1.5%	4.5%	3.7%	3.0%	7.3%	2.2%	3.6%
DQU	2.2%	1.1%	0.1%	0.0%	0.0%	0.1%	0.6%
Other	0.3%	0.1%	0.1%	0.0%	2.7%	1.8%	0.7%

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Prince George Forest District timber flows, total harvest from Crown and private.								
Scale site district	2003	2004	2005	2006	2007	2008	2003-08 avg	% by scale district
DPG	6,069,621	5,462,960	7,575,368	7,716,291	6,355,948	5,129,427	6,384,936	86.7%
DMK	306,372	575,443	487,490	345,131	378,788	167,659	376,814	5.1%
DQU	429,780	288,135	371,952	163,297	113,443	235,297	266,984	3.6%
DHW	80,981	223,798	113,453	24,215	17,916	630	76,832	1.0%
DPC	80,756	193,463	54,368	13			54,767	0.7%
DCC	45,716	125,346	62,091	43,679	4,242	2,581	47,276	0.6%
DMH	121,198	66,789	114,391	47,111	56,675	19,732	70,983	1.0%
DCH	1,863	46,656	43,972	9,863			17,059	0.2%
DOS	52,024	29,421	58	834	2	0	13,723	0.2%
DVA	5,990	6,781	13,847	6,623	13,234	2,257	8,122	0.1%
DJA		19,803	16,129	989		87	6,168	0.1%
DKA	22,725	3,014	373	5,707	-38	54	5,306	0.1%
DCS	2,402	505		416	354	-4	612	0.0%
DRM	35	354	705	110	142		224	0.0%
DCK	946	82		1	52		180	0.0%
DND		381	40		175		99	0.0%
DCO					49		8	0.0%
Not specified			59		131,239	96,108	37,901	0.5%
Grand Total	7,220,410	7,042,931	8,854,294	8,364,282	7,072,220	5,653,828	7,367,994	100.0%

Prince George Forest District percent timber flows, total harvest from Crown and private.							
	2003	2004	2005	2006	2007	2008	Average %
DPG	84.1%	77.6%	85.6%	92.3%	89.9%	90.7%	86.7%
DMK	4.2%	8.2%	5.5%	4.1%	5.4%	3.0%	5.1%
DQU	6.0%	4.1%	4.2%	2.0%	1.6%	4.2%	3.6%
DHW	1.1%	3.2%	1.3%	0.3%	0.3%	0.0%	1.0%
DPC	1.1%	2.7%	0.6%	0.0%	0.0%	0.0%	0.7%
DCC	0.6%	1.8%	0.7%	0.5%	0.1%	0.0%	0.6%
DMH	1.7%	0.9%	1.3%	0.6%	0.8%	0.3%	1.0%
Other	1.2%	1.5%	0.8%	0.3%	2.1%	1.7%	1.2%

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Vanderhoof Forest District timber flows, total harvest from Crown and private.								
	2003	2004	2005	2006	2007	2008	2003-08 avg	% by scale district
DVA	2,910,486	2,623,676	2,612,748	2,508,106	2,125,613	2,329,215	2,518,307	60.2%
DPG	1,152,240	962,985	1,513,661	1,115,393	918,938	969,507	1,105,454	26.4%
DSS	310,398	383,795	371,092	274,115	37,573		229,495	5.5%
DMK	14,511	129,960	298,387	139,904	49,216		105,330	2.5%
DND	157,202	220,906	56,615	33,403	1,585	1,036	78,458	1.9%
DJA	46,735	31,164	144,827	133,948	26,748		63,904	1.5%
DCH	22,712	61,344	45,688				21,624	0.5%
DPC		4,984	49,099	4			9,014	0.2%
DQU	16,529	23,270	13,267	78	4,112	772	9,671	0.2%
DHW	9,065	2,924	734				2,121	0.1%
DMH	44,735	14,652	14,462	3,785	9,857		14,582	0.3%
DCK		30						
DOS		17						
DKA	472				95,966	66,620	27,176	0.6%
Grand Total	4,685,085	4,459,706	5,120,581	4,208,735	3,269,608	3,367,150	4,185,136	100.0%

Vanderhoof Forest District percent timber flows, total harvest from Crown and private.							
	2003	2004	2005	2006	2007	2008	Average %
DVA	62.1%	58.8%	51.0%	59.6%	65.0%	69.2%	60.2%
DPG	24.6%	21.6%	29.6%	26.5%	28.1%	28.8%	26.4%
DSS	6.6%	8.6%	7.2%	6.5%	1.1%	0.0%	5.5%
DMK	0.3%	2.9%	5.8%	3.3%	1.5%	0.0%	2.5%
DND	3.4%	5.0%	1.1%	0.8%	0.0%	0.0%	1.9%
DJA	1.0%	0.7%	2.8%	3.2%	0.8%	0.0%	1.5%
Other	2.0%	2.4%	2.4%	0.1%	3.4%	2.0%	2.0%

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Appendix 3. OBAC preliminary input to the timber supply review process in the Prince George TSA

PILOT PROJECT

PRELIMINARY INPUT TO THE ALLOWABLE ANNUAL CUT DETERMINATION FOR THE PRINCE GEORGE TIMBER SUPPLY AREA (TSA)

From the
Omineca Beetle Action Coalition (OBAC)
July 2009

NOTE: The following information has been summarized or interpreted from work done during the development of sector strategies for the Omineca Region. It is provided as preliminary input, and should not be interpreted as the official position of the OBAC, its directors or member local governments.

The following general AAC relevant objectives were identified in the OBAC Future Forest Products and Fibre Use Strategy and Alternative Energy Sector Strategy. It is expected that the tourism and agriculture strategies may also have relevant objectives however they will not be complete until June 2009:

- Increase community benefits (e.g., jobs) from forest resources.
- Diversify and strengthen the sector.
- Ensure the forest is managed to meet both present and future needs and opportunities.
- Make use of available fibre, including fibre resulting from the Mountain Pine Beetle epidemic to produce bioenergy.

A number of specific more recommendations have arisen in the strategy documents and related work, and are summarized below for consideration:

1. Partitioning and/or scheduling the harvest so that:
 - a) dead pine is emphasized in the short-term and other species are held for the medium-term to the extent possible;
 - b) in the implementation of (a), the impacts on business certainty for tourism and other forest resources users is taken into account;
 - c) notwithstanding (a), providing for access to a mix of species to support diversity in the forest products industry;
 - d) the assumed shelf-life of dead pine includes utilization for non-traditional products (e.g., bioenergy);
 - e) the expected downward transition from the current salvage level AAC is gradual and leaves room for market fluctuations and opportunities, industry adjustment and diversification, and community transition;
 - f) in the medium term the industry is encouraged to utilize species that have traditionally been lower value (e.g., balsam and hardwoods);
 - g) subject to (a), the allowable harvest volume is distributed geographically in a manner more-or-less commensurate with the inventory of each supply block (in other words, encourage a distributed cut across the entire TSA); and
 - h) the rate and pattern of harvest takes into account transportation infrastructure constraints and opportunities.

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2. Applying silviculture assumptions^t that include one or more scenarios:
 - a) reflecting immediate stocking /restocking of all beetle-killed stands within the operable land base;
 - b) reflecting enhanced (intensive) silviculture treatments of existing juvenile stands with measures that could bring their harvest forward in time and reduce the expected mid-term falldown;
 - c) involving a significant percentage of reforestation with short rotation species; and
 - d) using a portion of the forest land base for multiple crops through agroforestry practices.
3. Applying utilization assumptions^u that include one or more scenarios:
 - a) for utilization of roadside “waste” and other accessible biomass that is potentially suitable for bioenergy production and other fibre-based opportunities; and
 - b) active management of some riparian areas or other constrained areas (e.g., VQAs) for multiple values, including timber.

The OBAC work also points to a number of factors that should be considered for future administration of the AAC, and could be identified at this time as work to be done in the ensuing five-year period:

1. Developing area-based approaches to administration of AAC for possible future application.
2. Ensuring multiple forest resource inventories are complete and up-to-date so that government and businesses can plan how to best utilize the available raw material for both conventional and non-conventional products.
3. Improved planning and more concise resource objectives at the landscape level to enable effective integration and optimization of resource uses.
4. Evaluation of the impacts of MPB on Land and Resource Management Plans, including any required updating of values and objectives.
5. Analysis of the long-term applicability of current TSA boundaries relative to community resilience, transportation patterns, consolidation of commodity businesses, aspirations to diversify the industry, optimal use of raw materials and other possible factors.

^t It is recognized that the chief forester does not set silviculture policy or program funding through the AAC determination process however it is important to understand the impact on mid- to long-term supply of status-quo versus more aggressive silviculture policies.

^u It is recognized that utilization is a function of both policy and economics that are not directly within the control of the chief forester or the AAC determination process, however such information is important to informing policy and business decisions.

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