

# **Robson Valley TSA Timber Supply Analysis Public Discussion Paper**

**Forest Analysis and Inventory Branch  
Ministry of Forests, Lands and  
Natural Resource Operations  
727 Fisgard Street  
Victoria, B.C.  
V8W 1R8**

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Ministry of  
Forests, Lands and  
Natural Resource Operations

Cover photograph courtesy of  
Jeff Burrows, Stewardship Officer  
Prince George Natural Resource District

## Introduction

The British Columbia Ministry of Forests, Lands and Natural Resource Operations (FLNR) regularly reviews the timber supply<sup>a</sup> for all timber supply areas<sup>b</sup> (TSA) and tree farm licences<sup>c</sup> (TFL) in the province. This review, the fourth for the Robson Valley 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<sup>d</sup> (AAC) for the Robson Valley 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 (TSR) are to:

- examine relevant forest management practices, 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 public discussion paper provides a summary of the results of the timber supply analysis for the timber supply review of the Robson Valley TSA. 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 during this review process. Those interested in the technical details of the timber supply analysis can contact the Ministry of Forests, Lands and Natural Resource Operations, Forest Analysis and Inventory Branch. Contact information is provided at the end of this document.

In May 2012, a Special Committee on Timber Supply (special committee) was appointed by the Legislative Assembly of British Columbia to make recommendations to address the loss of mid-term timber supply due to mountain pine beetle (MPB) in the central interior of BC. Following its review of technical information and public, stakeholder and First Nations input, the special committee issued a report entitled *Growing Fibre, Growing Value* (August 2012). As described in *Beyond the Beetle: A Mid-term Timber Supply Action Plan* (October 2012), the FLNR has responded to the special committee’s recommendations.

<sup>a</sup>**Timber supply**

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

<sup>b</sup>**Timber supply areas (TSAs)**

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

<sup>c</sup>**Tree farm licences (TFLs)**

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

<sup>d</sup>**Allowable annual cut (AAC)**

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

Key ministry responses relating to the provincial timber supply review program include:

1. Review marginally economic forest types within each TSA and quantify the types and areas of forest that might justifiably be included in a partition<sup>e</sup> within the timber harvesting land base<sup>f</sup> (THLB), while respecting resource objectives for other values, such as wildlife and water.
2. Where feasible and appropriate, provide information from the timber supply review to enhance public discussion of resource management objectives and practices.

With regard to the ministry's responses to the special committee, marginally-economic stands and operability in general are discussed in this public discussion paper and this information will be provided to the chief forester for consideration in determining the new AAC.

Timber supply reviews undertaken in support of AAC determinations are based on current forest management objectives and management. For the purposes of the Robson Valley TSA timber supply review, one source of resource management objectives is provided by the Robson Valley Land and Resource Management Plan (LRMP), which is described in more detail in the "Land use plans" section of this paper. The information compiled to support this timber supply review can be made available to support land-use planning activities, as required. In the event that resource management objectives and practices change, these changes can be reflected in future timber supply reviews.

## Timber supply review in the Robson Valley TSA

On July 8, 2006 the chief forester set the AAC for the Robson Valley TSA at 536 000 cubic metres, including a partition of 6000 cubic metres for deciduous-leading stands. In December 2007 and December 2009, areas were deleted from the TSA to establish the Valemount and Dunster Community Forests, respectively. In order to account for the harvest attributable to these deleted areas, the Robson Valley TSA AAC was reduced by 56 000 cubic metres to 480 000 cubic metres. The total of the Valemount and Dunster Community Forest Agreements and Robson Valley TSA allowable annual cuts totals 536 000 cubic metres. The AACs for community forests are determined by the regional executive director in a separate process.

In December 2012, a data package documenting information requirements and assumptions for the timber supply analysis 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 (TSR) and to highlight the key findings of the timber supply analysis, including the base case. 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 determined by the chief forester during this timber supply review may differ from the harvest projections presented in this public discussion paper, including the base case, as the chief forester must consider a wide range of information, some of which cannot be quantified. Ultimately, the chief forester's AAC determination is an independent, professional judgement 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, Lands and Natural Resource Operations 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.

### <sup>e</sup>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.*

### <sup>f</sup>Timber harvesting land base (THLB)

*The portion of the Crown forest land base (CFLB) that is managed for timber supply by the Ministry of Forests, Lands, and Natural Resource Operations where timber harvesting is both legally allowed and economically feasible, while meeting objectives for all relevant forest values, existing timber quality, market values and applicable technology.*

**Description of the Robson Valley TSA**

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The Robson Valley TSA is situated in east-central BC (see Figure 1). The TSA covers a total area of approximately 1.46 million hectares, including parks and all ownerships, and is administered from the Prince George Natural Resource District office in Prince George and field office in McBride. The TSA is bordered to the west by the Wells Gray and Bowron Lake Provincial Parks, and the Mitchell Lake-Niagara Protected Area that connects them, and by the Kakwa Recreation Area to the north. To the east are the Willmore Wilderness Area, Jasper National Park, and Mount Robson and Mount Terry Fox Provincial Parks.

The terrain of the TSA is varied: the bottomlands of the Rocky Mountain Trench are flat to rolling, while the adjacent snow-capped mountain ranges are rugged with steep forested lower slopes and deeply cut side valleys. The diversity of the landscape is reflected in a broad mix of tree species, a diversity of wildlife habitats, and a wide variety of land uses, including forestry, recreation, agriculture, protected areas, and private lands.

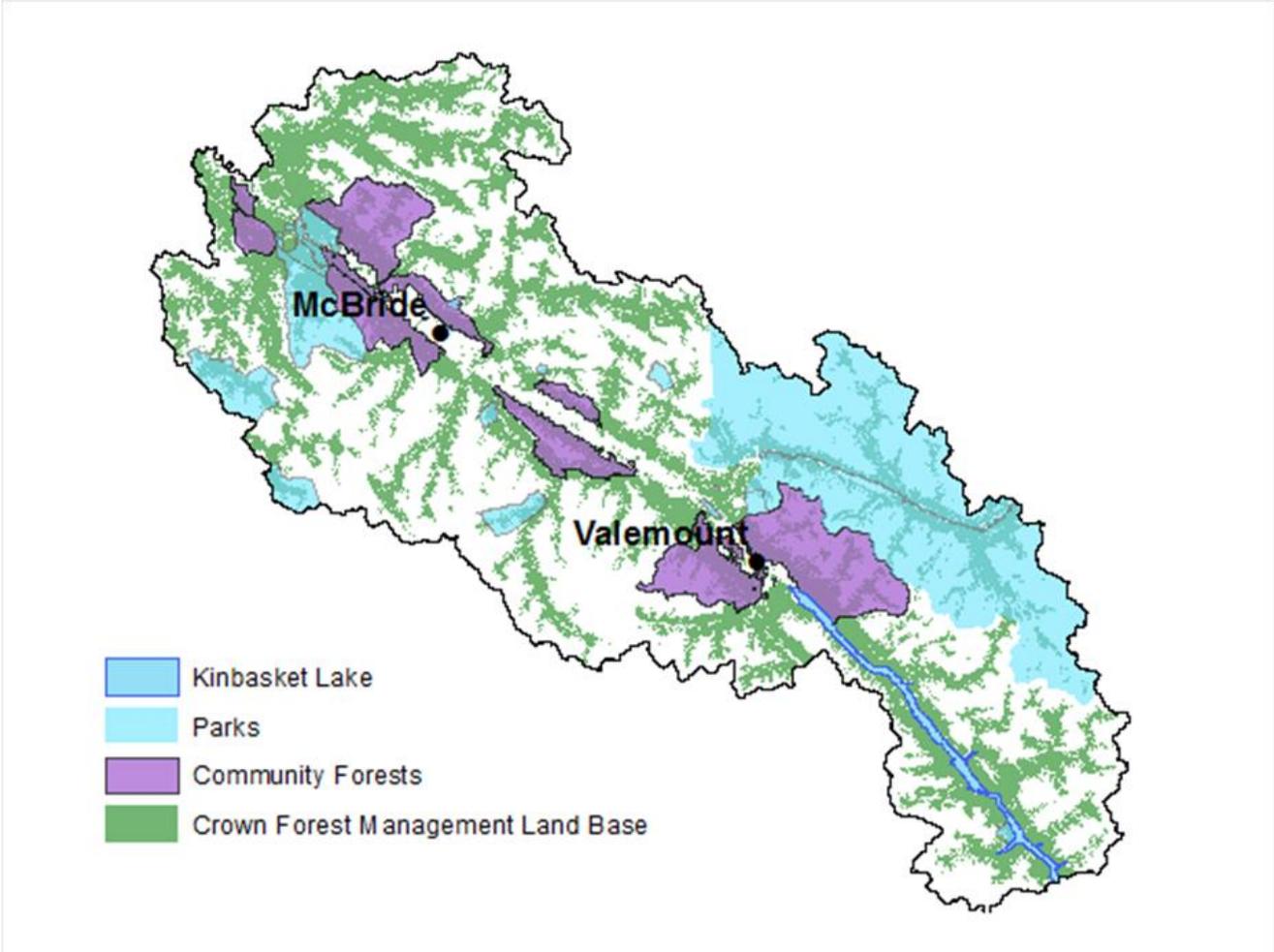


Figure 1. Map of the Robson Valley TSA.

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## Natural resources

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The Robson Valley TSA is both topographically and ecologically diverse, containing four biogeoclimatic zones (Interior Cedar-Hemlock, Sub-Boreal Spruce, Engelmann Spruce–Subalpine Fir, and Alpine Tundra) and sixteen subzones. The TSA contains diverse tree species. Various areas are dominated by spruce, subalpine fir, lodgepole pine, western red cedar and western hemlock, with smaller components of Douglas-fir and various deciduous species. The resultant mix of habitats supports a variety of wildlife species, including mountain caribou, grizzly bear and mule deer, as well as wolverine, cougar, wolf and lynx. Chinook salmon, bull trout, and Rocky Mountain whitefish are also present, and a number of species in the TSA are listed as endangered, threatened or vulnerable.

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## Forest management

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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. 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, community watersheds, recreation features, riparian management and protection of environmentally sensitive areas.

### Timber harvesting land base

As part of the process used to define the THLB in the timber supply analysis, a series of deductions are made from the productive forest land base. These deductions account for the factors that effectively reduce the suitability or availability of the productive forest area available for timber harvesting to account for ecological, economic or social factors.

The total area within the Robson Valley TSA is 1 458 588 hectares. After accounting for areas that are not forested land managed by the Crown, the Crown forest land base<sup>8</sup> (CFLB), is approximately 460 000 hectares. However, not all of this area is available for timber harvesting (see Table 1). Areas excluded from harvest include:

- areas dedicated for the management of other resource values (approximately 40 percent);
- physically inoperable stands (approximately 17 percent);
- and uneconomic or areas otherwise unsuitable for timber harvesting (approximately 18 percent).

Although these areas are not assumed to contribute to timber supply, they continue to provide for other important resource values. The THLB is estimated to be about 140 000 hectares, about 85 000 hectares less than in 2006, as discussed under below under “Land base and forest management changes since 2006”.

#### <sup>8</sup>Crown forest land base (CFLB)

*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 (e.g., brush areas). The CFLB does include federal protected areas because of their contribution to biodiversity.*

*Table 1. Timber harvesting land base – area netdowns*

Land classification	Total area	Forest area	Net area removed	Percent of total area	Percent of CFLB
<b>Total area</b> (including parks)	1,458,588	586,208			100
<u>Land not included in TSA</u>					
Community forests	153,436	91,175	153,436	10.5	
Woodlots	4,871	4,558	4,871	0.3	
Private land	37,135	19,144	37,135	2.5	
Non-productive areas (including water)	872,388	0	791,815	54.3	
Existing lineal features (roads, transmission lines, trails, rail)	16,825	9,051	9,051	0.6	
<b>Total Crown forest land base</b>			462,280	31.7	100.0
Parks and protected areas	291,311	87,887	87,131	6.0	18.8
Habitat conservation areas (UWR, WHA, Cariboo management areas)	152,070	52,412	44,469	3.0	9.6
Old growth management areas (OGMA)	31,084	27,760	16,502	1.1	3.6
Crown land plan (ADA, SRA)	7,134	5,988	2,055	0.1	0.4
Physically inoperable areas	130,291	113,819	66,167	4.5	14.3
Grizzly Bear habitat	126,613	26,334	16,562	1.1	3.6
Misc. reserves (UREP, REC, other)	20,961	6,444	3,623	0.2	0.8
Non-merchantable and non-economic stand types	177,881	125,306	34,315	2.4	7.4
Economically inoperable areas	473,780	76,601	1,904	0.1	0.4
Low volume areas	1,095,594	228,330	35,266	2.4	7.6
Riparian reserve zones	37,260	10,545	5,118	0.4	1.1
Wildlife tree retention	8,043	8,043	8,043	0.6	1.7
Environmentally sensitive areas	65,953	63,067	1,971	0.1	0.4
<b>Timber harvesting land base</b>			139,154	9.5	30.1

Figure 2 depicts the distribution of dominant tree species by volume in the CFLB and the THLB.

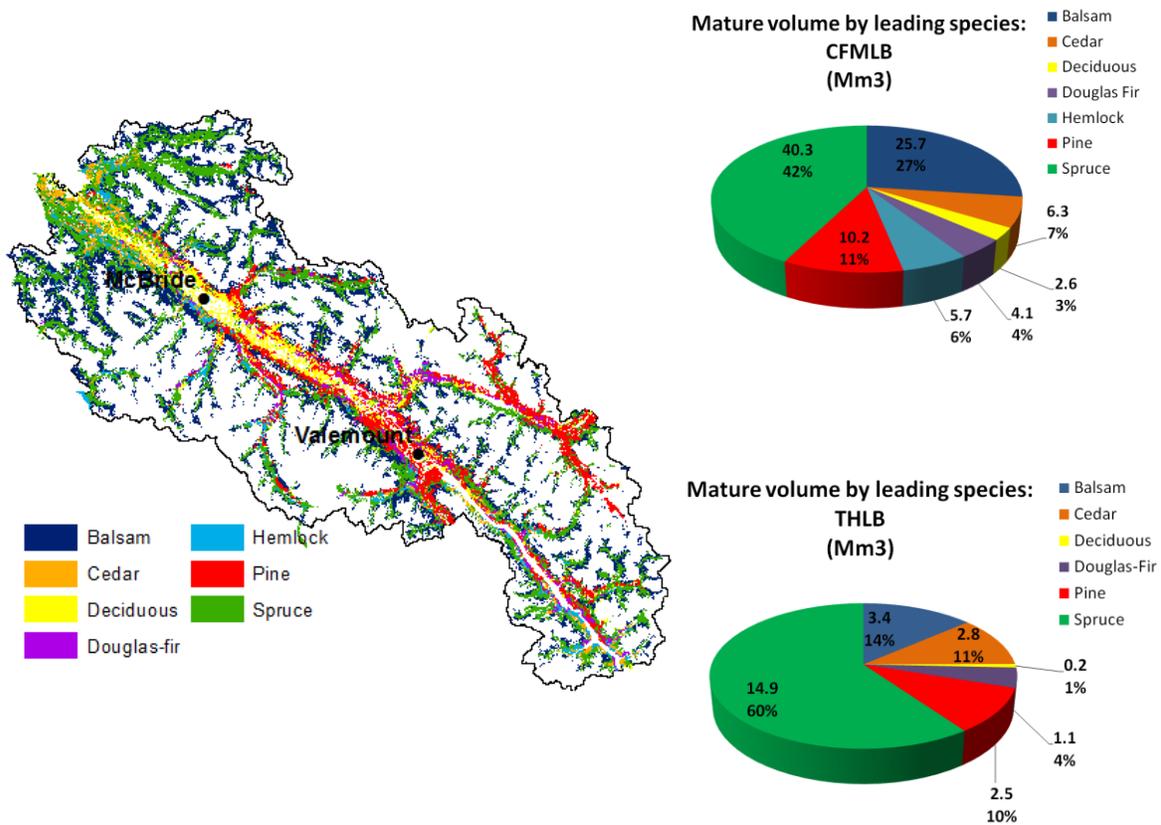


Figure 2. Proportion of leading species for the Crown forest land base and timber harvesting land base of the Robson Valley TSA.

Fires, wind, western hemlock-looper and bark beetle have been the predominant stand-replacing disturbances. The estimated annual non-recoverable timber volume loss attributed to natural disturbance, excluding losses to mountain pine beetle, is 80 000 cubic metres per year. About three-quarters of the stands in the THLB have never been harvested. Slightly more than half of the trees in the THLB are older than 140 years with the oldest stands consist primarily of cedar and hemlock. Over half of the mature timber stands have volumes less than 250 cubic metres per hectare (see Figure 3).

Most stands in the Robson Valley TSA are harvested by clearcutting and are restocked by planting, usually within less than two years.

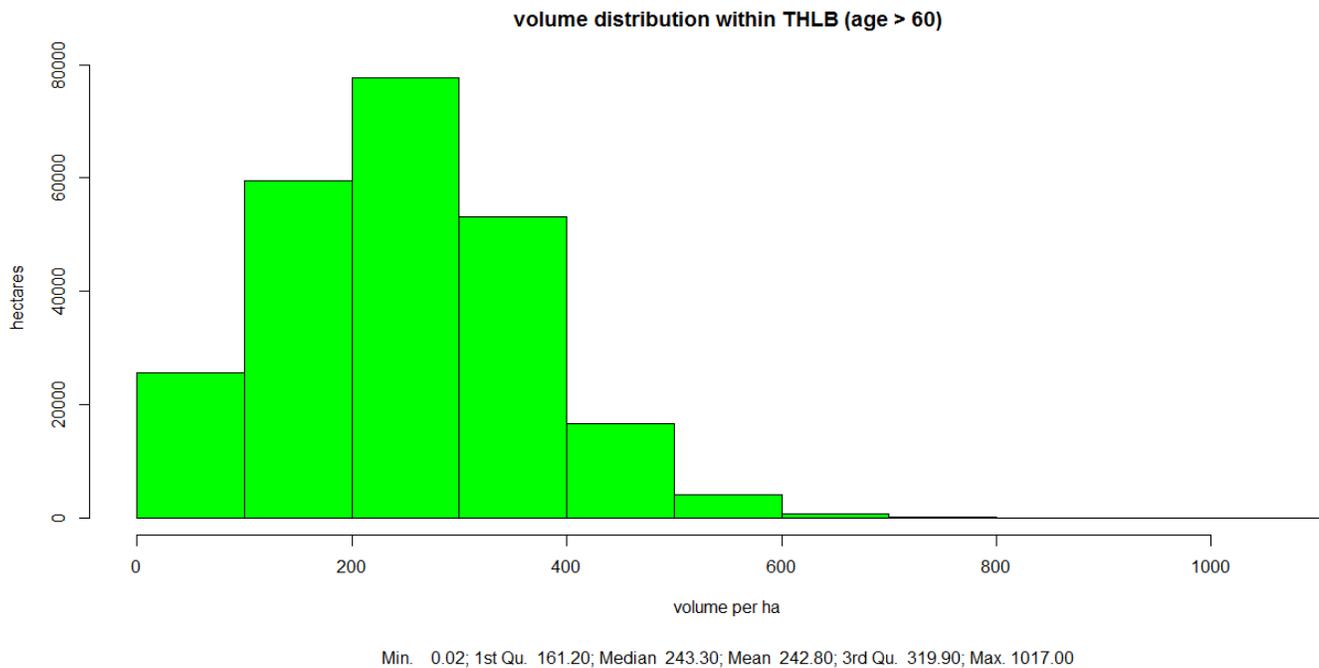


Figure 3. Age and volume class distribution for the Robson Valley TSA.

## Land base and forest management changes since 2006

The current AAC was determined on July 28, 2006 and came into effect on August 4<sup>th</sup>, 2006. Several changes have occurred to the land base and forest management information since then and these changes are reflected in the current timber supply analysis.

The major changes are:

1. issuance of two new community forest agreements (CFAs). When CFAs are established, the area is excluded from the TSA land base and the AAC of the remaining TSA is reduced accordingly. The AACs for these area based tenures are determined in a separate process;
2. establishment of new core habitat for mountain caribou designated as part of the Mountain Caribou Recovery initiative;
3. establishment of new old growth management areas in selected landscape units;
4. revision of the economic operability classification; and
5. issuance of a land use order, pursuant to Section 93.4 of the *Land Act*, for two Robson Valley Crown Land Plan zones – Agricultural Development Areas and Settlement Reserve Areas.

## Socio-economic information

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The Robson Valley TSA lies within the Regional District of Fraser Fort George – Electoral Area H. According to the 2011 Canadian census, the total population of the TSA is approximately 3300 residents, with the largest community being Valemount (1020), followed by McBride (586) and the smaller communities of Tete Jaune Cache, Crescent Spur-Loos, Dunster and Albreda. The 2011 Canadian census data also indicates that the Robson Valley TSA has experienced a steady downward trend in population since 1996 (*Statistics Canada. 2011, 2006, 2002. 2001 Community Profiles*). The Robson Valley TSA has recently experienced the closure of the Canfor Slocan Lumber sawmill in Valemount (2006) and the McBride Forest Industries plywood veneer manufacturing plant in McBride (2006). In 2007, Canfor's timber quota in the Robson Valley TSA was sold to Carrier Lumber.

Statistics Canada reports (2006) that the forest sector accounts for 23 to 33 percent of after-tax income for the Regional District of Fraser Fort George. This regional district includes all of the Prince George Natural Resource District; however, localized data for the Robson Valley TSA is unavailable. Statistics Canada reports other sector contributions to after-tax income as follows: transfer payments (26 percent), public sector (21 percent), tourism (11 percent), construction (5 percent), "other" (3 percent), and agriculture and food (1 percent).

While harvesting within the TSA has decreased in recent years (2009 to 2012), harvesting in the nearby community forests has increased to approximately 200 000 cubic metres per year (Figure 4). This is due, in part, to the increase in the Valemount Community Forest AAC to provide for the salvage of mountain pine beetle affected pine.

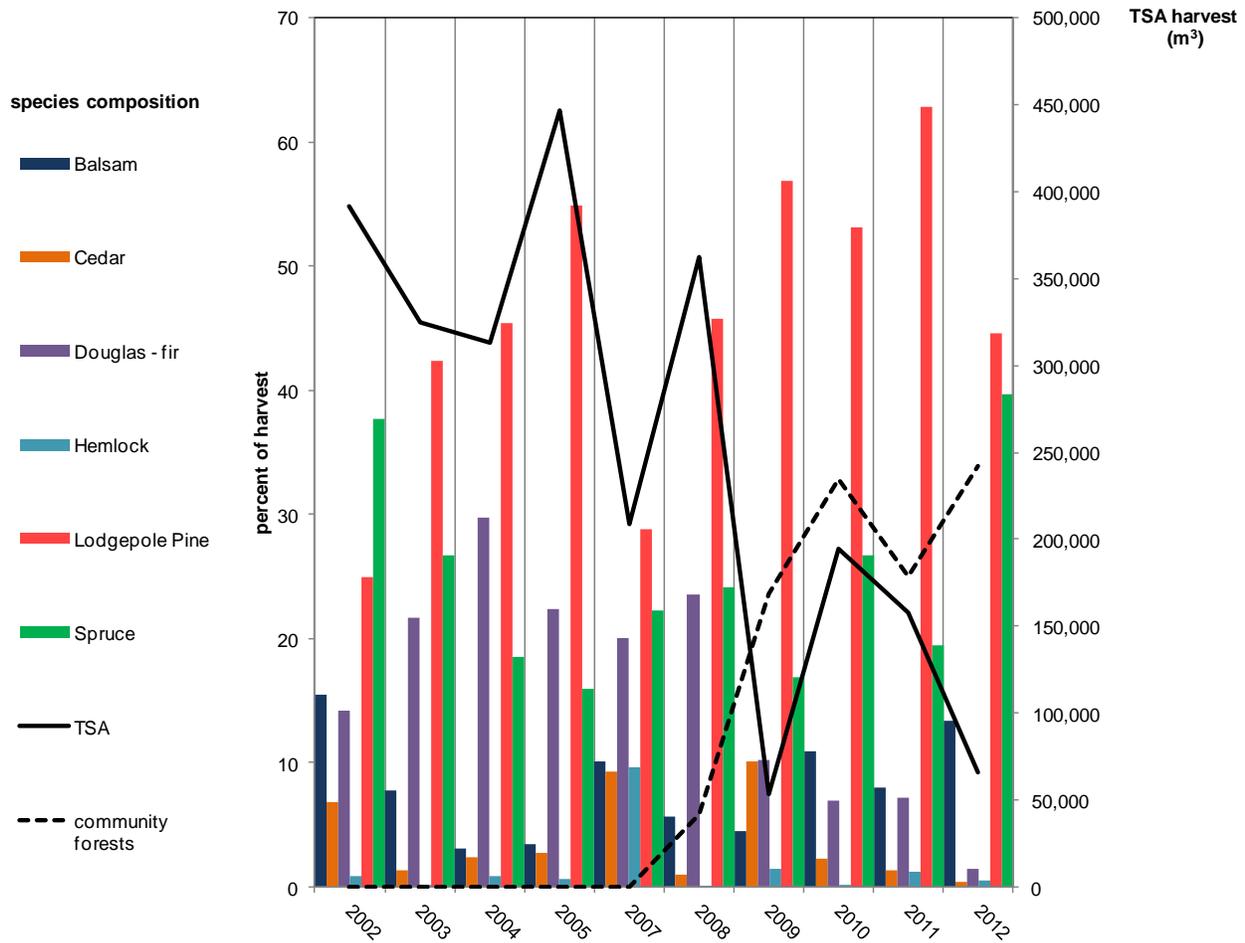


Figure 4. Volume harvest reported in the Harvest Billing System by species percent and cubic metres for the Robson Valley TSA and community forests – 2002 - 2012.

Traditionally bio-energy opportunities (co-generation and pellet manufacturing) have relied on residual fibre from primary manufacturers such as lumber producers and, more recently, logging residue. This currently limits bio-energy fibre opportunities in the Robson Valley TSA to landing and roadside waste.

Several run-of river-independent power projects have been proposed for the Robson Valley TSA but the lack of a high power transmission line into the valley has limited the ability to export power.

Over the last 10 years, the Robson Valley TSA has experienced a strong and steady increase in outdoor recreation-based tourism, including: snowmobiling, back country skiing, heli-skiing, back country hiking, guided hiking, mountain biking and summer all-terrain-vehicle recreation. The exceptional mountain scenery, combined with a forest road network that provides access to the backcountry, has helped to encourage this tourism growth. However, many of these roads are not currently being maintained and some have been closed, thereby reducing access to the backcountry.

## First Nations

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Eight First Nations have traditional territories within the Robson Valley TSA: Lheidli T'enneh First Nation, Simpcw First Nation, Lhtako Dene Nation, Canim Lake Indian Band, Xat'súll First Nation (Soda Creek), Shuswap First Nation, Okanagan First Nation, and the Tsilhqot'in National Government.

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 public discussion paper.

## Land use plans

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The Robson Valley Land and Resource Management Plan (LRMP) was approved by Cabinet in April 1999. The plan divides the area into 23 resource management zones, which fall into one of six categories: settlement and agriculture, community watersheds, resource development, general resource management, special management and protected areas. A legal order, pursuant to Section 93.4 of the *Land Act*, was issued on November 21, 2006 for two of the zones within the Robson Valley Crown Land Plan. The order prohibits logging in Agriculture Development Areas and Settlement Reserve Areas. These constraints are accounted for in the base case.

The Robson Valley Sustainable Resource Management Plan is a sub-regional plan that provides detailed direction for the biodiversity related objectives in the Robson Valley LRMP. Legal orders within the plan include:

1. *Order to Establish the Crescent Spur, Lower Morkill/Cushing, Forgetmenot, Upper Morkill, North Trench, and Goat Landscape Unit Objectives* (January 30, 2005);
2. *Order to Establish the Kiwa-Tete and Canoe Landscape Unit Objectives* (January 30, 2006);
3. *Order to Establish Landscape Unit Objectives for the Canoe Mountain Zone* (April 7, 2003);
4. *Order to Establish the East Kinbasket, West Kinbasket, Hugh Allan, Foster and Dawson Landscape Units Objectives* (May 26, 2005); and
5. *Section 8 of the Order Establishing Provincial Non-Spatial Old Growth Objectives* (establishment of draft Old Growth Management Areas (OGMA) and enhanced riparian/wildlife movement corridors for the South Trench Landscape Unit) (May 31, 2005).

## Mountain pine beetle

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The BC Mountain Pine Beetle model (BCMPB) was developed by the ministry to project the annual volume of mature pine killed by mountain pine beetle (MPB).

Recently this model has been found to overestimate pine mortality, particularly for those areas of the province, such as the Robson Valley TSA, that are on the periphery of the MPB infestation. In peripheral areas, it is believed that marginal climate suitability, which decreases MPB survival, and the presence of more mixed-species forests, in conjunction with protection by geographic barriers and prevailing wind patterns, limits MPB infestation.

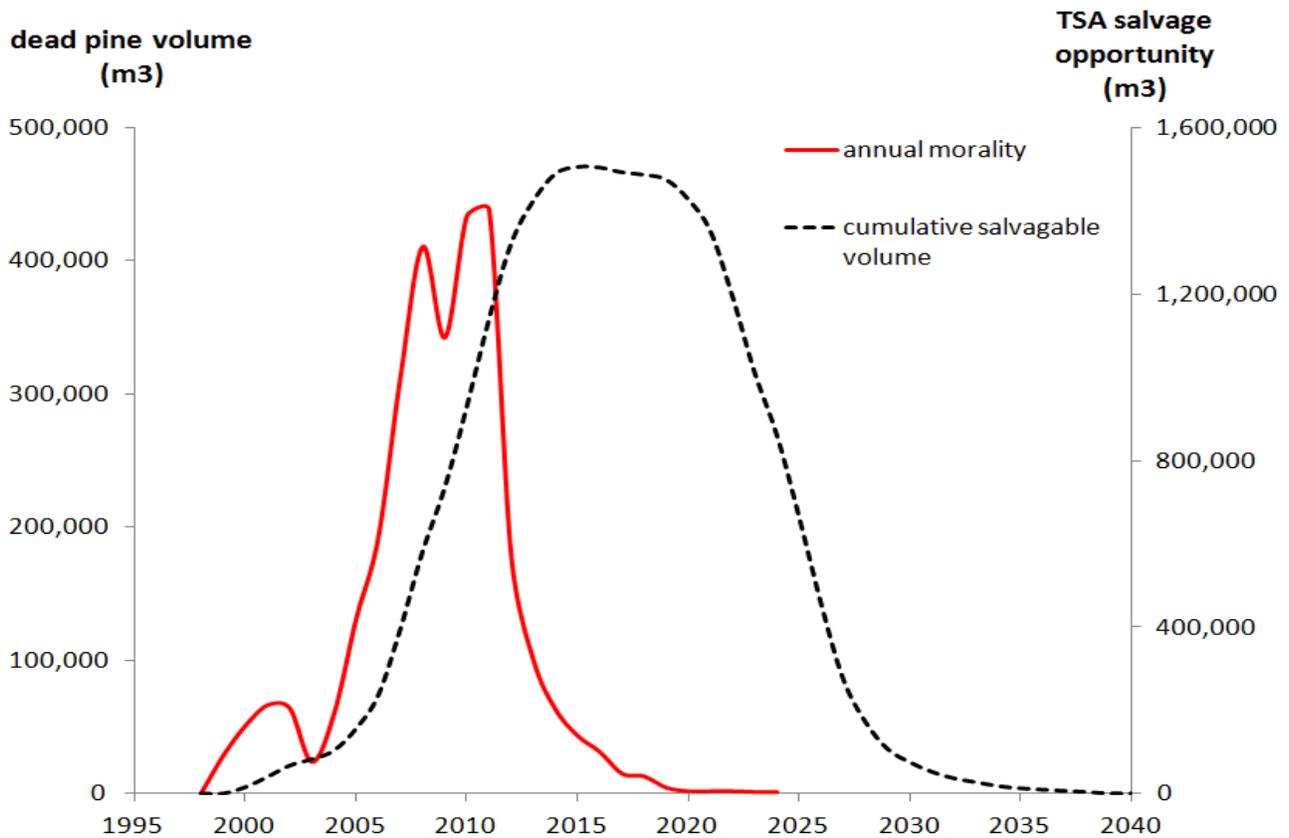


Figure 5. Projection of annual volume of pine killed by mountain pine beetle in the Robson Valley TSA.

Pine represents about 10 percent of the mature merchantable volume in the THLB. The BCMPB model (version 9) was used to account for current pine mortality, as well as to predict future mortality in Robson Valley TSA. The model forecasts that the annual mortality associated with MPB attack peaked during 2010, when 405 000 cubic metres of pine was killed.

The total volume of dead pine available for salvage was projected to reach 1.3 million cubic metres in 2012. This level is expected to increase to a maximum of 1.5 million cubic metres by 2015. Thereafter, the volume available for salvage declines due to the deteriorating quality of the dead pine.

### Timber supply analysis

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 Robson Valley TSA.

In order to determine an AAC, the chief forester reviews many sources of information, including a timber supply analysis that models the development of the forest through time and its response to harvesting while respecting government’s many timber and non-timber objectives. This section highlights some of the key findings from the timber supply analysis.

One of the key issues in this and subsequent timber supply reviews for the Robson Valley TSA is how best to transition from the current AAC to the long-term harvest level. As noted earlier, the Robson Valley TSA THLB has contracted substantially as the result of various land-use and tenure decisions, along with revised operability and merchantability assumptions. Consequently, in the current harvest projections the harvest level can no longer be sustained as long as previously projected and the transition to the long-term harvest level must occur earlier than forecast in the previous TSR.

Another key issue is the highly uncertain and variable economics of harvesting across the TSA. Timber harvesting in most of the Robson Valley TSA, with the exception of the trench area, typically involves high operating costs associated with difficult logging and road-building, and increased hauling costs associated with the general lack of large-scale local processing facilities, rendering the overall extent of the operable land base elastic and dependent on fluctuating commodity prices and market cycles. Significant areas within the TSA remain undeveloped and have historically been considered operationally inaccessible. Therefore, there is a risk that continued inclusion of these areas within the THLB may contribute to a significant overestimation of the projected timber supply.

Finally, an inventory audit completed in the Robson Valley TSA in 2010 suggests that the mature timber volume in the THLB may be underestimated. Since the majority of the THLB contains mature unmanaged stands, increasing or decreasing the associated stand volumes can have a significant impact on a harvest forecast.

In this public discussion paper six timber supply projections are presented that explore three themes:

1. potential transition options from the current effective AAC (480 000) to a long-term harvest level are shown in the base case and Forecasts 2, 3 and 4;
2. the effect of increasing the mature timber volumes to reflect the 2010 inventory sampling project is shown in Forecast 5; and
3. the implications of not harvesting in the “inaccessible areas” is shown in Forecast 6.

None of the scenarios presented in the analysis, including the base case, are AAC recommendations, but rather one of many sources of information the chief forester will consider when setting the AAC. The AAC determined by the chief forester may be greater or less than the initial level forecasted in any of these scenarios, including the base case, and is made on the basis of professional judgment rather than mathematical calculation.

### **The base case**

A timber supply analysis provides an assessment of the existing land base and forest management information. This assessment includes timber supply forecasts that ministry staff believe reflect the best available data and current forest management practices and requirements. These forecasts explore a range of options designed to avoid excessive changes from decade to decade and significant timber shortages while ensuring long-term forest productivity. One forecast is chosen from the range of options as the reference forecast and is called the “base case”.

In the base case, an initial harvest level of 480 000 cubic metres per year, which is about the same as the AAC attributable to the TSA following the issuance of the new CFAs (effective AAC), can be maintained for five years. Thereafter, the harvest level decreases by about 10 percent per five-year period for 20 years before reaching a mid-term harvest level of 290 000 cubic metres per year or about 58 percent of the effective AAC. After 30 years, the harvest level increases over five decades until it reaches a long-term level of 350 000 cubic metres per year.

Figure 6 depicts the base case forecast for the Robson Valley TSA, along with the five- and ten-year average actual harvest levels for the TSA. As noted earlier (see Figure 4) a substantial proportion of actual harvesting has shifted from the TSA to the community forests over the past decade.

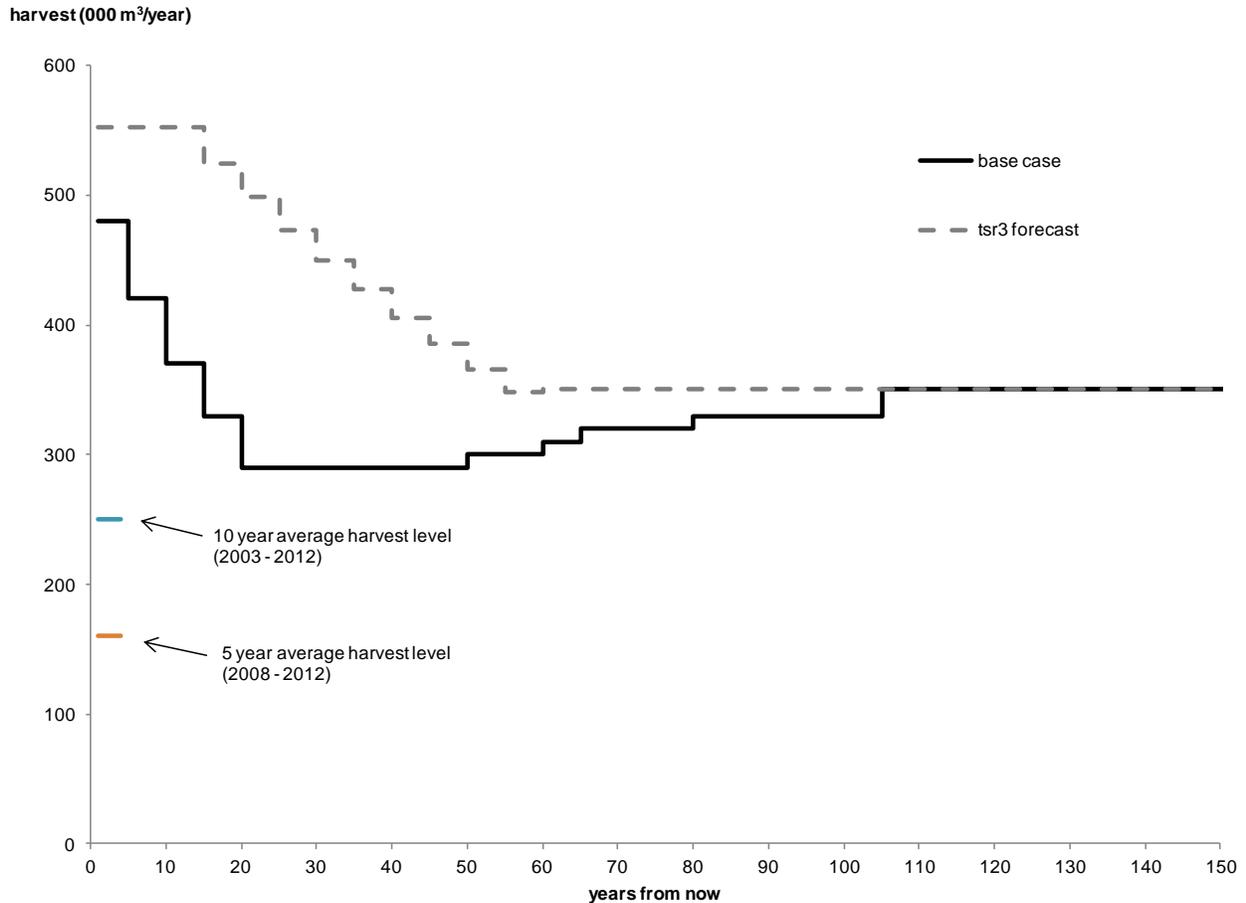


Figure 6. Base case timber supply forecast for the Robson Valley TSA, 2012.

In the base case and the three alternative harvest scenarios (discussed below), the rapid decline in harvest level, relative to the previous TSR (TSR3) (shown as a dotted line in Figure 6) results from the approximately 18 million cubic metre decrease in mature growing stock. This decrease is primarily due to the smaller size of the TSA and new operability assumptions. This contraction of the land base is partially offset by new site productivity estimates for managed stands that indicate that these stands are more productive than previously assumed. This increase in productivity raises the base case long-term harvest to the TSR3 level. No attempt was made to ascertain whether the long-term harvest levels could exceed those projected in TSR3, as the recovery in harvest level occurs in the distant future and is not impacted by the transition from initial to mid-term harvest levels in the various forecasts (see Figures 7 and 8).

**Alternative harvest forecasts to the base case (Forecasts 2, 3, and 4)**

In order to explore the various alternatives for transitioning from the initial harvest level to the mid-term harvest level, four harvest forecasts were prepared that share the same non-timber objectives and growth, regeneration, minimum harvest volume and MPB assumptions. The latter include: a) MPB mortality occurs until 2020 after which no further mortality is modelled (i.e. it is assumed that there will be no future waves of attack from the epicentre of the MPB outbreak) and b) dead pine remains merchantable for 15 years after the tree is killed. The initial harvest level, rate of harvest decline, and potential trade-offs between the short- and mid-term harvest levels in each of the four forecasts differ. The base case (Forecast 1) was selected from these four forecasts.

In Forecast 2 (see Figure 7), the initial harvest level is set at 440 000 cubic metres per year, which is about 8 percent lower than in the base case. This level can be maintained for 5 years before decreasing by 10 percent after every 5-year period for 15 years to a mid-term harvest level of 300 000 cubic metres per year, which is about 3 percent higher than the base case mid-term harvest level. After 30 years, the harvest level starts to increase until it reaches the long-term harvest level of 350 000 cubic metres per year.

In Forecast 3, the initial harvest level is set at 400 000 cubic metres per year, which is about 17 percent lower than in the base case. This level can be maintained for 5 years before the harvest level decreases by 10 percent after every 5-year period for one decade to a mid-term harvest level of 320 000 cubic metres per year, which is about 10 percent higher than in the base case.

In Forecast 4 (see Figure 8), maintaining the base case initial harvest level of 480 000 cubic metres per year for 10 years before declining by 10 percent per decade for 4 decades results in a mid-term harvest level of 250 000 cubic metres per year, which is 14 percent lower than in the base case. Lengthening the transition period also results in a doubling of the duration of the mid-term trough.

The results of the base case and Forecasts 2 and 3 suggest that decreases in the initial harvest level have minimal effect on the mid-term harvest level and the length of the transition period. However, maintaining the base case initial harvest level for an additional five years and prolonging the transition period, as in Forecast 4, significantly decreases the mid-term harvest level and lengthens the time until harvest levels begin to increase to the long-term level.

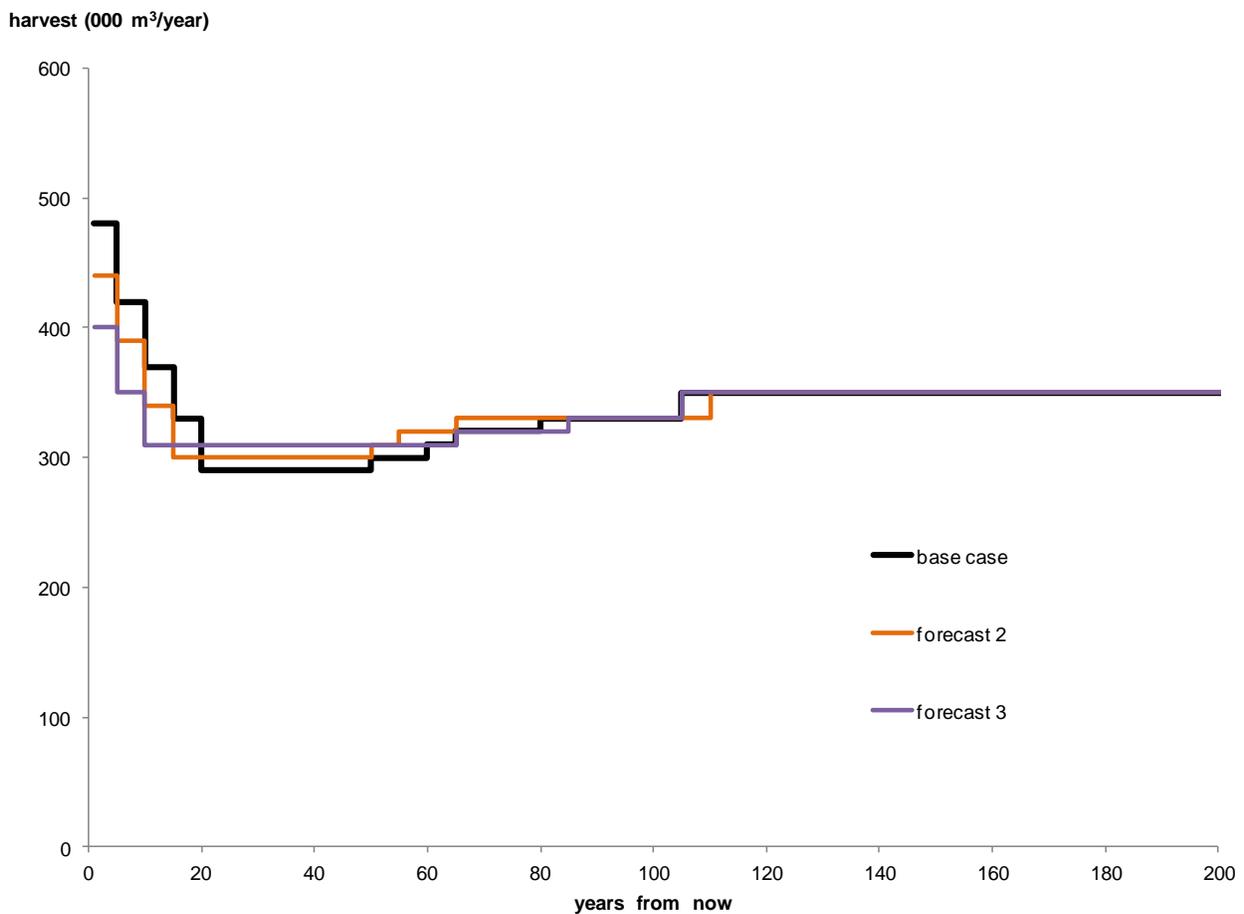


Figure 7. Alternative harvest forecasts - Forecasts 2 and 3.

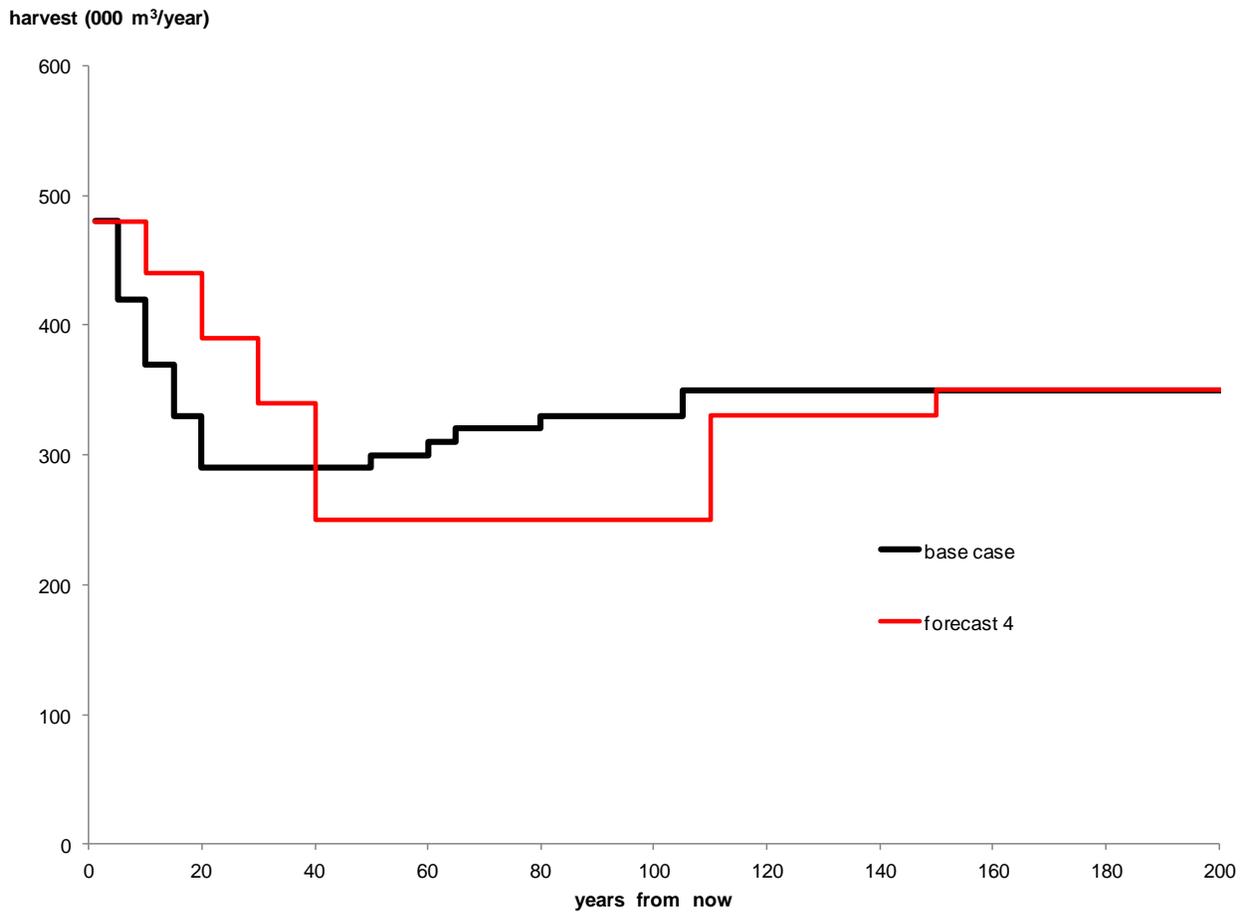


Figure 8. Alternative harvest forecast - Forecast 4.

A review of the base case and alternative harvest Forecasts 2, 3 and 4 indicates that in the short term, harvest levels are highly dependent on the harvest of cedar-leading stands and the use of cable-harvesting systems. Operationally, over the past decade only a small portion of the total harvest has occurred in either of these stand types. In addition, a substantial proportion of the stand volume harvested in the model comes from stands that are at or near the minimum volume per hectare threshold for merchantability. As a consequence, the base case and alternative harvest forecasts are very sensitive to changes in the minimum harvest level assumptions.

The impact of partitioning the harvest in the base case to maximize pine salvage and optimize the salvage of MPB-killed pine was assessed and found to have a negligible effect on the projected decrease from the initial harvest level to the lower mid-term harvest level or forestalling the projected decline.

**Key sensitivity analysis**

The base case uses a specific set of available data and forest management assumptions that attempt to capture current forest composition and management. Sensitivity analysis is used to examine the effect on the timber supply of uncertain information or known differences in the assumptions used in the base case.

**Mature volume estimates**

The base case and alternative harvest forecasts prepared for this timber supply review are based on the current inventory. Recent inventory work conducted in the Robson Valley TSA suggests that the mature stand volume estimates used in the analysis may be underestimated by up to 19 percent. However, due to the low number of inventory sample plots, the results are not considered to be statistically conclusive. A comparison of the inventory sampling results with timber cruise and harvest billing information for stands harvested over the last decade indicates that the recent inventory information may unduly inflate the volume estimates for mature stands.

In a sensitivity analysis (see Forecast 5 in Figure 9), increasing the volume estimates for mature stands by 19 percent increased the time that the base case initial harvest could be maintained from five years to 30 years before decreasing step wise to a mid-term harvest level of 360 000 cubic metres per year. These results suggest that if the actual mature volume estimates are higher than assumed in the base case, the decrease in timber supply due to the decrease in the size of the THLB and more restrictive operability assumptions could be offset.

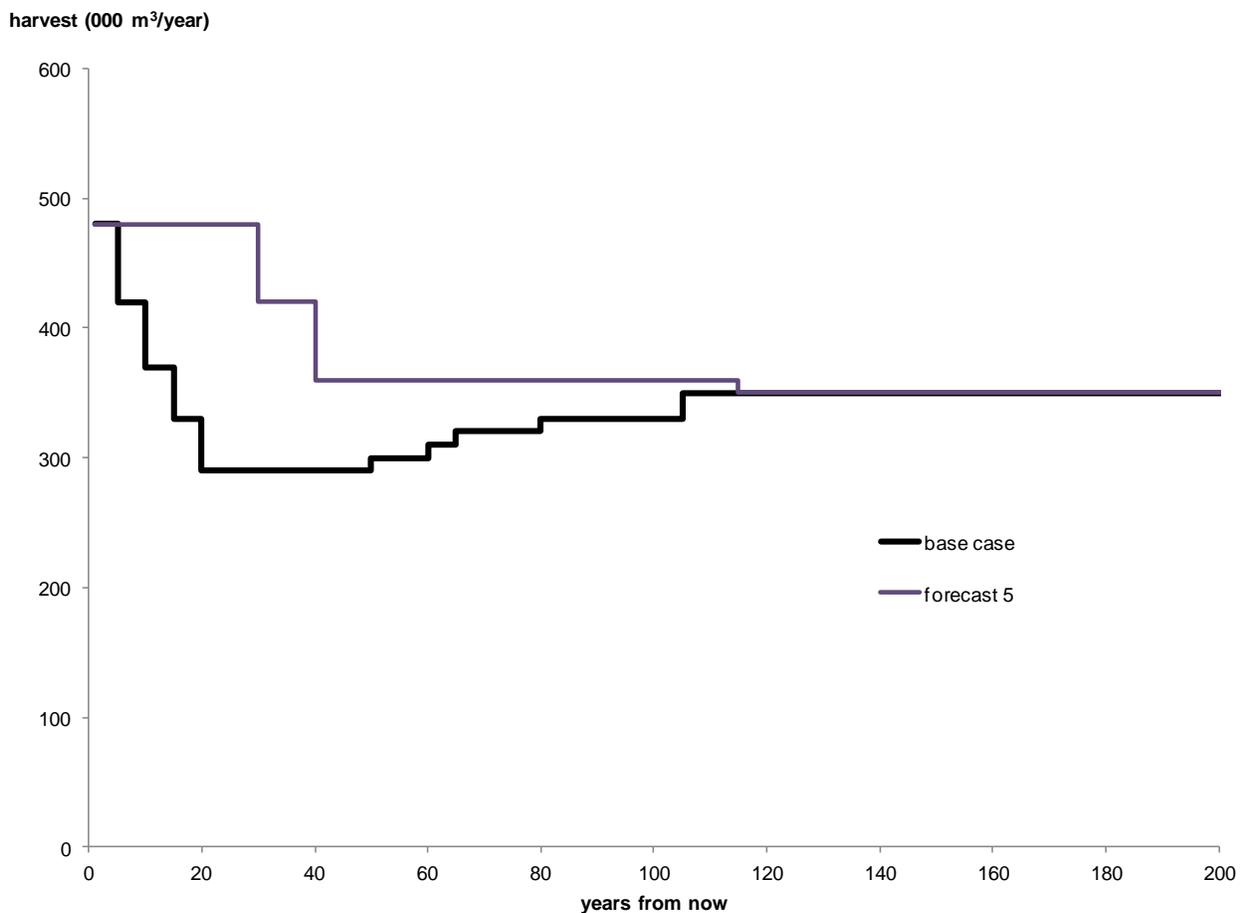


Figure 9. Alternative harvest forecasts - Forecast 5.

**Operability**

In previous timber supply reviews, licensees and district staff were concerned that a number of drainages included in the THLB should have been excluded by reason of difficult access and low economic operability. A reassessment of the Robson Valley TSA operability indicates that a number of drainages in the Robson Valley TSA that contain significant amounts of mature timber cannot be expected to be fully accessed under foreseeable economic conditions.

These drainages constitute 14 percent of the THLB and collectively account for more than 21 percent (see Forecast 6 in Figure 10) of the harvest during the transition from initial- to mid-term harvest levels.

In Forecast 6, all areas deemed operationally inaccessible have been excluded from the THLB. The decrease in short-term harvest levels is the same as in the base case but the mid-term and long-term harvest levels are decreased by 25 percent and 9 percent, respectively. Taken together, Forecasts 5 and 6 can be viewed as the bounds of uncertainty associated with the base case and alternative harvest forecasts.

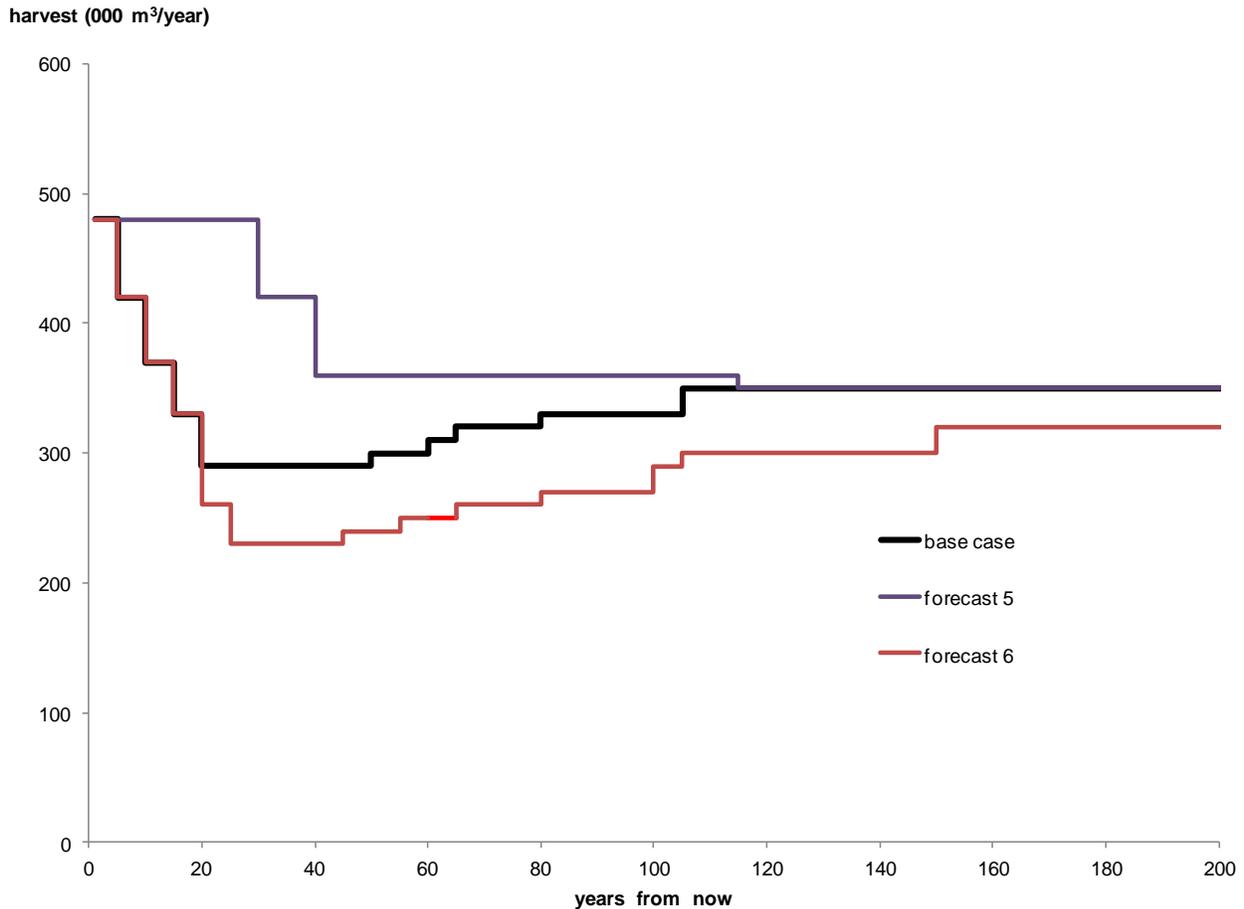


Figure 10. Alternative harvest forecasts - Forecast 6.

**Other key sensitivity analyses**

Table 2 provides a summary of other key issues that were explored using sensitivity analysis. It provides the percent change in the short-, mid- and long-term harvest levels compared to the base case harvest forecast. The key sensitivity analyses tested the effect of:

- adopting the minimum volume per hectare thresholds used in the previous TSR (TSR3);
- restricting cedar harvest to better reflect current practice;
- restricting cable harvest to better reflect current practice; and
- combining inaccessibility with restricted cable and cedar harvest.

*Table 2. Select sensitivity analyses for the Robson Valley TSA  
Short-term = decade 1, Mid-term = decades 2 to 11, Long-term = decades 12 to 25*

What	Change	Percent impact		
		Short-term	Mid-term	Long-term
Decrease the minimum volume requirement for harvested stands to the level used in the previous timber supply review.	Conventional operating systems: 160/180 cubic metres per hectare (base case) decreased to 140 cubic metres per hectare.	0	+9	0
	Mixed/cable operating systems: 220/250 cubic metres per hectare (base case) decreased to 200 cubic metres per hectare.			
Assess the timber supply impact of not harvesting mature cedar stands.	No harvesting of mature cedar stands.	0	-8	untested
Increase the minimum volume requirement for stands harvested using a cable harvest system.	Cable: 300 m <sup>3</sup> /ha threshold.	0	-11	untested
Exclude all mature cedar stands and inaccessible areas from harvesting and increase the minimum volume requirement for cable harvest system.	All mature cedar stands and inaccessible areas are not harvested. Cable: 300 m <sup>3</sup> /ha threshold	0	-32	untested

The results of the sensitivity analyses indicate that although there is some elasticity in the short-term, mid-term harvest levels are very sensitive to changes in operability, minimum volume criteria and the harvest of mature cedar stands.

**Summary**

The base case harvest forecast indicates that the current effective AAC (i.e. the AAC adjusted to reflect the transfer of AAC to the community forest) of 480 000 cubic metres can only be maintained for five to ten years before decreasing to a significantly lower mid-term level. The rapid decline in the projected harvest levels relative to the timber supply forecasts prepared for the previous TSR is due to a decrease of about 18 million cubic metres of mature growing stock. This decrease in growing stock is primarily due to the removal of area from the TSA to establish a community forest and the use of more restrictive operability assumptions.

Some of the key issues tested indicate that the base case is highly sensitive to changes in merchantability and operability assumptions and there is significant uncertainty associated with mature volume estimates, both of which could affect the short-term and mid-term harvest level.

**Your input is needed**

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Public input is a vital part of establishing the new AAC. Feedback is welcomed on any aspect of this public discussion paper or any other issues related to the timber supply review for the Robson Valley TSA. Ministry staff would be pleased to answer questions to help you prepare your response.

Your comments will be accepted until February 3, 2014.

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:

Attention: Norma Stromberg-Jones

Prince George Natural Resource District – McBride Field Office  
Ministry of Forests, Lands and Natural Resource Operations  
Box 40, 300 Robson Centre  
McBride, BC  
V0J 2E0

Telephone: (250) 569-3788 Fax: (250) 569-3755

Email: [Norma.StrombergJones@gov.bc.ca](mailto:Norma.StrombergJones@gov.bc.ca)

Further information regarding the technical details of the timber supply analysis is available on request by contacting [Forests.ForestAnalysisBranchOffice@gov.bc.ca](mailto:Forests.ForestAnalysisBranchOffice@gov.bc.ca)

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