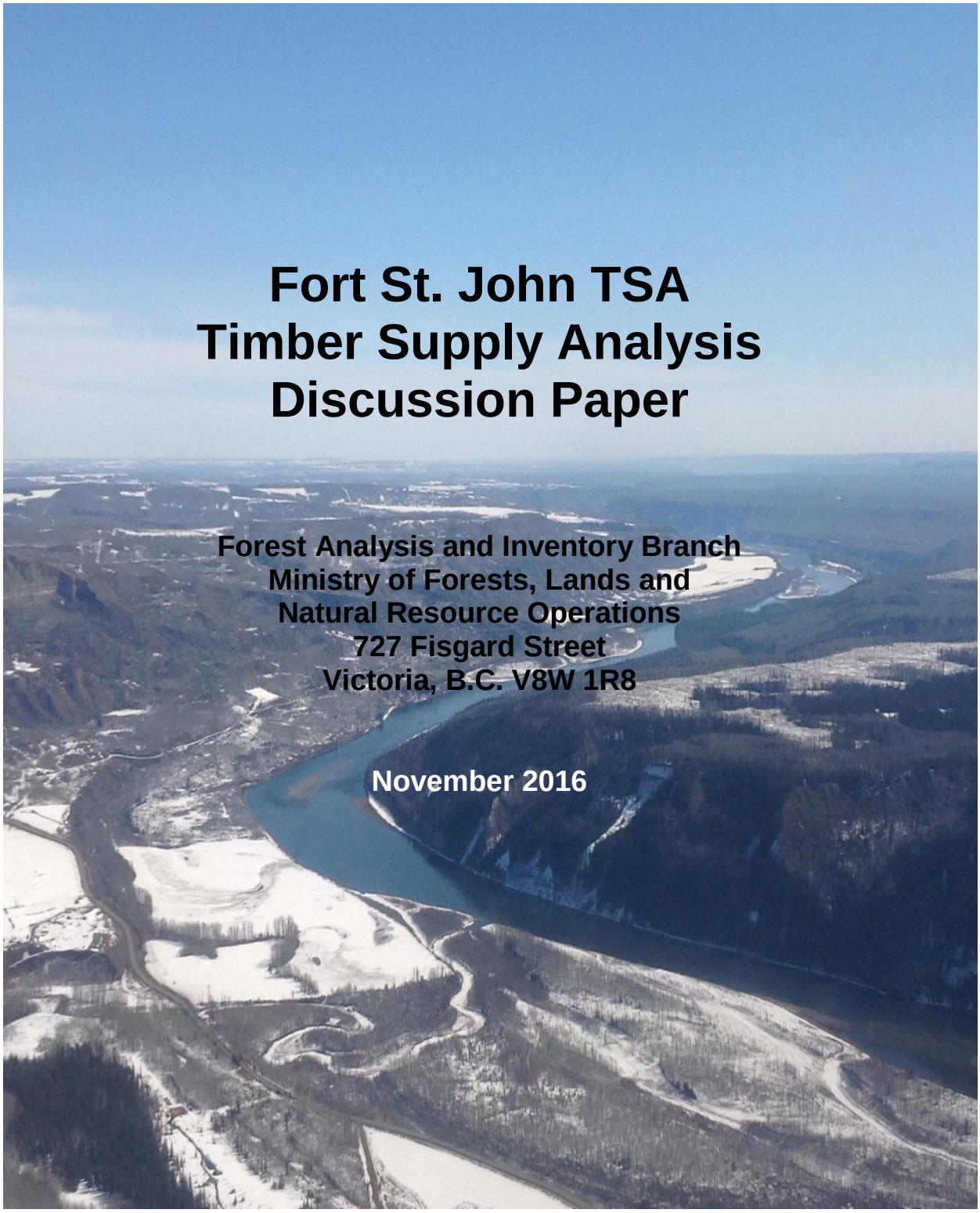

Fort St. John TSA
Timber Supply Analysis
Discussion Paper

Forest Analysis and Inventory Branch
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Natural Resource Operations
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BRITISH COLUMBIA

Ministry of
Forests, Lands and
Natural Resource Operations

Cover photograph courtesy of Stephanie Smith
Peace Natural Resource District
Ministry of Forests, Lands and Natural Resource Operations

Introduction

The British Columbia Ministry of Forests, Lands and Natural Resource Operations (FLNRO) 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 third for the Fort St. John TSA, examines the impacts of current legal requirements and demonstrated forest management practices on the timber supply, economy, environment and social conditions of the local area and province. Based on this review the chief forester will determine a new allowable annual cut[d] (AAC) for the Fort St. John TSA.

According to Section 8 of the *Forest Act* the chief forester must regularly review and set new AACs for all 38 TSAs and 34 TFLs in the Province of British Columbia (BC).

The objectives of the timber supply review are to:

- examine relevant forest management practices, legal land use requirements, environmental and social factors, and input from First Nations, forest licensees and the public;
- set a new AAC; and
- identify information to be improved for future timber supply reviews.

This discussion paper provides a summary of the results of the timber supply analysis for the timber supply review of the Fort St. John TSA. Details about the data and assumptions proposed for use in the analysis were provided in the May 2015 data package. Updates to the information used and technical details regarding the analysis are available on request from the FLNRO Forest Analysis and Inventory Branch. 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 input received on this discussion paper.

Timber supply reviews undertaken in support of AAC determinations are based on the current resource management objectives established by government in legislation and by legal orders. For the purposes of the Fort St. John TSA timber supply review, forest management objectives are provided by the Fort St. John Land and Resource Management Plan, Fort St. John Pilot Project and its Sustainable Forest Management Plan and subsequent orders for scenic areas, ungulate winter ranges and wildlife habitat areas under the Government Actions Regulation. The information compiled to support this timber supply review can be made available to support land-use planning as required. However, land-use planning and land-use decisions are outside the scope of the chief forester's AAC determination. In the event that resource management objectives and practices change, these changes can be reflected in future timber supply reviews.

[a] **Timber supply**
Timber supply is the amount of timber available for harvesting over a specified period of time.

[b] **Timber supply areas (TSAs)**
Timber supply areas are integrated resource management units established in accordance with Section 7 of the Forest Act.

[c] **Tree farm licences (TFLs)**
Tree farm licences are tenures that grant exclusive rights to harvest timber and manage forests in a specific area; may include private land.

[d] **Allowable annual cut (AAC)**
Allowable annual cut is the maximum volume of timber available for harvesting each year from a specified area of land, usually expressed as cubic metres of wood.

Timber supply review in the Fort St John TSA

The current AAC for the Fort St. John TSA, effective March 1, 2003 is 2 115 000 cubic metres. This AAC includes a partition[e] which limits the harvest of coniferous-leading stands to 1 200 000 cubic metres and a partition which limits the harvest of deciduous-leading stands to 915 000 cubic metres.

Under the *Forest Act*, the chief forester can decide to postpone an AAC determination by up to five years, if the available information suggests that a determination at that time would not result in a significantly different AAC. On December 5, 2007, the chief forester issued an AAC determination postponement order for the Fort St. John TSA.

In May 2015, a data package documenting the data and forest management assumptions to be used in this timber supply analysis was released for public review and to assist with First Nations consultation. This discussion paper is being released in order to provide an overview of the timber supply review and to highlight the key findings of the timber supply analysis for the Fort St. John 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 statement that will be publicly available.

The actual AAC that is determined by the chief forester during this timber supply review may differ from the harvest projections, including the base case, presented in this discussion paper as the chief forester must consider a wide range of information, some of which is not quantifiable. Ultimately, the chief forester's AAC determination is an independent, professional judgment based on the legal requirements set out in Section 8(8) of the *Forest Act.*

Once the chief forester has determined a new AAC, the Minister of Forests, Lands and Natural Resource Operations will apportion the AAC to the various licence types and programs as per Section 10 of the *Forest Act*. 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. The chief forester has no role in the apportionment or disposition of the AAC.

Description of the Fort St. John TSA

The Fort St. John TSA is located in north-eastern British Columbia (BC) and is administered by the Peace Natural Resource District. It is the sixth largest TSA in British Columbia and covers approximately 4.6 million hectares. The timber supply area is bounded by the Peace River, Dawson Creek TSA and TFL 48 in the south, the Alberta border to the east, the Fort Nelson timber supply area to the north and the height of the Rocky Mountains to the west.

A vast plateau intersected by streams in deep gullies dominates the eastern part of the TSA. Moving westward, the plateau gives way to a rolling, hilly landscape and finally to the steeper terrain of the Rocky Mountains. Rivers are the dominant water features, as lakes tend to be small and shallow. The major rivers include the Sikanni Chief, Beatton, Halfway, Chowade, Graham, Ettithun and Fontas.

The TSA lies primarily within two eco-regions: the Boreal Plains in the east, and the Central Canadian Rocky Mountains in the west. Climate is characterized by cold prolonged winters and warm short summers. Four biogeoclimatic zones are represented in the TSA: Boreal White and Black Spruce (BWBS); Engelmann Spruce-Subalpine Fir (ESSF); Sub Boreal Spruce (SBS); and, Alpine Tundra (AT). White spruce, lodgepole pine, trembling aspen and black spruce are the dominant tree species in the TSA (Figure 1) and frequently grow together as mixed-wood stands. Minor amounts of subalpine fir, balsam poplar, birch and larch are also present.

[e] **Partition**
Under Section 8(5) of the Forest Act *the chief forester in determining an AAC can specify a portion of the AAC that is attributable to certain types of timber, terrain or areas of the TSA.*

Figure 1. Map of the Fort St. John TSA.

Natural resources

The forests of the Fort St. John TSA provide a wide range of natural resources, including forest products, forage, minerals, recreation and tourism amenities, oil and gas reserves, and fish and wildlife.

Parks, recreation sites and trails, and both roaded and non-roaded areas provide opportunities for numerous outdoor activities including mountain-biking, all-terrain-vehicle use, horseback riding, hiking, hunting, camping, boating, cross-country skiing and snowmobiling. Provincial parks within the TSA include the Sikanni Chief Canyon, Milligan Hills, Graham Laurier, and Redfern Keily.

A large geographical area known as the Muskwa-Kechika covers a western portion of the TSA as well as parts of the Fort Nelson and Mackenzie TSAs. An important part of the Fort St. John LRMP was the designation of the Muskwa-Kechika Management Area, which contains protected areas and special management zones. Important management objectives for this area ensure that wilderness characteristics and wildlife and their habitat are maintained, while allowing resource development.

First Nations

The Fort St. John TSA is located within Treaty 8 Territory. Treaty 8 was originally a treaty settlement negotiated between the Government of Canada and First Nations in northern Alberta, northwest Saskatchewan and the southern Northwest Territories. In 1899, the treaty was extended into British Columbia to include eight First Nations in the northeast part of the province.

Three First Nations in the TSA, who are signatories to Treaty 8, have reserve lands and traditional territories that encompass areas within the TSA: Blueberry River First Nations, Doig River First Nation and Halfway River First Nation. Other Treaty 8 signatories have traditional territory that encompasses the TSA but their reserve lands are outside the TSA, these include: Fort Nelson First Nation, Prophet River First Nation, West Moberly First Nations and Dene Tha First Nation. The Dene Tha First Nation's reserve lands are in Alberta.

Currently, the Government of Canada is negotiating treaty land entitlement claim areas with some Treaty 8 First Nations (Prophet River First Nation has been settled), including areas within the Fort St. John TSA. Although not part of the Treaty 8 negotiations, areas of importance to First Nations communities within the Fort St. John TSA have been identified, and negotiations are taking place with the provincial government regarding these significant areas.

There is an economic benefits agreement (EBA) between the province and the Prophet River First Nation, and West Moberly First Nations. Consultation is conducted under the Forests and Range Resource Management Agreement (FRRMA) and Decision Matrix with these two communities. A New Relationship and Reconciliation Agreement was signed between Saulteau First Nations and the Province of British Columbia on September 25, 2015. Implementation of this agreement is underway. New Government-to-Government Agreements are under negotiation with the Doig River First Nation and Halfway River First Nation.

The Ministry of Forests, Lands and Natural Resource Operations has been communicating with First Nations about this timber supply review and intends to continue to fulfill its legal obligations to consult with First Nations in conjunction with the release of this timber supply analysis discussion paper.

Regional economy

The Fort St. John TSA is unique in several ways. Oil and gas exploration and development has occurred throughout most of the TSA over the past few decades. The southern and southeastern portion of the TSA is predominantly used for agriculture and has a high concentration of private land. The forestry sector, although a major contributor to the current local economy, is relatively recent with some areas yet to be developed for timber harvesting. Energy development is the largest economic sector in the TSA, with agriculture and forestry ranking second and third respectively, in terms of local employment.

BC Hydro's planned 'Site C' development will create a reservoir downstream of Hudson's Hope and upstream of Taylor on the Peace River, an area that is located mainly along the border between the Dawson Creek and Fort St. John TSAs. A Joint Review Panel Report with recommendations was submitted to the BC Environmental Assessment Office and the Federal Minister of Environment. Environmental approval was received in the fall of 2014. Construction is anticipated to take about seven years. The reservoir will occupy about 9330 hectares, and will be managed in coordination with the comparatively vast Williston Reservoir upstream as well as the smaller Dinosaur Reservoir.

The city of Fort St. John is the largest community in the TSA. According to BC Statistics 2011, 60 percent of the TSA population or 18,609 people lived in Fort St. John and 1,373 people lived in Taylor. This represents a population increase of seven percent for Fort St. John and about one percent for Taylor since 2006. Hudson's Hope, which is located just outside of the TSA, has a population of 970 people.

Land use plans

The Fort St. John Pilot Project (FSJPP) was implemented across the Fort St. John TSA in 2001 as a pilot project under the *Forest Practices Code* for an improved regulatory framework for forest practices. The main components of the project include regulatory flexibility to facilitate adaptive approaches to forest management, landscape-level planning through a sustainable forest management plan (SFMP), ongoing public involvement through a public advisory group (PAG) and the adoption and implementation of certification systems. With the introduction of the *Forest and Range Practices Act* (FRPA) in 2002, the Fort St. John Pilot Project Regulation (FSJPPR) was continued with the expectation that certain aspects of the FSJPP will be incorporated into FRPA in the coming years.

The FSJPP participants include BC Timber Sales (BCTS), Cameron River Logging Ltd., Canadian Forest Products Ltd. (Canfor), Peace Valley Oriented Strand Board, Dunne-Za Ventures, Louisiana-Pacific Canada Ltd., and Paper Excellence. However, all field operations along with planning are carried out by Canfor and BCTS. All have consented in writing to take part in the pilot project and be subject to the terms and conditions of the FSJPP Regulation. The defined forest area of the FSJPP covers approximately 4.1 million hectares within the Fort St. John TSA which excludes private land and woodlots.

Forest management

Current forest management must be consistent with the requirements of the the Fort St. John Pilot Project (FSJPP), which are designed to maintain a range of biodiversity and wildlife 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, wildlife habitat, recreation features, riparian management and protection of environmentally sensitive areas. These requirements are applied to the Crown forest management land base[f] (CFMLB).

[f] **Crown forest management land base (CFMLB)**
The forested area of the TSA that the provincial government manages for a variety of natural resource values. This excludes non-forested areas (e.g., water, rock and ice), non-productive forest (e.g., alpine areas, areas with very low productivity), and non-commercial forest.

Timber harvesting land base

As part of the process used to define the timber harvesting land base[g] (THLB) in the timber supply analysis, a series of deductions are made from the TSA land base. Table 1 shows categories of land that are considered not to contribute to the THLB. The table presents the area of the categories within the gross TSA boundary and the area for each factor that is uniquely (i.e., no overlaps with other factors) considered excluded from timber harvesting.

The total area within the TSA boundary covers 4 864 884 hectares of which 57 percent — 2 757 161 hectares — is Crown forest management land base (CFMLB). About 209 000 hectares of the CFMLB area in the TSA are in riparian reserves. Large areas are assessed as non-THLB for various reasons such as low productivity (nearly two million hectares), economic inoperability (54 000 hectares), and problem forest types (1.7 million hectares). Large areas are also set aside for wildlife habitat areas (321 000 hectares) and ungulate winter ranges (nearly 300 000 hectares). Although these and other such areas are assumed not to contribute to timber supply, they do provide for other important natural resource values. About 37 percent of the CFMLB, or 21 percent of the total TSA area, is included in the current THLB of 1 020 817 hectares. This is very similar to the THLB estimate used in the 2003 timber supply review for the Fort St. John TSA.

[g]**Timber harvesting land base (THLB)**
The THLB is an estimate of the land where timber harvesting is considered both acceptable and economically feasible, given the objectives for all relevant forest values, existing timber quality, market values and applicable technology. The THLB is derived from the data, forest management practices and assumptions described in the data package. It is a theoretical, strategic-level estimate used for timber supply analysis and could include areas that may never be harvested or may exclude areas that will be harvested.

Table 2. Fort St. John TSA land base classification

Land classification	Total area	Percent of total area	Unique area excluded
TSA boundary	4,864,884	**100**	**0**
Wetlands (from Fresh Water Atlas)	729,945	15.0	729,945
Wetlands (from VRI BC Land Class)	268,738	5.5	105,201
Lakes	24,659	0.5	3,637
Rivers	27,225	0.6	1,517
Water	48,057	1.0	20
Alpine	142,683	2.9	142,285
Non-vegetated	137,539	2.8	26,008
Vegetated non-treed	964,503	19.8	682,872
Non-Crown from Forest Cover ownership	911,646	18.7	416,202
Crown Forest Management Land Base	**2,757,161**	**56.7**	
Oil and gas imprint	102,016	2.1	50,801
Current roads	117,483	2.4	63,045
Stream management area	164,864	3.4	74,148
Lake management area	2,934	0.1	837
River management area	41,602	0.9	22,530
Low productivity sites	1,966,293	40.4	1,009,275
Steep ground	552,232	11.4	92,668
Unstable ground	199,252	4.1	35,208
Economically inoperable	54,330	1.1	1,323
Problem forest types	1,683,748	34.6	207,156
Does not meet minimum harvest age (MHA) criteria on VDYP curves	2,681,354	55.1	75,568
Wildlife and range burns	59,170	1.2	8,085
Wildlife habitat areas	321,456	6.6	16,599
Ungulate winter range	293,099	6.0	14,717
Recreation sites	2,297	0.0	571
Archaeology sites	1,513	0.0	181
Permanent sample plots for growth and yield	175	0.0	147
Wildlife tree retention	35,865	0.7	35,865
Timber harvesting land base	**1,020,817**	**21.0**	

Figure 2 below shows the leading species distribution in the Crown forest management land base (CFMLB) and the THLB. The major point to note is that the THLB does not contain any black spruce.

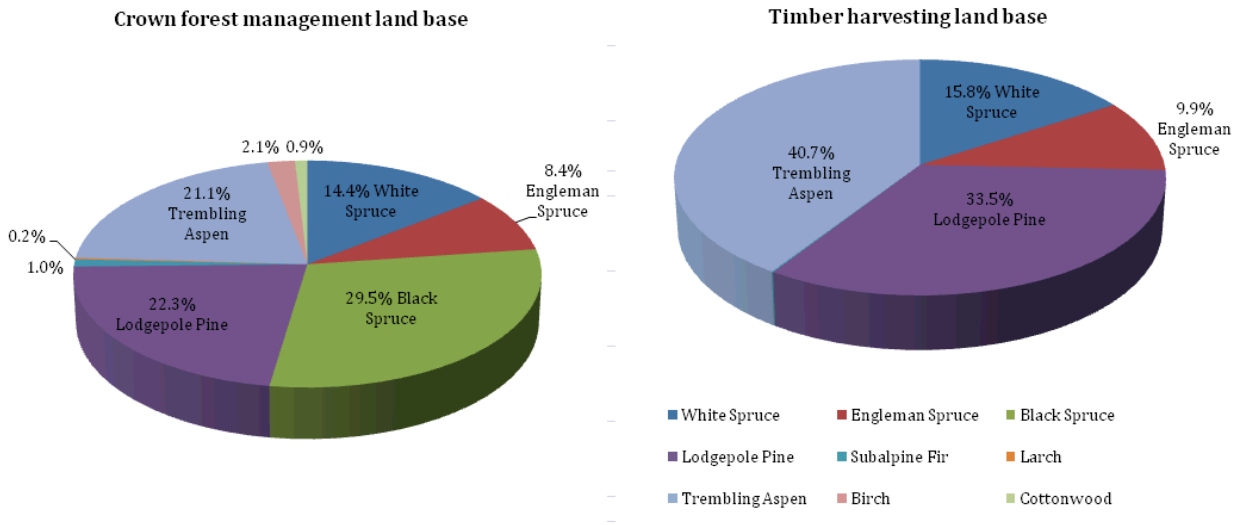

Figure 2. Proportion of leading species for the Crown forest management land base and timber harvesting land base of the Fort St. John TSA by area.

Figure 3 shows the current age class distribution of the CFMLB. Natural stands are mostly older than 80 years, while managed stands are under 25 years. Stands less than 60 years occupy a small proportion of the Fort St. John TSA.

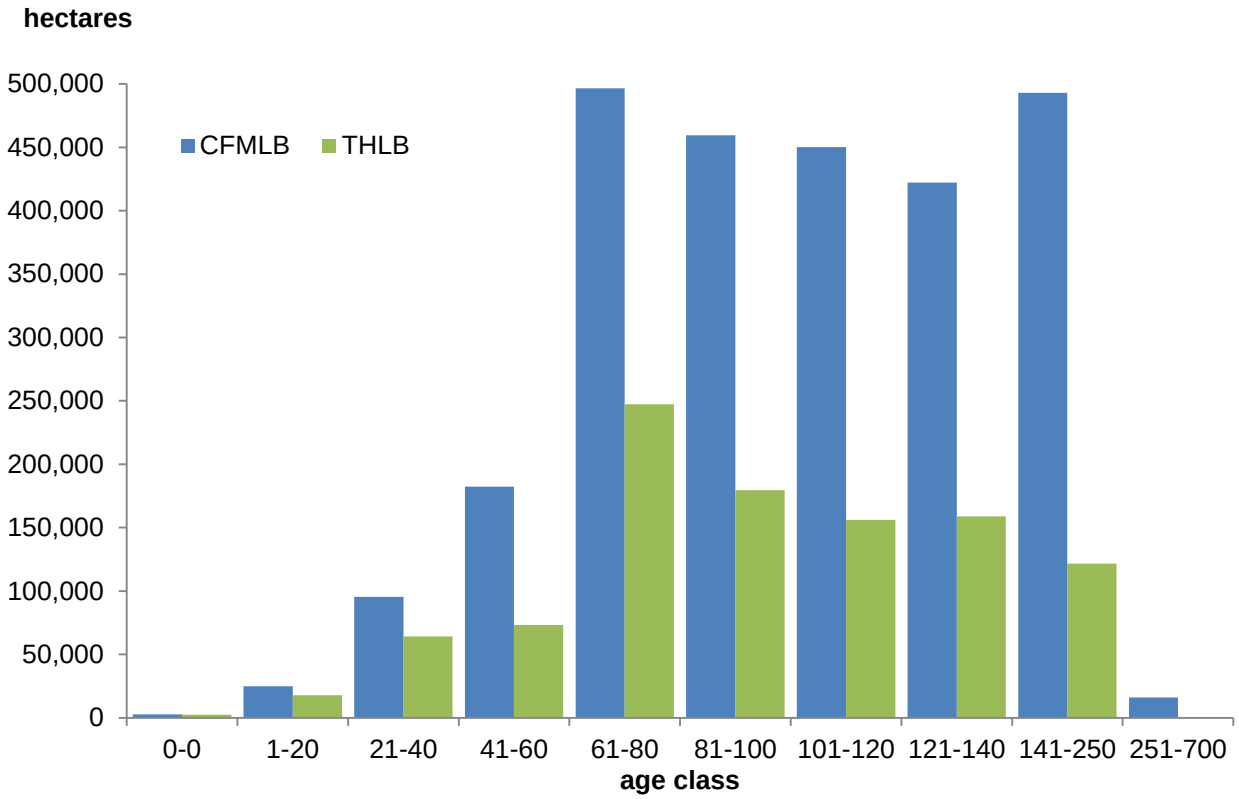

Figure 3. Age class distribution for the Crown forest management land base and timber harvesting land base of the Fort St. John TSA.

Figure 4 presents much the same information provided in Figures 2 and 3, but displayed as the species distribution within each age class for the THLB and CFMLB. Figure 4 shows that a significant proportion of black, white and Engleman spruce in the CFMLB over 140 years old, and that most of the trembling aspen found on the CFMLB is located in the THLB. Aspen and pine are most prominent in the 60 to 80 year old range. The amount of dead pine as of 2011 is also shown for the CFMLB and THLB.

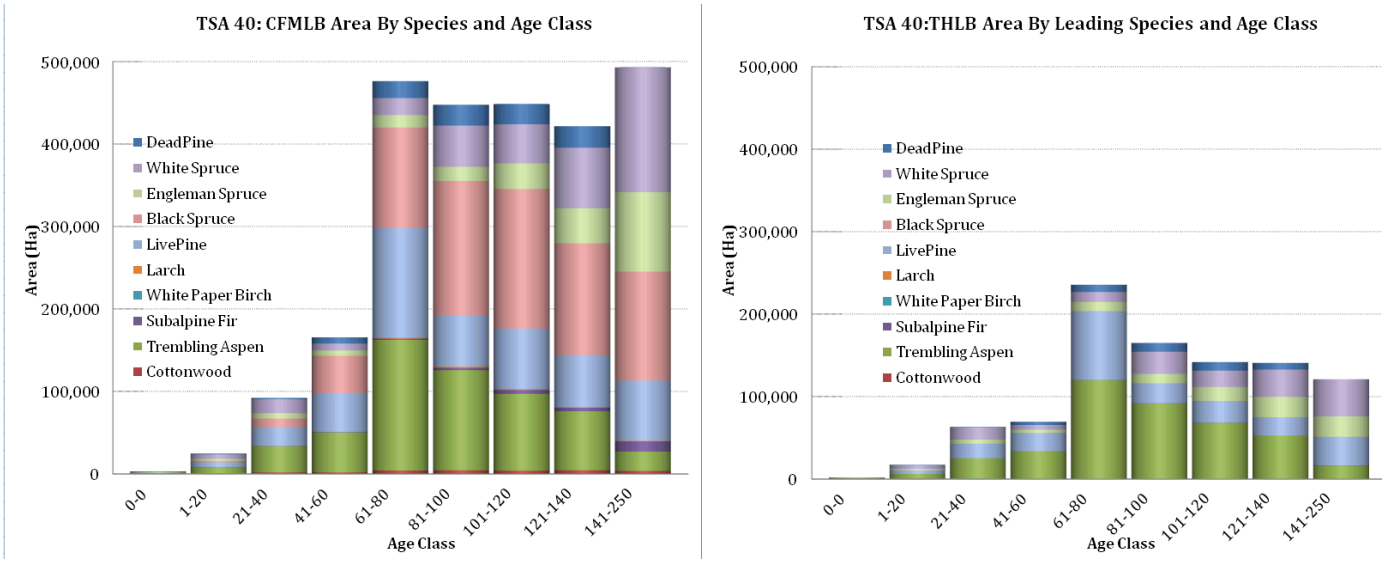

Figure 4. Species and age class distribution for the CFLMB and THLB.

Land base and forest management changes since 2003

The current AAC determination came into effect in May 2003. Several changes have occurred to the land base and forest management information since then and these changes are reflected in the timber supply analysis. The major changes are:

- establishment of new ungulate winter ranges and wildlife habitat areas;
- establishment of visual quality objectives;
- availability of updated mapping estimates for oil and gas seismic lines, roads, riparian areas and timber harvesting operability;
- availability of new vegetation resources inventory; and
- use of site productivity estimates from the provincial site productivity information in place of forest cover inventory site productivity estimates;
- presence of mountain pine beetle infestations.

Mountain pine beetle

The BC Mountain Pine Beetle model (BCMPB) was developed by FLNRO to project the annual volume of mature pine killed by mountain pine beetle (MPB). This model was integrated with the forest estate model used for this timber supply review (TSR).

Approximately 29 percent of the THLB area is occupied by pine and 25 percent of the total THLB volume is pine volume. According to the BCMPB model about 11 percent of the THLB pine volume or about 2.8 percent of the total THLB volume was dead in 2011. By 2020, mountain pine beetles are expected to have killed about 33 percent of the pine volume on the THLB, which represents about eight percent of the total THLB volume. Dead pine on the CFMLB and THLB are shown in Figure 4.

The forest estate model tracks pine death from MPB in the growing stock as well as the harvest of dead pine. This includes dead pine that is considered to be merchantable within the assumptions and parameters described as well as the dead pine that has been dead for so long that it is no longer merchantable. In the base case, dead pine was assumed to retain commercial value until the pine trees fell to the ground 15 years after infestation by pine beetles.

History of the allowable annual cut

In 1989, the AAC was set at 1 815 162 cubic metres, of which 900 162 cubic metres was specified for coniferous-leading stands, and 915 000 cubic metres for deciduous-leading stands. In 1996, the AAC was set at 2 015 000 cubic metres, of which 1 100 000 cubic metres was specified for coniferous-leading stands and 915 000 cubic metres for deciduous-leading stands. The 1996 determination increased the AAC by about 200 000 cubic metres per year, representing a 24-percent increase in the coniferous level and the maintenance of the deciduous level. Since March 1, 2003 the AAC for the Fort St. John TSA is 2 115 000 cubic metres. This harvest level includes a partition of 1 200 000 cubic metres per year for coniferous-leading stands and 915 000 cubic metres per year for deciduous-leading stands. This AAC excludes all volume issued to woodlot licences since the 1996 determination.

Actual harvest performance compared with the AAC is shown in Figure 5. Data from the Harvest Billing System (HBS) for 2003 through 2015 indicate that approximately 60 percent of the deciduous partition and 68 percent of the conifer partition was harvested for a combined average of 64.4 percent. Annual harvest levels according to HBS are compared to AAC levels in Figure 5.

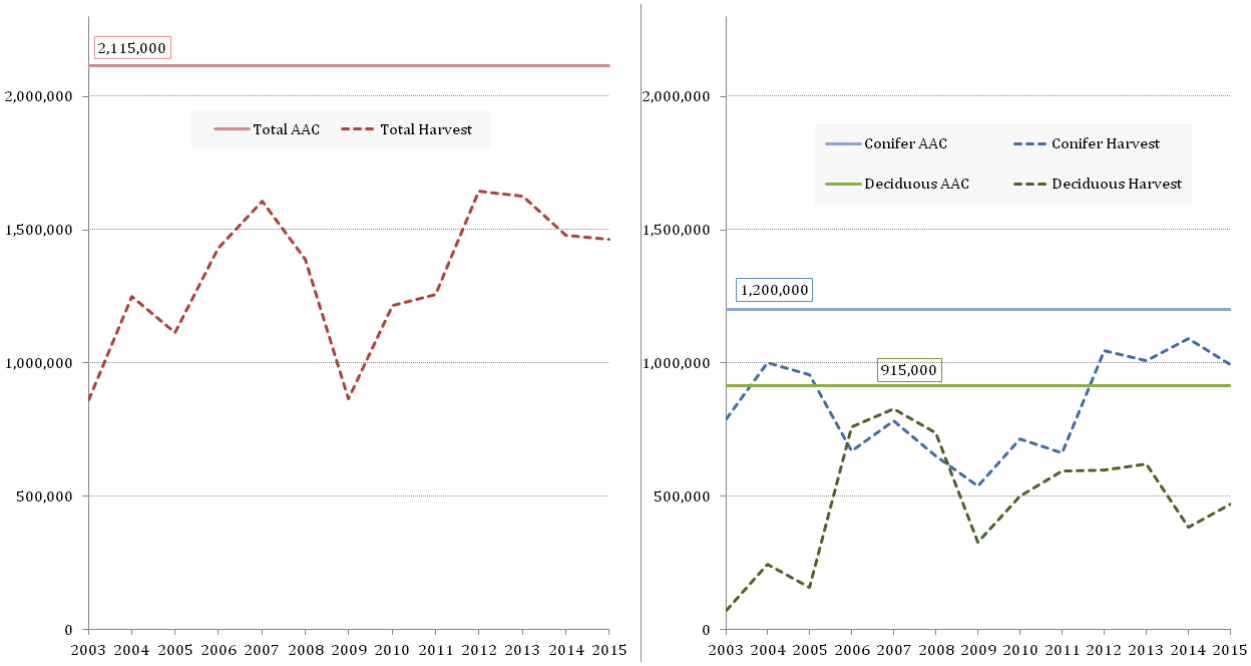

Figure 5. Harvest billing system harvest levels in comparison with allowable annual cut.

Timber supply forecast

For most AAC determinations, a timber supply analysis is carried out using three categories of information: land base inventory, timber growth and yield, and management practices. Using this information and a computer model, a series of timber supply forecasts are produced to reflect different starting harvest levels, rates of decrease or increase, and potential trade-offs between short- and long-term harvest levels.

From a range of possible forecasts, one is chosen which attempts to avoid both excessive changes from decade to decade and significant timber shortages in the future, while ensuring the long-term productivity of forest lands. This is known as the 'base case' forecast and forms the basis for comparison when assessing the effects of uncertainty of the information modelled on timber supply. The base case is designed to reflect current management practices.

Because it represents only one in a number of possible forecasts, and because it incorporates information and modelling assumptions about which there may be some uncertainty, the base case is not an AAC recommendation. Rather, it is one possible timber supply forecast, whose validity - as with all the other forecasts provided - depends on the validity of the data and assumptions incorporated into the computer model used to generate it.

Due to the existence of uncertainty in the timber supply analysis, additional forecasts are usually prepared to test the effect of changing some of the assumptions or data used in the base case. These harvest forecasts are referred to as 'sensitivity analyses'. Both the base case and sensitivity analyses are prepared using a computer model that projects the future availability of timber for harvesting based on the growth of the forest and the level of harvesting, while staying within the legal land-use objectives established by the provincial government.

Base case

The base case harvest forecast (Figure 6) shows a harvest level of 2 115 000 cubic metres per year. Similar to the current AAC, this is composed of 1.2 million cubic metres from conifer-leading stands and 0.915 million cubic metres from deciduous-leading stands. The contribution of coniferous-leading stands is the same as the current AAC partition for coniferous-leading stands.

The forecast for the harvest of deciduous-leading stands begins to decline 30 years into the forecast and steps down 10 percent per decade three times, then by five percent per decade twice. Seventy years into the forecast, the harvest of deciduous stands reaches a long-term harvest level of 600 000 cubic metres per year.

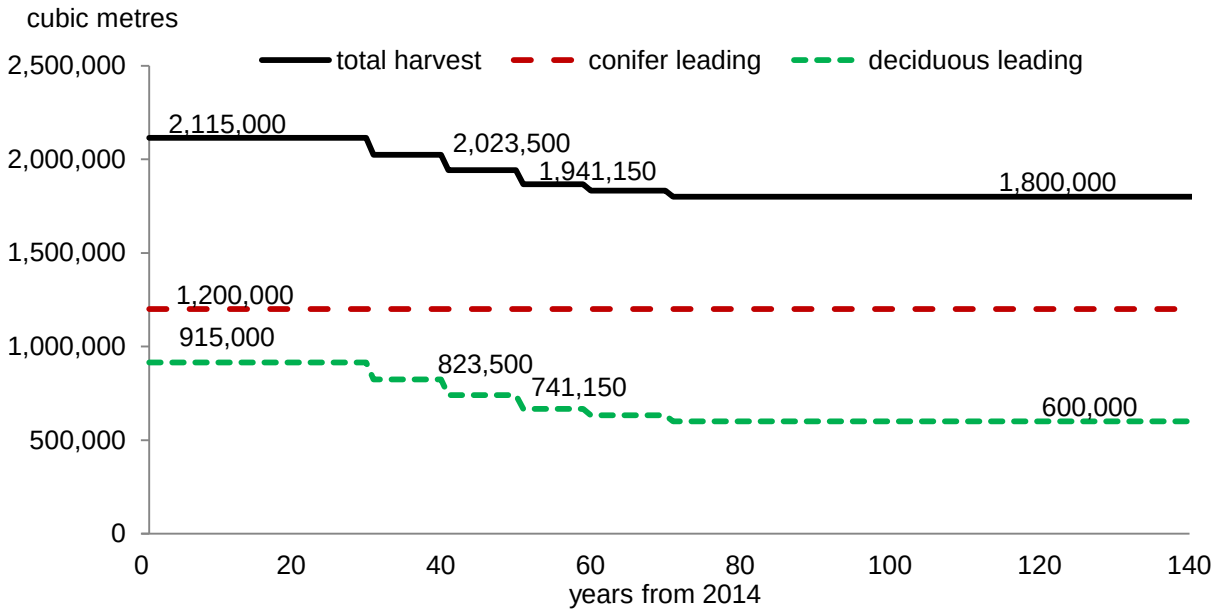

Figure 6. Base case harvest projection with conifer- and deciduous-leading partitions.

The base case is one of many harvest flows possible. Figure 7 presents alternatives considered besides the base case in each partition that demonstrate in general the range of forecasts that are possible with the same set of modelled information. The dashed line is chosen as the base case that forms the basis of comparison for sensitivity testing.

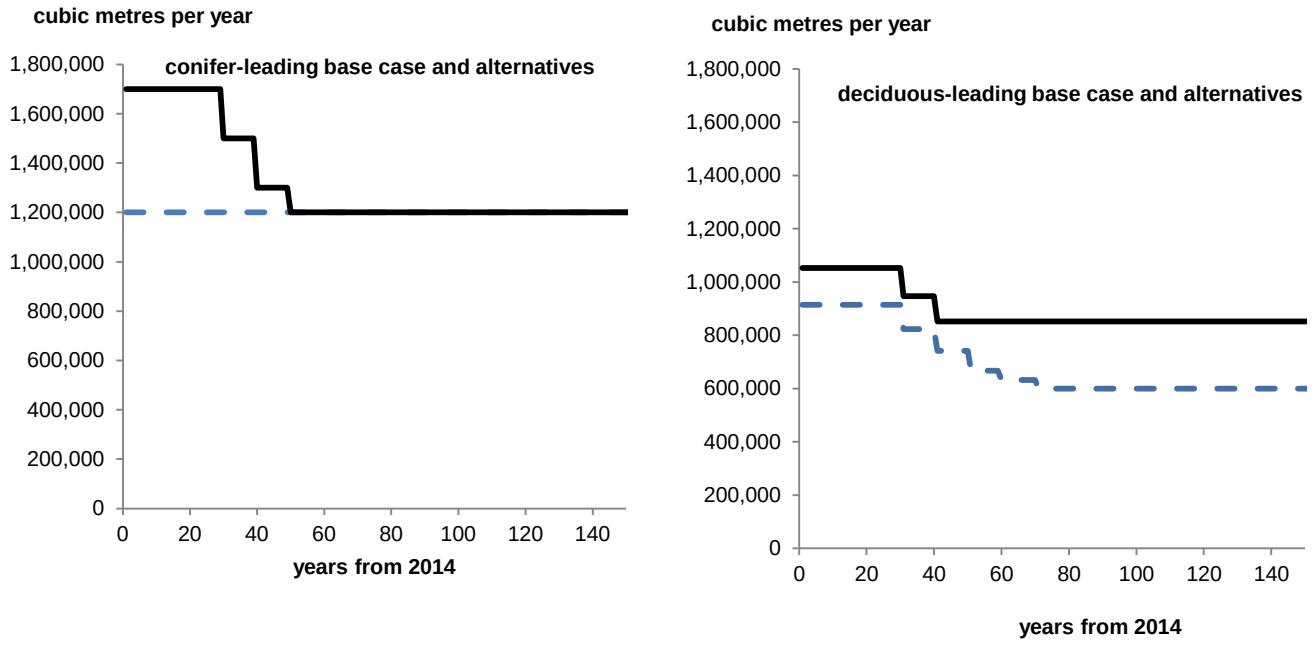

Figure 7. Base case alternative harvest projections in the conifer-leading and deciduous-leading partitions.

Attributes of the base case

Figure 8 shows the contribution of MPB salvage and harvest of live timber to the total projected harvest. It also shows amount of unsalvaged MPB volume. Some of the initial harvest is salvaged MPB kill.

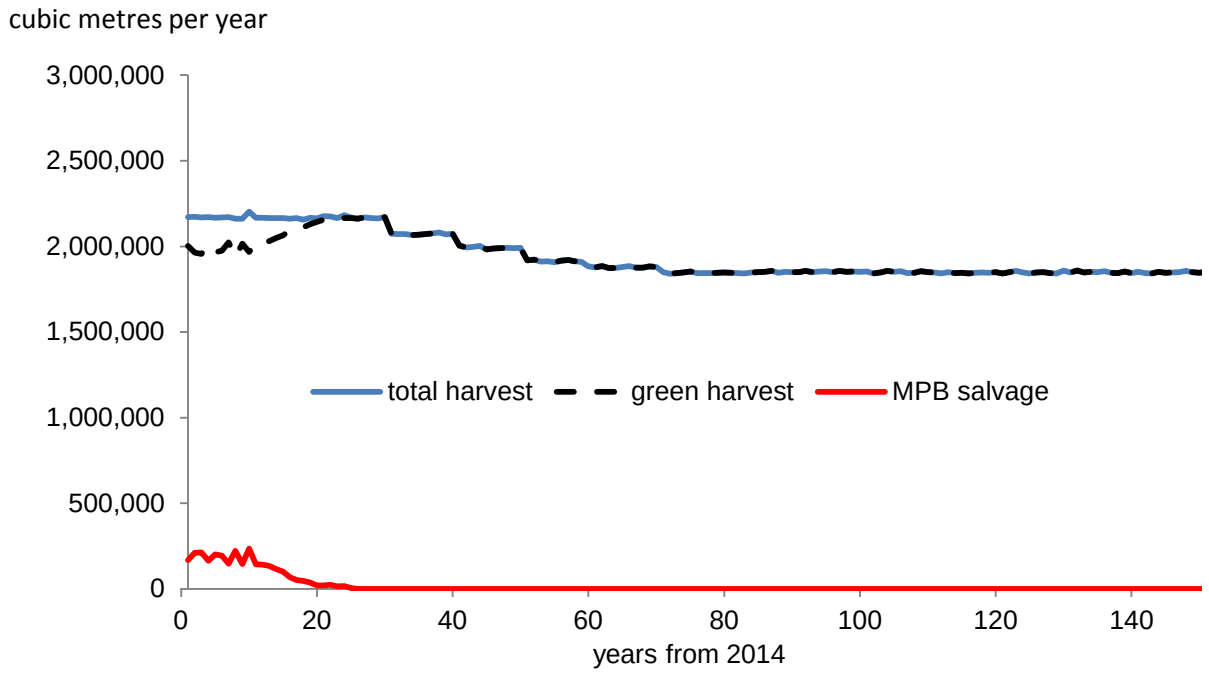

Figure 8. Base case total harvest with MBP kill.

Figure 9 shows the THLB growing stock that results from the combination of growth and harvest projected over time in the categories of THLB. Figure 9 also demonstrates the effect of MPB on available growing stock.

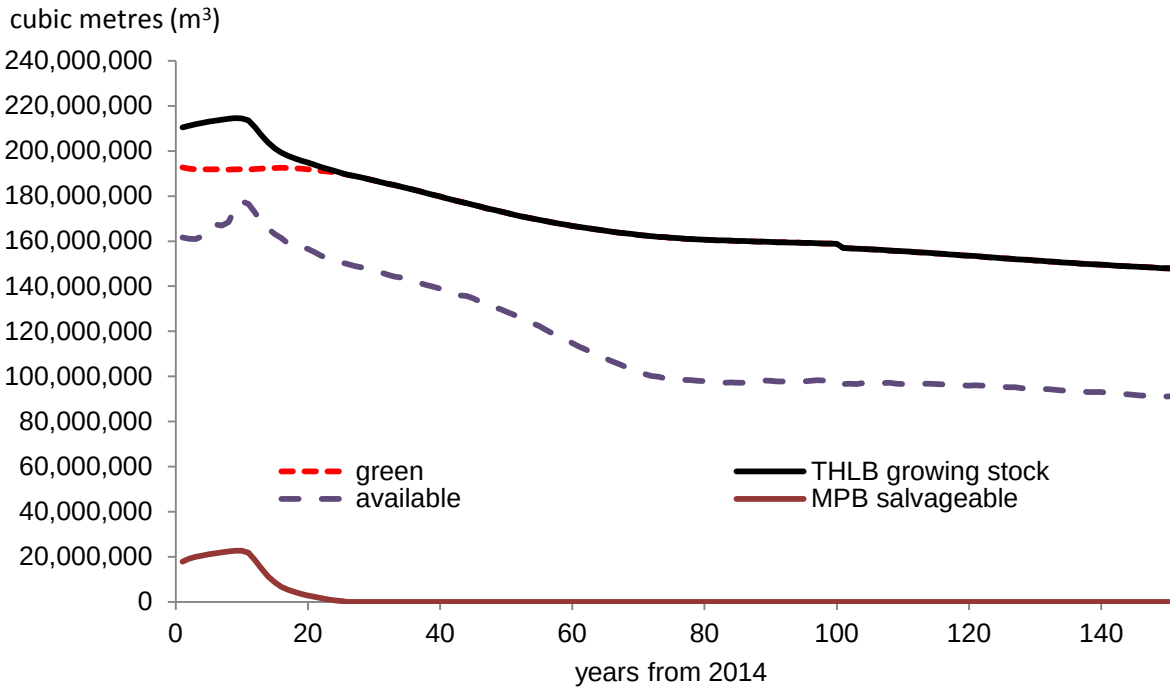

Figure 9. Base case total growing stock with MBP kill.

Figure 10 shows the annual area harvested and the somewhat greater amount of area that is disturbed when access structures such as roads, trails and landings are accounted for. This is fairly steady, but is higher at the start of the projection due to the deciduous-leading partition having a higher initial harvest level.

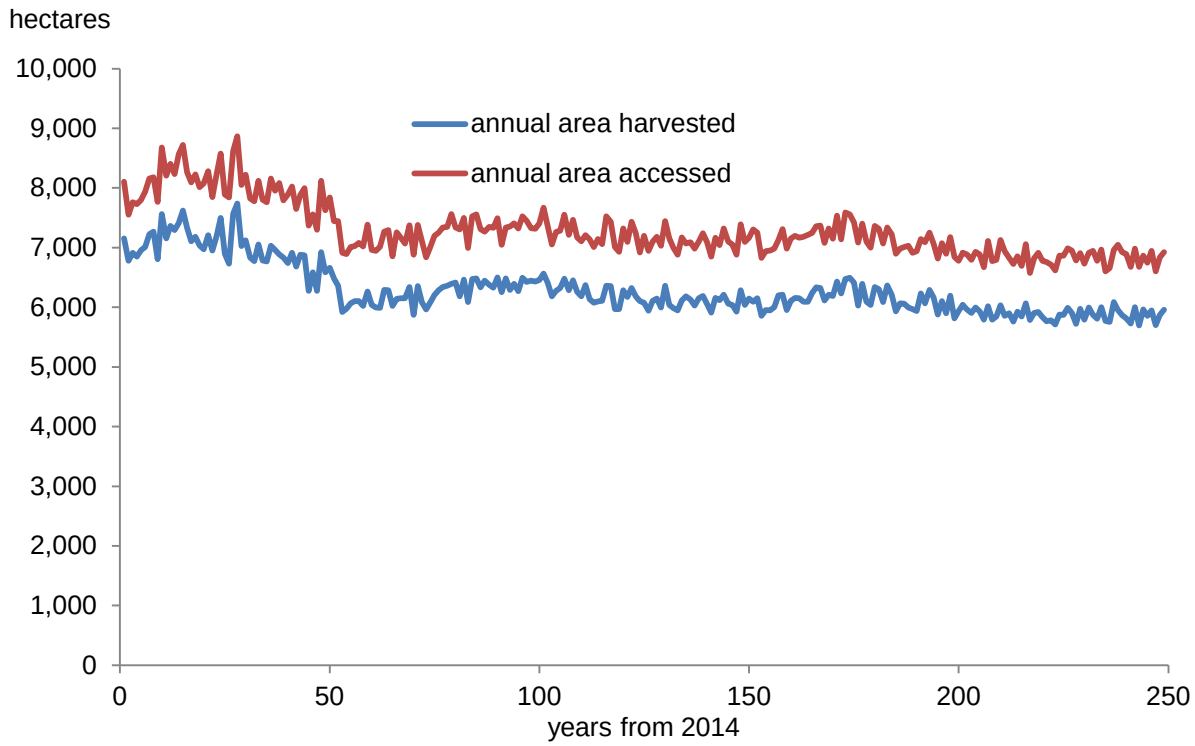

Figure 10. Base case annual area harvested and accessed.

Figure 11 shows the projected annual average volume per hectare of the harvest which is quite steady near 300 cubic metres per hectare. The annual average harvest age of stands projected in the base case is also shown. During the transition from the harvest of natural to managed stands, the average harvest age rises from about 125 years to almost 150 years old before declining to an average of about 100 years old. The transition to harvesting in managed stands is largely complete in 100 years.

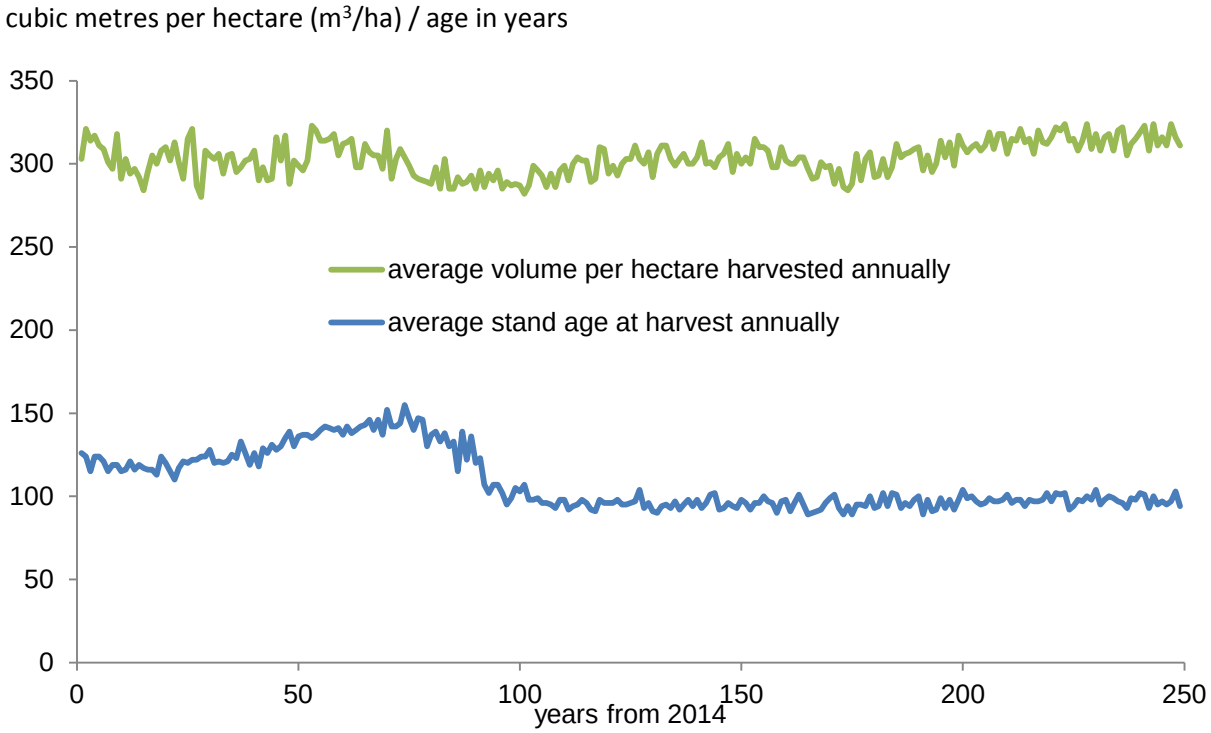

Figure 11. Base case average annual stand age at harvest and volume per hectare.

Key sensitivity analyses

The base case uses a specific set of data and assumptions that are intended to reflect forest composition and growth, legally-established land use objectives and current forest management practices. However, while the base case is designed to reflect current management in the Fort St. John TSA, there is uncertainty about some management information and the modelling framework. Therefore, sensitivity analyses are used to provide further understanding by examining the effect on timber supply of uncertainty in data and assumptions. The results of general sensitivity analyses are summarized below.

- Site productivity – Reducing managed stand site productivity estimates by two metres (height of stands at 50 years) causes a failure in the harvest forecast at the end of the planning horizon. Increasing managed stand site productivity estimates by two metres leads to greater amounts of unharvested THLB. Also, the THLB growing stock is more clearly sustainable.
- Size of THLB – Increasing and decreasing the THLB in turn by 10 percent does not have a significant impact on harvest levels. This insensitivity is caused the the large amount of mature timber available for harvest, which is reflected in the alternative harvest flow that shows that the first period harvest level can be increased without affecting the long-term harvest level.

- Minimum harvest age (MHA) – Increasing and decreasing the minimum harvest ages of managed stands in turn by 10 years does not cause any dramatic responses in harvest levels or other indicators because there is so much old timber available for harvest, as shown in the alternative harvest flow. Lowering the MHAs does allow the model access to some younger stands, but it is not constrained in the base case, so that improved access is not an effective easement.

The result of sensitivity analyses for specific issues are summarized below.

- Harvest queue rule – The base case was projected by selecting stands for harvest with the highest volume per hectare in each period. This is a good approximation of operational harvest preference. Under this harvest rule, 40 percent of the THLB remains unharvested at the end of the 250-year planning horizon because young managed stands grow fast enough to overtake old natural stands with respect to volume per hectare.
- An alternative harvest rule was tested that selects the oldest stands for harvest in each period. This harvest rule does not reflect actual harvest operations. However, it reduces the amount of THLB that remains unharvested at the end of the 250-year planning horizon to 20 percent; half as much as with the maximum volume per hectare rule. Oldest first harvesting also creates a larger projected growing stock for the same harvest forecast and higher harvest levels can be achieved as a result. An oldest first harvest rule converts much more THLB to plantations (or managed stands) which typically have higher mean annual increment (higher growth rates) than the base case harvest rule.
- Existing stand volumes – A statistical analysis of vegetation resources inventory Phase 2 ground sampling found that inventory volumes were underestimated by about 10.5 percent on the operable land base. The base case contains a large amount of mature volume and increasing the mature volume by five to 10 percent did not affect the harvest forecast. The even-flow forecast for conifer leading is affected by managed stand growing stock in the long term, which is not affected by the adjustments to the current inventory. The indicators for long-term growing stock did improve marginally with the Phase 2 adjustments.
- Operability – Pilot project participants asserted that high slope areas removed from the THLB can actually be accessed operationally. Increasing the amount of THLB in high slope areas had no dramatic effect in model indicators, as with the general sensitivity analysis of the size of the THLB.
- Boreal Caribou Implementation Planning – This sensitivity analysis represents the Province's latest plan which is being developed to protect Boreal Caribou in both the Fort St. John and Fort Nelson TSAs. In this analysis the Prophet, Chinchaga and Etthithun caribou herd core areas are removed from the THLB. The Milligan herd core is not removed from the THLB because existing wildlife habitat areas cover a large amount of the Milligan core. Also, early-seral stage constraints are placed on the remainder of the herd ranges beyond their core area limiting the amount of early seral created by harvesting to five percent of the THLB in those range areas. This THLB removal and constraint affect approximately 28 percent of the THLB in the TSA. The effect of these requirements is a reduction of about 17 percent on the short- and long-term harvest levels under the even-flow harvest policy for the coniferous partition. Although this is a large effect, it is less than the proportion of area and volume affected by the scenario, due to the large amount of mature volume that remains available for harvest.
- Concentration of harvesting – Concerns were expressed that harvesting is concentrated in the southern and central part of the TSA, with little likelihood of harvesting in the more remote parts of the TSA. To address this concern, the concentration or sparseness of historic harvest was described by calculating ratios to compare the amount of THLB with the amount of historic harvesting in each remote or sparsely harvested landscape unit. A sensitivity analysis tested the effect of reducing the THLB by these ratios. The result is that THLB is reduced by 35 percent overall, the short-term timber harvest level is reduced by 13 percent and the long-term harvest level is reduced by 20 percent. The conifer-leading partition is reduced by 23 percent in the short- and long-term, and the deciduous-leading partition is unchanged in the short term but reduced by 14 percent in the long term. The harvest level impacts are less than the proportion of THLB affected due to the large mature forest inventory in the TSA.

Summary

The base case is a good representation of the current management regime and the initial harvest levels in both the conifer-leading and deciduous-leading partitions are aligned with the current AAC.

The THLB of the Fort St. John TSA does not have many management requirements that actually impinge or constrain the harvest projections in this TSR because of the large amount of mature timber available for harvesting. Only extremely high harvest requests or pessimistic assumptions in sensitivity analyses cause pinch points or harvest request failures in the projections.

Improved indicator behavior and/or higher long-term harvest levels appear when the harvest queue rule is changed from a maximum volume preference to an oldest first preference.

The sensitivity analyses show that the base case harvest levels are generally insensitive to key modelling inputs, such as future productivity, minimum harvest age and THLB subtractions or additions. The base case forecast, especially in the short- to mid-term, is due by the large area of natural forest.

The sensitivity analysis for the proposed Boreal Caribou Implementation Plan shows impacts to the short-term and long-term harvest levels of 17 percent.

Your input is needed

Public input is a vital part of establishing the allowable annual cut. Feedback is welcomed on any aspect of this discussion paper or any other issue related to the timber supply review for the Fort St. John TSA. Ministry staff would be pleased to answer questions to help you prepare your response. Please send your comments to the resource district manager at the address below.

Your comments will be accepted until January 11, 2017.

You may identify yourself on the response if you wish. If you do, 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.

For more information or to send your comments, contact:

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Further information regarding the technical details of the timber supply analysis is available on request by contacting Forests.ForestAnalysisBranchOffice@gov.bc.ca

Visit the Forest Analysis and Inventory Branch web site at http://www.for.gov.bc.ca/hts