

**BRITISH COLUMBIA
MINISTRY OF FORESTS, LANDS AND
NATURAL RESOURCE OPERATIONS**

**Quesnel
Timber Supply Area**

**Rationale for
Allowable Annual Cut (AAC)
Determination**

Effective June 16, 2017

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Objective of this document

This document provides an accounting of the factors I have considered and the rationale I have employed in making my determination, under Section 8 of the *Forest Act*, of the allowable annual cut (AAC) for the Quesnel Timber Supply Area (TSA). This document also identifies where new or better information is needed for incorporation in future determinations.

Acknowledgement

For preparation of the information I have considered in this determination, I am indebted to staff of the BC Ministry of Forests, Lands and Natural Resource Operations (FLNRO) in the Quesnel Natural Resource District, and the Forest Analysis and Inventory Branch (FAIB). I am also grateful to local residents, First Nations, and stakeholders who contributed to this process.

Statutory framework

Section 8 of the *Forest Act* requires the chief forester to consider a number of specified factors in determining AACs for TSAs and Tree Farm Licences (TFLs). Section 8 of the *Forest Act* is reproduced in full as Appendix 1 of this document.

Description of the Quesnel Timber Supply Area

The Quesnel TSA is located in the northern part of the Cariboo Natural Resource Region, between the Coast Mountains on the west and the Cariboo Mountains on the east. The TSA includes the Itcha-Ilgachuz mountain ranges in the west and the rolling terrain encompassing the Blackwater and Nazko River systems. To the east lie the Quesnel Highlands, Barkerville, and the Cariboo River.

The TSA has varied climate, terrain and forests. A relatively dry climate west of the Fraser River supports forests dominated by lodgepole pine, whereas east of the Fraser River the forests receive more rainfall and contain more spruce and subalpine fir. Overall, the TSA is covered by stands of lodgepole pine (85 percent by area), spruce (10 percent by area), and Douglas-fir (three percent by area) with hemlock and subalpine fir, and deciduous species forming minor components.

The Crown managed land of the TSA is about 1.55 million hectares in total. About 1.375 million hectares is Crown forest management land base (CFMLB). After accounting for the areas excluded from timber harvesting to provide for other resource values a total of 1 020 699 hectares are available for timber harvesting and are referred to throughout this document as the timber harvesting land base (THLB).

The major population centre in the TSA is the city of Quesnel with a population of 10,023 (2009, BC Stats). The adjacent communities of Red Bluff, Barlow Creek, Dragon Lake and Bouchie Lake, contribute to the total population of the TSA of 23,584. Other communities within the TSA include Wells in the east, and Nazko and Kluskus villages in the west. There are thirteen First Nations communities with asserted traditional territory in the TSA.

The economies of the communities in the TSA are largely resource-based, and the majority are dependent on the local forest industry. Ranching, mining and tourism are also integral to communities in the TSA.

There is a diverse Aboriginal history in the Quesnel TSA with several overlapping asserted territories. First Nations with asserted territory in the Quesnel TSA fall into the four cultural groups of the Carrier, Secwepemc, Tsilhot'in, and Wet'suket'en.

History of the AAC for the Quesnel TSA

The AAC for the Quesnel TSA was first established in 1981 at 2 300 000 cubic metres. The AAC was adjusted from 1981 to 1996 to account for a mountain pine beetle (MPB) outbreak and partitions were established to encourage the harvest of deciduous stands and problem forest types. In 1996, the AAC was determined at 2 340 000 cubic metres, of which 1 965 000 cubic metres were attributable to conventional sawlogs, 300 000 cubic metres were attributable to problem forest types (PFTs), and 40 000 cubic metres were attributable to deciduous species.

In 2001, during the initial outbreak of the MPB epidemic, the AAC for the Quesnel TSA was set at 3 248 000 cubic metres to facilitate the salvage of beetle-killed pine and to diminish the extent of future damage. Of the total AAC, 300 000 cubic metres were attributable to problem forest types and 20 000 cubic metres were attributable to deciduous species. In October 2004, the AAC was increased to 5 280 000 cubic metres, about 63 percent greater than the previous AAC. This increase, in response to the rapidly increasing mortality occurring from the expanding MPB epidemic, was to provide sufficient opportunity to salvage beetle-killed timber. Of the AAC, 20 000 cubic metres remained attributable to deciduous-leading stands while the problem forest type partition increased to 450 000 cubic metres.

In 2011, the AAC was decreased by about 24 percent to 4 000 000 cubic metres, which included 650 000 cubic metres attributed to non-pine volume. This AAC was set to initiate a transitional decline in the AAC until the remaining MPB impacted trees had been harvested.

The AAC at the time of this determination is apportioned as follows:

Table 1. Apportionment of current AAC

Apportionment	Cubic metres per year	Percentage
Forest Licences – replaceable	1 237 548	30.94
Forest Licences – non-replaceable	1 879 802	47.00
First Nations Woodlands Tenures	42 650	1.07
BCTS Timber Sale Licences	800 000	20.00
Forest Service Reserve	40 000	1.00
Total	4 000 000	100.00

New AAC determination

Effective June 16, 2017, the new AAC for the Quesnel TSA is 2 607 000 cubic metres, of which 1 250 000 cubic metres is attributed to live coniferous trees, 1 230 000 is attributed to dead trees, and 127 000 cubic metres is attributed to deciduous-leading stands. This AAC is about 35 percent lower than the AAC in place prior to this determination and about 11 percent higher than the pre-MPB uplift AAC set in 1996.

This AAC will remain in effect until a new AAC is determined, which must take place within 10 years of this determination.

Information sources used in the AAC determination

The information sources considered in determining this AAC for the Quesnel TSA include but are not limited to, the following:

- British Columbia. 2014. *Forest Act*. See Section 8 Allowable annual cut www.bclaws.ca/civix/document/id/complete/statreg/96157_02
- British Columbia. 2014. *Forest and Range Practices Act*. See www.bclaws.ca/civix/document/id/complete/statreg/02069_01
- British Columbia. 2014. Forest Planning and Practices Regulation. See www.bclaws.ca/civix/document/id/complete/statreg/14_2004
- British Columbia. 2014. Government Actions Regulation. See www.bclaws.ca/civix/document/id/complete/statreg/582_2004
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- Krakatsoulis, J. S. Paul, R. Osborne, C. Ortner and M. Anderson. 2005. Skeetchestn Indian Band: Research and development in riparian zone management.
- Maclauchlan, L. 2016. *Quantification of Dryocoetes confuses-caused mortality in subalpine fir forests of southern British Columbia*. *Forest Ecology and Management* 359(2016): 210-220.
- Ministry of Environment. Terrain stability mapping. See www.env.gov.bc.ca/terrain/terrain_files/types.html#terrainstability
- Ministry of Environment. Identified Wildlife Management Strategy. See www.env.gov.bc.ca/wld/frpa/iwms/index.html
- Ministry of Environment. BC Species and Ecosystems Explorer. See <http://a100.gov.bc.ca/pub/eswp/>
- Ministry of Environment. Mountain Caribou Recovery. See www.env.gov.bc.ca/wld/speciesconservation/mc/index.html
- Ministry of Environment. Ungulate winter ranges. See www.env.gov.bc.ca/wld/frpa/uwr/
- Ministry of Forests. 1995. *Biodiversity guidebook*. See www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/biodiv/biotoc.htm
- Ministry of Forests. 2009. Variable density yield projection. Volume 1 – VDYP7 Overview Version 2.0. Forest Analysis and Inventory Branch, Victoria, BC.
- Ministry of Forests, Lands and Natural Resource Operations. Provincial-level projection of the current mountain pine beetle outbreak. See www.for.gov.bc.ca/hre/bcmapb/year12.htm

- Ministry of Forests, Lands and Natural Resource Operations. Harvest Billing System (HBS). See <http://www2.gov.bc.ca/gov/content/industry/forestry/competitive-forest-industry/timber-pricing/harvest-billing-system>
- Ministry of Forests, Lands and Natural Resource Operations. Wildlife Management Areas. See www.env.gov.bc.ca/fw/habitat/conservation-lands/wma/
- Ministry of Forests, Lands and Natural Resource Operations. Archaeology in British Columbia. See www.for.gov.bc.ca/archaeology/index.htm
- Ministry of Forests and Range. 2009. *TIPSY and VDYP7 volume comparison*. Draft. March 31, 2009, Forest Analysis and Inventory Branch, Victoria, BC.
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- Ministry of Forests, Lands and Natural Resource Operations. 2013. *Best practices for calculating non-recoverable losses*. Forest Health Unit. Resource Practices Branch. Victoria, BC.
- Ministry of Forests, Lands and Natural Resource Operations. 2015. *Monitoring harvest activity across 28 mountain pine beetle impacted management units*. Forest Analysis and Inventory Branch. June 15, 2015.
- Ministry of Forests, Lands and Natural Resource Operations. 2015. *Quesnel Timber Supply Area Timber Supply Review Data Package*. June 2015. Victoria, BC.
- Ministry of Forests, Lands and Natural Resource Operations. 2015. *Quesnel Timber Supply Area Timber Supply Analysis Discussion Paper*. May 2016. Victoria, BC.
- Ministry of Forests and Range. 2005. *Provincial Logging Residue and Waste Measurement Procedures*. Manual. Revenue Branch, Ministry of Forests and Range, Victoria, BC and amendments to October 2013.
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- Special Committee of the BC Legislature on Timber Supply. August 2012. *Growing Fibre, Growing Value*.

- Ministry of Forests, Lands and Natural Resource Operations, Regional extension note *Adapting Natural Resource Management to a Changing Climate in the Cariboo Region* (February 2016).
- Statistics Canada. 2011. www.statcan.gc.ca
- Stearns Smith, S., G. Neinaber, M. Cruickshank, A. Nussbaum. 2004. *Demonstrating Growth and Yield Adjustments (TIPSY OAFs) for Armillaria root disease in a timber supply analysis*. Forestry Canada, Pacific Forestry Centre, Victoria, BC. 9 p.
- Winkler, R., Spittlehouse, D. and S. Boon, 2017. Streamflow response to clear-cut logging on British Columbia's Okanagan Plateau. *Eco-hydrology*.
- Woods, A. and K.D. Coates. 2013. *Are biotic disturbance agents challenging basic tenets of growth and yield and sustainable forest management?* *Forestry* 86(5): 543-554.
- Legal objectives established under the *Forest and Range Practices Act (FRPA)* and the *Land Act* (e.g., *Land Use Objectives for the Cariboo-Chilcotin Land Use Plan*, May 2011 (LUO)).
- *Land Use Order Objectives for the Cariboo-Chilcotin Land Use Plan*, May 19, 2010 and amended April 18, 2011. (Maps).
- *Land Use Objectives for the Cariboo-Chilcotin Land Use Plan (CCLUP) Area – Land Use Order*, May, 2011.
- *Regional Biodiversity Conservation Strategy Update Note 14 - The Function and Management of Old Growth Management Areas in the Cariboo-Chilcotin*, March, 2011.
- *Quesnel TSA – Type 4 Silviculture Strategy*. Forsite Consultants Ltd., July 2013.
- Ministry of Forests, Forest Analysis Branch, *Modelling Options for Disturbance of Areas Outside of the THLB* (Draft Working Paper, March 2004).

Role and limitations of the technical information used

Section 8 of the *Forest Act* requires the chief forester, in determining AACs, to consider biophysical, social and economic information. Most of the technical information used in determinations is in the form of a timber supply analysis and its inputs. These inputs are concerned primarily with biophysical factors—such as the rate of timber growth and the definition of the land base considered available for timber harvesting—and with management practices.

The analytical techniques used to assess timber supply necessarily are simplifications of the real world. Many of the factors used as inputs to timber supply analysis are uncertain, due in part to variation in physical, biological and social conditions. Ongoing scientific studies of ecological dynamics will help reduce some of this uncertainty.

Furthermore, computer models cannot incorporate all of the social, cultural and economic factors that are relevant when making forest management decisions. Technical information and analysis, therefore, do not necessarily provide the complete answers or solutions to forest management decisions such as AAC determinations. Such information does provide valuable insight into potential impacts of different resource-use assumptions and actions, and thus forms an important component of the information I must consider in AAC determinations.

In determining this AAC for the Quesnel TSA I have considered the known limitations of the technical information provided. I am satisfied that the information provides a suitable basis for my determination.

Guiding principles for AAC determinations

Section 8 of the *Forest Act* requires the chief forester to consider particular factors in determining the AACs for timber supply areas and tree farm licences.

Given the large number of periodic AAC determinations required for British Columbia's many forest management units, administrative fairness requires a reasonable degree of consistency of approach in addressing relevant factors associated with AAC determinations. In order to make my approach in these matters explicit, I have considered and adopted the following body of guiding principles, which have been developed over time by BC's chief foresters and deputy chief foresters. However, in any specific circumstance in a determination where I consider it necessary to deviate from these principles, I will explain my reasoning in detail.

When considering the factors required under Section 8, I am also mindful of my obligation as a steward of the forests of British Columbia, of the mandate of the Ministry of Forests, Lands and Natural Resource Operations as set out in Section 4 of the *Ministry of Forests and Range Act*, and of my responsibilities under the *Forest Act* and *Forest and Range Practices Act (FRPA)*.

Integrated decision making

One of the key objectives of the Ministry of Forests, Lands and Natural Resource Operations is to take an integrated approach to all resource management decisions that considers all resource values. In considering the factors outlined in Section 8 of the *Forest Act*, I will continue to consider all available information on timber and non-timber resources in the management unit, and all available information on the interactions of the management of those resources on timber supply.

Information uncertainty

Given the complex and dynamic nature of forest ecosystems coupled with changes in resource use patterns and social priorities there is always a degree of uncertainty in the information used in AAC determinations.

Two important ways of dealing with this uncertainty are:

- (i) managing risks by evaluating the significance of specific uncertainties associated with the current information and assessing the various potential current and future, social, economic and environmental risks associated with a range of possible AACs; and
- (ii) re-determining AACs frequently, in cases where projections of short-term timber supply are not stable, to ensure they incorporate current information and knowledge.

In considering the various factors that Section 8 of the *Forest Act* requires the chief forester to take into account in determining AACs, it is important to reflect those factors, as closely as possible, that are a reasonable extrapolation of current practices. It is not appropriate to base decisions on proposed or potential practices that could affect the timber supply but are not substantiated by demonstrated performance or are beyond current legal requirements.

In many areas, the timber supply implications of some legislative provisions remain uncertain, particularly when considered in combination with other factors. In each AAC determination, this uncertainty is taken into account to the extent possible in the context of the best available information.

It is not appropriate to speculate on timber supply impacts that may eventually result from land-use decisions not yet finalized by government, nor is it possible at this time to speculate about the possible effect on timber supply that could result from possible eventual legal proof of aboriginal title. However, where specific protected areas, conservancies, or similar areas have been designated by legislation or by order in council, these areas are deducted from the timber harvesting land base (THLB) and are not considered to contribute any harvestable volume to the timber supply in AAC determinations, although they may contribute indirectly by providing forest cover to help in meeting resource management objectives such as for biodiversity.

In some cases, even when government has made a formal land-use decision, it is not necessarily possible to fully analyse and account for the consequent timber supply impacts in a current AAC determination. Many government land-use decisions must be followed by detailed implementation decisions requiring, for instance, further detailed planning or legal designations such as those provided for under the *Land Act* and FRPA. In cases where there is a clear intent by government to implement these decisions that have not yet been finalized, I will consider information that is relevant to the decision in a manner that is appropriate to the circumstance. The requirement for regular AAC reviews will ensure that future determinations address ongoing plan implementation decisions.

Where appropriate, information will be considered regarding the types and extent of planned and implemented silviculture practices as well as relevant scientific, empirical and analytical evidence on the likely magnitude and timing of their timber supply effects.

I acknowledge the perspective that alternate strategies for dealing with information uncertainty are to delay AAC determinations or to generally reduce AACs in the interest of caution. However, given that there will always be uncertainty in information, and due to the significant impacts that AAC determinations can have on communities, I believe that no responsible AAC determination can be made solely on the basis of a response to uncertainty.

Nevertheless, in making a determination, allowances may need to be made to address risks that arise because of uncertainty by applying judgment to the available information. Where appropriate, the social and economic interests of the government, as articulated by the Minister of Forests, Lands and Natural Resource Operations, can assist in evaluating this uncertainty.

Climate change

One key area of uncertainty relates to climate change. While some controversy appears to remain on the causes of climate change, there is substantial scientific agreement that climate is changing, that the changes will affect forest ecosystems, and that forest management practices will need to be adapted. Nevertheless, the potential rate, amount, and specific characteristics of climate change in different parts of the province are uncertain. As research provides more definitive information on climate change, I will consider the findings in AAC determinations. Where forest practices are implemented to mitigate or adapt to the potential effects of climate change on forest resources, I will consider related information in my determinations.

In addition, vulnerability assessments can provide information on the potential risks associated with climate change, and could be useful in defining how to consider climate change in different AAC determinations. Such assessments could also highlight key topics in need of research that could improve climate change considerations for future determinations.

I note, however, that even with better information on climate change there will be a range of reasonable management responses. Considerations of how to respond in anticipation of uncertain, potential future impacts and risks differ from those related to responding to known or ongoing processes such as the recent MPB infestation. For example, it is not clear if either increases or decreases to current harvest levels would be appropriate in addressing potential future increases in

natural disturbance due to climate change. Conversely, the present forest conditions resulting from the MPB infestation provide a clearer circumstance to which to respond.

To some extent, decisions on the preferred management responses to potential future risks, including potential changes to allowable timber harvests, are appropriately informed by broad discussion among interested parties. I will monitor such discussions and consider them insofar as they are relevant to AAC determinations. In general, the requirement for regular AAC reviews will allow for the incorporation of new information on climate change and its effects on forests and timber supply as it emerges.

First Nations

Established (declared) Aboriginal title lands and other areas, such as Treaty Settlement Lands or Indian Reserves, are not provincial Crown land. Consequently, the timber on these lands does not contribute to the AAC of the timber supply area or tree farm licence with which they overlap. For other areas, where Aboriginal title has not been legally proven, the Crown has a constitutional obligation to consult with First Nations regarding their asserted Aboriginal rights and title (Aboriginal Interests) in a manner proportional to the strength of their Aboriginal Interests and the degree to which the decision may impact these interests. In this regard, full consideration will be given to:

- (i) the information provided to First Nations to explain the timber supply review process;
- (ii) any information brought forward through engagement and consultation respecting First Nations' Treaty rights or Aboriginal Interests, including how these rights or interests may be impacted; and
- (iii) any operational plans and/or other information that describe how First Nations' Treaty rights or Aboriginal Interests are addressed through specific actions and forest practices.

Treaty rights or Aboriginal Interests that may be impacted by AAC decisions will be addressed consistent with the scope of authority granted to the chief forester under Section 8 of the *Forest Act*. When information is brought forward that is outside of the chief forester's scope of statutory authority, this information will be forwarded to the appropriate decision makers for their consideration. Specific considerations identified by First Nations in relation to their Aboriginal Interests and the AAC determination are addressed in the various sections of this rationale.

AAC determinations should not be construed as limiting the Crown's obligations under court decisions in any way, and in this respect it should be noted that AAC determinations do not prescribe a particular plan of harvesting activity within the management units. They are also independent of any decisions by the Minister of Forests, Lands and Natural Resource Operations with respect to subsequent allocation of wood supply.

The role of the base case

In considering the factors required under Section 8 of the *Forest Act* to be addressed in AAC determinations, I am assisted by timber supply forecasts provided to me through the work of the Timber Supply Review Program (TSR) for TSAs and TFLs.

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

From a range of possible forecasts, one is chosen in which an attempt is made 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 on timber supply. The base case is designed to reflect current management practices, demonstrated performance and legal requirements.

Because it represents only one in a number of theoretical forecasts, and because it incorporates information about which there may be some uncertainty, the base case is not an AAC recommendation. Rather, it is one possible forecast of timber supply, 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.

Therefore, much of what follows in the considerations outlined below is an examination of the degree to which all the assumptions made in generating the base case are realistic and current, and the degree to which resulting predictions of timber supply must be adjusted to more properly reflect the current and foreseeable situation.

These adjustments are made on the basis of informed judgment using currently available information about forest management, and that information may well have changed since the original information package was assembled. Forest management data are particularly subject to change during periods of legislative or regulatory change, or during the implementation of new policies, procedures, guidelines or plans.

Thus, in reviewing the considerations that lead to the AAC determination, it is important to remember that the AAC determination itself is not simply a calculation. Even though the timber supply analysis I am provided is integral to those considerations, the AAC determination is a synthesis of judgment and analysis in which numerous risks and uncertainties are weighed. Depending upon the outcome of these considerations, the AAC determined may or may not coincide with the base case. Judgments that in part may be based on uncertain information are essentially qualitative in nature and, as such, are subject to an element of risk. Consequently, once an AAC has been determined, no additional precision or validation would be gained by attempting a computer analysis of the combined considerations.

Base case for the Quesnel TSA

The timber supply forecasts, including the base case, were prepared for this determination using FAIB's Standard Timber Supply Model (StTSM), run using the Spatially Explicit Landscape Event Simulator (SELES). The model was run in five-year increments for the first decade which represented the salvage phase, and then 10-year increments for the remainder of the timber supply forecast.

Harvest level projections can vary dependent on the harvest flow objectives used in the analysis, even when prepared using the same information, data and timber supply model. The flow modelled in the base case was constructed as three even-flow harvest forecasts, for each of the short-term salvage period, the mid term, and the long term, with all three harvest flows established to meet the objective of maximizing the mid term. The modelling also followed the standard guidance established by FAIB for MPB-impacted units, wherein the transition from the short term to the mid term occurs at the end of the salvage period; the transition from the mid term to the long term occurs when 75 percent of the harvest comes from stands established after the onset of the MPB epidemic; and the long-term harvest flow is set at the level that ensures the growing stock at the end of the forecast equates to a rotation's worth of harvest.

No assumptions were made in the base case about the potential end use of the dead pine. All dead trees were assumed to fall over 15 years following their death after which they were no longer considered viable for harvesting. Since the MPB outbreak peaked in 2005, the majority of dead pine was assumed to have fallen over five years into the harvest forecast.

In the base case, which starts in 2015, the initial harvest level was set at 4 000 000 cubic metres per year, which is the level of the current AAC. This level was selected even though it is significantly higher than recent harvest performance in order to explore the potential for the continued salvage of dead pine in the short term. The initial harvest level includes 720 000 cubic metres per year of live volume, which is incidentally harvested during the salvage of predominately dead stands (live volume bycatch).

After five years, when the dead pine was assumed to no longer be a commercially-viable source of timber, the harvest level decreased to the mid-term level of 1 617 000 cubic metres per year, including 127 000 cubic metres per year of deciduous-leading stand volume. The harvest remains at this level until decade seven, when enough of the stands established since the start of the MPB outbreak become eligible for harvest, at which point the harvest level increases to the long-term level of 2 139 000 cubic metres per year.

The data and assumptions used in the base case were intended to reflect current legal requirements, demonstrated operational practices and current forest conditions in the Quesnel TSA, in the context of the best currently available information.

In addition to the base case, I was provided with a number of sensitivity analyses and alternative harvest forecasts carried out using the base case as a reference. These analyses and others as noted have been helpful in specific considerations and reasoning in my determination as documented in the following sections. I am satisfied that the base case, and the other analyses as noted and described, represent the best information currently available to me respecting various aspects of the projection of the timber supply in this TSA, and that as such they are suitable for reference in my considerations in this determination.

Consideration of Factors as Required by Section 8 of the Forest Act

I have reviewed the information for all of the factors required to be considered under Section 8 of the *Forest Act*. Where I have concluded that the modelling of a factor in the base case is a reasonable reflection of current legal requirements, demonstrated forest management and the best available information, and uncertainties about the factor have little influence on the timber supply projected in the base case, no discussion is included in this rationale. These factors are listed in Table 2.

Table 2. List of accepted factors

Forest Act section and description	Factors accepted as modelled
8(8)(a)(i) Composition of the forest and its expected rate of growth	<ul style="list-style-type: none"> • Areas Not Administered by the Crown • Areas Classified as Non-Forest • Low Site Exclusions
8(8)(a)(ii) Expected time that it will take the forest to become re-established following denudation	<ul style="list-style-type: none"> • Operational Adjustment Factors • Regeneration Delay • Not Satisfactorily Restocked
8(8)(a)(iii) Silvicultural treatments to be applied	<ul style="list-style-type: none"> • Silvicultural Systems • Rehabilitation Programs
8(8)(a)(iv) Standard of timber utilization and allowance for decay, waste, and breakage	<ul style="list-style-type: none"> • Decay Waste and Breakage
8(8)(a)(v) Constraints on the amount of timber produced by use of the area for purposes other than timber production	<ul style="list-style-type: none"> • Cariboo Chilcotin Land Use Plan • Stand Level Biodiversity and Hydrology • Lakeshore Management • Riparian Reserve and Riparian Management Zones • Mature Birch Retention • Restoration of Grassland Benchmark Areas
8(8)(a)(vi) Any other information	<ul style="list-style-type: none"> • Kluskus Supply Block
8(8)(d) Economic and social objectives of the government	<ul style="list-style-type: none"> • Summary of Public Input
8(8)(e) Abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area	<ul style="list-style-type: none"> • Mountain Pine Beetle • Mountain Pine Beetle Mortality in Young Stands • Disturbances Outside the Timber Harvesting Land Base

For other factors, where more uncertainty exists or where public or First Nations input indicates contention regarding the information used, modelling, or some other aspect under consideration, this rationale incorporates an explanation of how I considered the essential issues raised and the reasoning that led to my conclusions.

Section 8 (8)

In determining an allowable annual cut under this section the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

- (a) **the rate of timber production that may be sustained on the area, taking into account**
 - (i) **the composition of the forest and its expected rate of growth on the area**

Land base contributing to timber harvesting

- general comments

The total area of the Quesnel TSA is 2 077 293 hectares. Of this total TSA area, 1 375 613 hectares or 66 percent is classified as CFMLB.

As part of the process used to derive the THLB for use in the timber supply analysis, a series of deductions is made from the CFMLB. The THLB is a coarse estimate of the area available for timber production, at a single point in time, after areas reserved from harvesting for economic, cultural or ecological factors have been excluded. Because the THLB is an estimate derived for the purpose of timber supply modelling, the inclusion or exclusion of an area in the THLB does not determine how it will be managed and whether or not it will be harvested. For the Quesnel TSA, the THLB assumed in the base case is 1 020 699 hectares or approximately 74 percent of the CFMLB.

Having reviewed the information and assumptions, I conclude that the best available information was used to estimate the THLB for the Quesnel TSA, and the THLB is adequate for use in this determination. I note that the factors listed in this section of the rationale do not include all of the areas excluded from the THLB, as some factors have been listed in Table 2, as noted above, while others are referred to later in this document.

- roads, trails and landings

In the derivation of the THLB, areas are excluded to account for access structures that will never regenerate forest and therefore should not be considered part of the CMFLB. Separate estimates are made to account for existing roads and for future roads.

To account for existing roads, the average maintained clearing width was estimated for mapped roads, both Forest Service roads and other roads constructed under a road permit. A total of 15 354 hectares were excluded on this account.

To account for future roads, an estimate of the amount of area expected to be permanently lost from the construction of roads was made using observed performance and data from the FLNRO Reporting Silviculture Updates and Land Status Tracking System (RESULTS). A percentage area reduction was applied after existing stands were harvested for the first time in the model. A total of 3670 hectares was excluded over the entire analysis horizon.

District staff indicate that several road data refinement projects have been completed for the TSA to improve the accuracy of the available information. Staff are satisfied that the loss of productive area from recent road construction is appropriately reflected by the data. However, the data for older roads is less complete.

Input received from the Tsilhqot'in National Government (TNG) stated that it was not clear whether the reduction for future roads adequately accounts for the impact on below-ground growing space that results from compaction. FLNRO staff responded that to the extent that new roads are required, the operational adjustment factor (OAF) 1 applied to managed future stand yields is expected to account for any implications to stand growth that may result from compaction.

Other First Nations expressed concern about the increased roading of the landscape that could result if harvest is sustained at the current level. FLNRO staff responded that little additional road construction is anticipated to be necessary in the TSA given its existing road network.

Comments were also received regarding the growing pressure on wildlife populations that results from increased hunting access provided by expanding road networks and lack of habitat protection. District staff agree that moose populations can be susceptible to the ease of hunting access afforded by an extensive road network. Overall, staff note that there are no plans to construct new main haul roads, although some smaller new roads may possibly be built and some older roads could be reactivated.

Having considered the information and the comments received from First Nations, I acknowledge the concerns that have been expressed regarding the potential impacts on wildlife populations from extensive road networks. I discuss my consideration of any implications for moose populations and habitat that result on this account further under “other wildlife habitat areas”.

In consideration of the information provided and the accounting in the base case for the loss of productive land resulting from current and future roads, I accept that the best information available was used and that roads, trails and landings were appropriately modelled in the timber supply analysis.

As discussed under ‘**Implementation**’, I request that staff work to improve the available inventory information for all roads, especially non-status roads, for use in future timber supply reviews. An updated inventory would also benefit future economic planning for the area, including for tourism. I also request that district and licensee staff work with First Nations to ensure that any roads that are no longer needed be deactivated and rehabilitated to the extent practicable.

- areas considered inoperable

The majority of areas considered inoperable within the TSA are associated with steep slopes. These areas have a high probability of unstable terrain and sensitive soils that require the use of lower disturbance harvest systems such as cable logging.

In preparation for the timber supply analysis, staff reviewed the slope information included in cutting permit appraisal data to determine operability limits. The operability criteria varied for the eastern and western portions of the TSA. In the western portion of the TSA, slopes greater than 40 percent were excluded to reflect that the forest types in this portion of the TSA are only suitable for skidder harvesting. In the eastern portion of the TSA, slopes greater than 70 percent were excluded to reflect that for these forest types, cable harvesting is currently practiced on slopes between 40 and 70 percent.

As a result of applying these criteria, a total of 8071 hectares were excluded in the base case to account for areas considered to be inoperable due to steep slopes.

In previous timber supply reviews areas occupied by non-commercial tree species, such as aspen and birch, were considered as inoperable and excluded from the THLB. For this determination these areas, totalling 52 149 hectares, were included in the THLB in order to assess their potential contribution to timber supply. I will discuss my consideration of deciduous stands under ‘**AAC partitions**’.

With regards to overall operability assumptions, input received from Tolko suggested that the steep slope criteria established by WorkSafe BC should be used in the base case and requested that opportunity volume be made available on steep slopes. District staff responded that the assumptions for harvest of stands on steep slopes reflect practices in the TSA since 1999 and noted that, unless harvest is restricted for other reasons, the opportunity for licensees to harvest volume from areas excluded from the THLB due to steep slopes is not limited by the classification.

I have considered the information regarding the exclusions applied in the base case to account for inoperable areas and discussed the information with district staff. I am satisfied that the base case assumptions reflect current practices in the TSA. In response to Tolko's input, I note that the base case assumptions do not dictate operational practices and should it be possible in the future to harvest on steeper slopes than what was assumed in the base case, the implications of these practices can be incorporated into future timber supply operability assumptions.

Existing forest inventory

- vegetation resources inventory

The vegetation resources inventory (VRI) is the provincial standard of forest cover information for use in timber supply analysis. The original VRI for the Quesnel TSA was created in 2005 based on photo interpreted imagery acquired in the 1980's and 1990's.

Since then, the MPB epidemic has impacted the majority of the forests in the TSA and has significantly changed the composition of the stands. A new VRI was initiated and completed in 2011 for the eastern portion of the TSA which largely consists of spruce-leading stands not affected by the MPB.

Stands in the remaining portions of the TSA most impacted by MPB, where the older VRI was assessed to no longer accurately reflect stand attribute information, were modelled using a landscape vegetation inventory (LVI). This new type of inventory will be discussed under 'landscape vegetation inventory'.

Public input was received that commented on the uncertainty in the available inventory information. Opinions about the implications of this uncertainty ranged from an underestimation of timber supply to an overestimation. One comment included a request that a conservative estimate of available volumes be used and another comment suggested that the base case includes a potential understatement of volumes in stands with secondary structures. The Nazko First Nation asked if the methodology used in the data package and timber supply review was accurate.

FAIB staff note that the analysis used a combination of VRI and LVI data in order to provide the best currently available inventory information, and this data is supported by ground plots, air photos and satellite imagery.

I have considered the information about the forest inventory for the TSA and discussed it with FLNRO staff. I agree that the information currently available for the stands impacted by the MPB epidemic is subject to some uncertainty, and I am aware that a new VRI, postponed until the MPB outbreak was complete, is now underway for the remainder of the TSA.

I look forward to the completion of the VRI and the better information it provides, including improved estimates of the volume available in secondary stand structure. I encourage FLNRO staff to ensure the inventory reflects the complexity of the stand types and structures in the TSA. As discussed under '**Implementation**', I encourage FAIB staff to lead work with the district staff and the Forests for Tomorrow (FFT) program to support an amalgamation of all the information being collected (such as data from regeneration surveys, FFT sample plot surveys, Young Stand Monitoring (YSM) plots and VRI data) to ensure alignment between the various information sources available to describe the different levels of stand development, and ensure yield curves are calibrated correctly.

For this determination, I accept that the VRI information that was used for the portions of the TSA to which it applied represents the best available information for stands during this transition phase of the forests in the TSA, and I make no adjustments to the base case on this account.

- *landscape vegetation inventory*

As mentioned above, the existing VRI for areas impacted by the MPB is considered to be unreliable due to the extensive change to the forest as a result of the epidemic. To provide better information for this determination, an LVI was used as an interim source of information for the stands in the central portion of the TSA. The LVI was based on Landsat satellite imagery and high resolution digital photography collected in 2013.

To assess the suitability of the LVI data, a comparison of the inventory information from the existing VRI, the results of the British Columbia Mountain Pine Beetle (BCMPB) projection model applied to the VRI data, and the LVI was carried out prior to the timber supply analysis. The results showed that the LVI data had a higher proportion of dead volume than the other two approaches as well as a higher overall amount of volume. The LVI also had a higher proportion of spruce-leading stands and a lower average stand age than in the VRI.

Ground sampling, at a level that exceeded the standard number of plots used for the VRI, was completed in 2013 and was integrated into the LVI model. An independent review of the LVI confirmed that the estimation of live volume is very good at the population level.

West Fraser expressed concern about the LVI data, noting the poor correlation found between LVI estimates and group samples in the 2011 report, *Landscape Vegetation Inventory (LVI) West Quesnel TSA*. FAIB staff clarified that the report documented the results of the LVI pilot project. The shortfalls noted in the pilot were addressed prior to the implementation of the LVI for the entire target area. In particular, the estimation of dead volume was problematic in the pilot project because dead stems are difficult to identify using aerial photography. The extensive ground sampling was able to provide improved data that were used to refine the model's estimation of dead volume.

Tolko stated that in their experience the LVI volumes appear to drastically overstate the merchantable volume available in the salvage stands. District staff responded that the analysis projects all volume lost to MPB, regardless of end product, and the component of volume considered merchantable for sawlogs is greatly reduced because MPB-killed trees have been dead for 10 years.

Overall, FAIB staff consider the LVI, in combination with the ground sample plot data, to provide the best available information for the MPB-impacted stands in the TSA. District staff have reviewed the LVI and confirm that it provides reasonable inventory information that appears to be consistent with field observations of current stand conditions.

Public input questioned why the base case projected a higher mid-term harvest level than was forecast by the 2012 Mid-term Timber Supply Project. FAIB staff note that the higher mid-term harvest level is due to the use of better inventory information from the LVI and improved site productivity estimates that indicate that some of the managed stand yields are higher than originally estimated.

Public input also commented that most remaining non-pine timber is constrained either economically or is reserved to provide biological values. FAIB staff indicate that these limitations are accounted for in the analysis through the application of minimum harvestable volume and age constraints as well as modelling of stand retention objectives for biodiversity.

I have considered the LVI information used in the analysis to capture the current and expected condition of stands impacted by the MPB, and I have discussed this information with FLNRO staff. I accept that the LVI represents the best available information at this time, and I make no adjustments on this account.

Expected rate of growth*- volume estimates for natural stands*

In the timber supply analysis, Variable Density Yield Prediction (VDYP) model version 7 was used to project volumes for natural stands. Natural stand yield projections do not include dead volume. The estimated dead volume available for salvage was provided by the LVI and the VRI.

District staff indicate that operationally, only 20 percent of deciduous species volume within coniferous-leading stands is typically harvested and the remaining 80 percent is left standing, in addition to wildlife tree requirements. This was reflected in the analysis by reducing the deciduous volume component of coniferous stands by 80 percent at time of harvest.

FAIB staff note that in the base case, approximately 28 percent of the stands on the THLB do not reach merchantable volumes and are not harvested by the model. An assessment showed these stands are primarily post-MPB stands with complex stand structures whose projected yields may not be well reflected by VDYP. In addition, the presence of the trees comprising the complex secondary stand structures that will experience growth release after the MPB epidemic is not well reflected by the LVI or the older VRI data. Staff expect that VDYP yield projections will be improved when the new VRI is completed and it provides improved information on the residual stand structures of post-MPB stands.

A sensitivity analysis was conducted to explore the timber supply impacts of uncertainty in the yield estimates for natural stands. If natural stand yields have been overestimated by 10 percent, mid-term and long-term timber supply would be 10.3 percent and 6.3 percent lower, respectively. Conversely, if natural stand yields have been underestimated by 10 percent, then mid- and long-term timber supply would be 10.1 and 2.6 percent greater than shown in the base case.

I have considered the information about natural stand yields and discussed it with FLNRO staff. The sensitivity analysis results show that mid-term timber supply is sensitive to uncertainty about yields from existing stands, as would be expected given the shortage of available timber supply in the mid term before managed stands are broadly available for harvest. In addition, I am aware of the significant proportion of the THLB that is covered in stands which never achieve harvestable volumes in the model. Although this may indeed be reflective of the capability of those stands on poorer sites, it is expected that some stands would reach merchantable volumes over time and be available operationally for harvest. In addition, after the first harvest, the sites would regenerate to productive stands supporting the longer term timber supply.

While I accept that the best available information was used for this analysis and that VDYP has provided the best available projection of yields from existing stands, I am aware that its limitations for yield projection for stands with complex stand structures has likely resulted in an underestimation of the mid- to long-term timber supply. I discuss this further under '**Reasons for Decision**'.

I encourage district staff to focus the Forests For Tomorrow (FFT) program on these stands, so as to better understand stand structures and yields and rehabilitate priority stands. I will discuss this further under '**Implementation**'.

- volume estimates for managed stands

Yield estimates for the managed stands in the Quesnel TSA were produced using Table Interpolation Program for Stand Yields (TIPSY) model version 4.3.

Management of forests in the TSA dates back to approximately 1959. To reflect this history of management, existing managed stands were defined as stands currently between 11 and 55 years of age. Stands 10 years of age or less were modelled as future managed stands, and the data from these stands was used to create the future managed stand yield tables.

Managed stands established with similar regeneration practices were grouped into analysis units based on data recorded in RESULTS. Data from free-growing surveys collected since 1993 was used in the formulation of existing managed stand yield curves. The curves for future managed stands were based on averaged regeneration survey data collected since 2003.

West Fraser in its input expressed concern about several of the assumptions for managed stands, including that analysis units should have been based on ecosystems, and that the use of managed stand yield tables for stands established shortly after 1959 would overestimate yields for those stands harvested using intermediate utilization, as this system resulted in the establishment of uneven-aged stands. FAIB staff responded that the limited quantity of RESULTS data available could not support aggregation at finer levels such as BEC subzone, elevation or slope. FAIB staff note that the Young Stand Monitoring Program (YSMP) is expected to provide better information about the variety of second growth managed stands so as to reduce the uncertainty in available growth and yield information.

The Lhoosk'uz Dene First Nation expressed concern regarding regeneration in the Kluskus area, and specifically the use of natural regeneration instead of planting. District staff concur that there are indications that licensees in the TSA are relying more on natural regeneration of harvested stands. This observation is not yet evident in the RESULTS data that was used to develop the managed stand yield curves for the analysis.

A sensitivity analysis was completed to explore the impact on timber supply if natural regeneration was assumed for all future mixed pine and spruce managed stands. New yield curves were produced to reflect the irregular stem spacing typical of naturally established stands, as well as the lack of genetic gains given that the stands were established from non-select seed. The results suggested that the mid-term timber supply would decrease by 13.4 percent and the long term by 15.8 percent. FLNRO staff note the timber supply impacts are exacerbated by the fact that it takes naturally regenerated stands an additional 15 years to reach 95 percent of culmination age (the age at which a stand reaches its maximum mean annual growth increment). This results in a shortage of stands available for harvest near the end of the mid-term period in the base case.

I have considered the information regarding managed stand yield estimates and discussed this information with FLNRO staff. I acknowledge the concern from the Lhoosk'uz Dene First Nation, and also note that the province monitors and enforces regeneration obligations to ensure they are met following harvest. In some cases, licensees may be using natural regeneration as an acceptable means of meeting regeneration obligations for some stands in the TSA.

I am very concerned that the results of the sensitivity analysis indicate that extensive reliance on natural regeneration for stand re-establishment following harvest is likely to significantly reduce the mid-term and long-term timber supply. I therefore strongly caution licensees to ensure that practices reflect the urgent need to re-establish stands quickly on harvested sites to enable a more robust mid-term and long-term timber supply. It is my expectation that following this determination district staff will monitor the practice of planting stands as compared to direct seeding or natural regeneration, as discussed under **'Implementation'**.

I expect district staff to work with licensees over the term of this determination to improve the quantity and accuracy of the data in RESULTS to ensure better alignment of all information available for the next timber supply review, as discussed under **'Implementation'**.

- *site productivity estimates*

The Provincial Site Productivity Layer (PSPL) is the standard source for site productivity information for managed stands for use in provincial timber supply reviews. For the Quesnel TSA, the estimates in the PSPL are derived from Site Index Estimates by Biogeoclimatic Site Series (SIBEC), based on the Predictive Ecosystem Mapping (PEM) work completed in 2008. This PSPL information was used in the base case to estimate managed stand yields. A site index adjustment (SIA) project completed for pine- and spruce-leading stands in 2009, was used in the development of site productivity information for the previous timber supply review.

Input received from West Fraser noted that in their opinion, the SIA data is local and more representative of the TSA and should have been applied in the base case. FAIB staff responded that the PSPL data is the standard data source for estimated managed stand site productivity in timber supply reviews and is considered the best available information.

FAIB staff note that YSM plot data has been collected by FAIB for the Quesnel TSA and the preliminary results suggest the site productivity is slightly underestimated by the PSPL data. Resource Practices Branch staff assessed the PSPL site index values during the development of the Type IV Silviculture Analysis for the TSA and found the values in the PSPL to be supported by RESULTS data.

I have considered the information about site productivity and discussed the information with district staff. For this determination, I am satisfied that the PSPL site productivity estimates used in the base case represent the best available information, and that their use is consistent with the provincial standard for consistency in timber supply reviews. Therefore I make no adjustments to the base case in this regard.

As noted above under '*managed stand yields*', the mid-term timber supply in the Quesnel TSA is very sensitive to the assumptions about the yields for managed stands as these stands support the mid-term harvest. Ensuring the site productivity information represents the growing potential of sites in the TSA is an important factor in estimating available mid-term supplies. I am comfortable that the ongoing collection of YSM data will continue to improve our understanding of managed stand growth.

Should future data confirm an underestimation in productivity, as suggested by the initial sample plots, or reveal that the PSPL does not adequately reflect local site productivity, the new information can be incorporated in future timber supply reviews. Any implications in mid-term timber supply can also be reassessed at that time.

- *genetic gains*

The *Chief Forester's Standards for Seed Use* provides direction to forest professionals about the use of genetically improved seed stock (class A seed) where it is available.

In the base case, genetic gains were applied to yield projections for future managed stands, defined as those stands 10 years of age or younger and stands regenerated in the future. The assumptions applied in the base case were derived from survey data as well as reported use of class A seedlots. Values for genetic improvement were applied to the yield projections for the lodgepole pine, spruce and Douglas-fir components of managed stands on an area-weighted basis. The values reflected the limited availability of improved Douglas-fir and lodgepole pine seed in practice.

District staff are satisfied that the assumptions for genetic gain represent recent practices in the TSA. However, they note that there is some uncertainty regarding the extent to which licensees are relying on natural regeneration. If practices shift from planted stock to natural regeneration, the assumed genetic gains will not be realized and the current projections of future timber supply could be overestimated. As well, stands established through natural regeneration tend to be composed of pure or nearly pure pine which varies from the regeneration species mixture assumed in the base case.

I have considered the information regarding genetic gain assumptions applied in the base case and discussed the assumptions and current practices with FLNRO staff. I am aware that long-term timber supply is contingent on the continued use of genetically improved planting stock. If the level of planting or the proportion of improved stock decreases from current practice then long-term timber supply will be lower than projected in the base case.

I expect licensees to monitor and report on the operational practices and the extent to which direct seeding and non-planting silviculture strategies are being relied upon for regeneration of stands and to make this information available at the time of the next timber supply review for the Quesnel TSA. This information will be used to formulate the regeneration assumptions used in the next timber supply analysis.

- minimum harvest criteria

A minimum harvestable volume and age are assigned to a stand based on the time required for the stand to accumulate volume and grow to a harvestable condition. These criteria are used to define when a stand becomes available for harvest in the modelling.

In the base case, a minimum harvestable volume of 110 cubic metres per hectare was modelled for all stands in conjunction with 95 percent of culmination age, the age at which the maximum mean annual growth increment would be achieved.

The minimum stand volume criteria assumed in the base case is lower than the 120 cubic metres per hectare applied in the previous timber supply analysis, which reflects the continuing trend towards harvesting lower volume stands in the TSA. The trend is evident in the appraisal data that show that operationally, the average volume harvested per hectare in the TSA has been decreasing since the peak of the MPB epidemic. Over that time, the average has decreased from about 280 cubic metres per hectare to 170 cubic metres per hectare. Staff suggest that this reflects the historic pattern that prioritized higher volume stands for harvest earlier in the MPB epidemic and the associated improvements in milling efficiency that occurred as harvesting transitioned to lower volume stands. Staff think that some of the decrease may also be attributed to higher proportions of defect volumes within harvested stands that are sold to secondary manufacturers and do not contribute to the AAC (see 'grade 4 and waste').

The minimum harvest volume criteria were derived from an analysis conducted by staff to compare VRI volumes to the stand volumes in cutting permit areas, that found the lower volume limit to be approximately 110 cubic metres per hectare.

Sensitivity analysis in which minimum harvestable ages were reduced by five years compared to the base case ages showed an increase of 5.8 percent in the mid-term timber supply but a 5.6 percent decline in the long-term level. Harvesting stands at younger ages assists with providing timber supply in the mid term, but reduces the longer term timber supply, due to stands being harvested prior to the trees achieving their maximum growth rate and thus the higher potential volume available from older trees.

Additional sensitivity analysis was conducted that demonstrated that up to 100 000 cubic metres per year of harvest could come from younger, live stands without impacting the timber supply. These results indicate that limited harvest of younger stands can occur without detrimental impacts to the longer term timber supply.

Input received from Nazbec, a joint venture between Pacific Bioenergy and Nazko First Nation, noted that the minimum volume criteria used in the base case results in the exclusion of some forest types from the THLB that historically would have been included in the THLB as problem forest types. They suggest spatially identifying these problem forest types and ensuring they contribute to timber supply even if they can only be utilized for biomass. FLNRO staff acknowledge the input from Nazbec, and

note that assumptions about forest types that are made in the analysis do not in any way limit the possible harvest of the sites, for biomass or other purposes.

The TNG expressed concern that two different measures of volume are used for sawlog and biomass. FLNRO staff responded that the volume of the biomass was modelled using the same volume measurements and merchantability specifications provided in the inventory for the stand prior to mortality.

Input from the Lhoosk'uz Dene Nation asked why 50-60 year old stands were targeted in the base case. FLNRO staff note that although some 50 – 60 year old stands were harvested in the base case, these stands were not specifically targeted. Stands in this age class were only harvested in the model if they had reached 95 percent of culmination age, i.e., the age at which stands have reached peak productivity.

Input received from a member of the public expressed concerns about the impacts to wildlife habitat of harvesting in forests at younger ages and questioned the ability of the forests to develop mature habitat properties by these ages. FLNRO staff acknowledge this concern and note that government has protected areas of mature forest through the establishment of areas reserved from timber harvesting, such as old growth management areas and wildlife habitat areas. These provisions were reflected in the base case.

I have considered the information about minimum harvestable ages and volumes, and discussed the information with FLNRO staff. I am aware that there are as-yet unsalvaged MPB-impacted stands on the THLB that would be considered unmerchantable under historic minimum volume assumptions. If these stands remain unharvested, they will not contribute to mid-term or long-term timber supply as the stands will fall below the minimum harvestable volume threshold after the dead stems in the stand have decayed and fallen over.

I note that it is critically important to the mid-term timber supply that salvage of these lower volume stands continues for as long as it is feasible. The stands that are harvested and rehabilitated now become productive stands that will reach maturity at the end of the mid term in the base case forecast. I caution licensees that discontinuing salvage operations in these stands and transitioning to harvest in stands unaffected by the MPB will both potentially reduce the mid-term harvest level as well as extend the length of the reduced mid-term period beyond what is projected in the base case.

For this determination, I accept the assumptions in the base case for minimum harvestable volumes and ages, and I encourage licensees to focus, to the extent possible, on the salvage of MPB-impacted stands. I discuss this further in '**Implementation**'.

Section 8 (8) (a) (ii) the expected time that it will take the forest to become re-established on the area following denudation:

No factors considered under this section require additional comment.

Section 8 (8) (a) (iii) silvicultural treatments to be applied to the area:

No factors considered under this section require additional comment.

Section 8 (8) (a) (iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area:

- utilization standards and compliance

The merchantable timber specifications define the maximum stump height, minimum top diameter inside bark (dib) and minimum diameter at breast height (dbh) by species, and are used to calculate merchantable volume.

In the base case, a 30-centimetre maximum stump height and a 10-centimetre minimum top dib were modelled for all species. This represents current merchantability standards, licence requirements for licensees and current operational performance. The minimum dbh modelled was 12.5 centimetres for pine and 17.5 centimetres for all other species.

To assess the sensitivity of timber supply to the minimum dbh utilized for non-pine species, a sensitivity analysis was completed in which all species were assumed to be utilized to 12.5 centimetres dbh. The analysis results suggested that mid-term timber supply could be three percent higher on this account.

Public input was received that expressed concern about harvest in very young 25 to 30 year old stands that should be retained to grow and contribute to future timber supply. Staff note that these stands may be MPB-impacted stands with a young secondary stand structure that is being harvested with the dead pine. I am aware that under FRPA requirements, secondary stand structure should be retained until the trees are of sufficient size and volume to meet minimum harvest age and volume criteria. District staff inform me that secondary structure assessments are required to be completed before stands are approved for harvest, and that a review of harvest records suggests a minimal area has been harvested to date in stands with ages less than 40 years.

The Nazko First Nation asked if economics were considered in relation to merchantability specifications. FLNRO staff respond that the economics of manufacturing lumber were considered in the development of these specifications.

Having considered the information about utilization and discussed the information with FLNRO staff, I make the following observations. If licensees were able to find a way to utilize all species to the same minimum diameters they are able to utilize pine, mid-term timber supply could be slightly greater than in the base case, as suggested by the sensitivity analysis results. I therefore encourage licensees to explore increasing utilization levels for other species where feasible.

I am also aware of the concerns expressed by district staff and members of the public about the harvest of younger live stands before culmination age. Apart from the obvious disparity between this practice and what we know to be sustainable forest practices, harvesting stands well before culmination age could have a detrimental impact to the long-term timber supply in the TSA. Therefore, it is my expectation that district staff will monitor the harvesting data to determine the level of harvest in young stands below culmination age to determine if this concern is substantiated by the data, as indicated under '**Implementation**'. If there are trends or concerns in this direction this information will be incorporated into the next timber supply review in order to ensure any impacts to timber supply are appropriately modelled.

Section 8 (8) (a) (v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production:

Integrated resource management objectives

The Ministry of Forests, Lands and Natural Resource Operations is required under the *Ministry of Forests Act* to manage, protect and conserve the forest and range resources of the Crown and to plan the use of these resources so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated. Accordingly, the extent to which integrated resource management (IRM) objectives for various forest resources and values affect timber supply must be considered in AAC determinations.

The entire area of the Quesnel TSA is encompassed by the Cariboo Chilcotin Land Use Plan (CCLUP) and subject to the forest management provisions established by government under this plan.

- landscape-level biodiversity

Objectives for the maintenance of old seral forests in the Quesnel TSA are met through old growth management areas (OGMAs) established under a Land Use Order (LUO) in 2010. The OGMAs were located with consideration for their overlap with areas to be managed for other resource values, including mule deer winter range, riparian reserves, critical fish habitat and wildlife habitat areas. Forest licensees must ensure that strategies described in their Forest Stewardship Plans (FSPs) are consistent with objectives in the LUO.

Three types of OGMAs were established in the Quesnel TSA: Permanent-Static, Permanent-Rotating and Transition. During the MPB epidemic, some conditional harvesting for control and abatement of the beetle was permitted in the Permanent-Static and Permanent-Rotating OGMAs, but is no longer permitted. Transition OGMAs with greater than 50 percent dead volume are still available for salvage harvest under the LUO until 2030, after which point they will revert to being entirely available for harvest.

In 2015, a boundary reconciliation project was carried out to account for BEC unit boundary changes and salvage harvesting that had occurred within the OGMAs. As well, remaining Permanent-Rotating OGMAs were converted to Permanent-Static. A Ministerial Order in October 2015 amended the land use order and made the revised boundaries legal.

In the base case, 83 881 hectares of OGMAs were excluded in the derivation of the THLB. These OGMAs were the Permanent-Static and those previously classified as Permanent-Rotating. Old seral targets were deemed to be fully met by these OGMAs as well as through parks and other no harvest areas under the CCLUP.

In 2004, the Cariboo Interagency Management Committee approved non-legal direction to allow temporary draw down of the mature plus old seral targets, to facilitate salvage of MPB timber. The direction included a strategy for recruitment to restore the area reserved for mature plus old targets to the requisite levels. There are 16 landscape unit/BEC units in the TSA that are in deficit relative to the legal targets.

Input received from TNG noted that stand rehabilitation is acceptable as being a second priority after salvage harvest, but should not be placed at a higher priority than non-timber values. They requested confirmation that no stand rehabilitation would occur until after salvage is complete for a landscape unit, and a seral-stage analysis consistent with the CCLUP Land Use Order has confirmed that a surplus of the applicable seral stage exists. FLNRO staff respond that in the timber supply forecasting, all harvest must meet the non-timber objectives as summarized in the data package, including the seral-stage objectives of the CCLUP Land Use Order. They also note that the current reforestation

strategy under the Land Based Investment Program prioritizes stand rehabilitation, based on the potential for salvage and natural regeneration.

As well, TNG expressed concern in the ability of the inventory to represent the actual seral condition of the forest following the MPB outbreak. FLNRO staff acknowledge that the MPB epidemic has drastically altered the composition of the stands in the TSA, and that the resulting uncertainty around stand composition post-MPB has been mitigated by using LVI data for those portions of the TSA most impacted by the MPB. Staff note that the instances where an entire stand was killed by MPB where the remaining stems would be considered early seral in photo interpretation were rare, and that where this did occur, it would be reflected in the analysis through the modelling of seral-stage objectives.

TNG also asked why OGMA areas can be harvested. FLNRO staff note that harvesting in OGMA is limited, but is dependent on the classification of the OGMA. Any harvesting that has occurred has been for forest health reasons and in general is permitted only when in accordance with the Land Use Order and approved FSPs for forest health, where “harvesting is essential for insect control to curtail severe damage to forest values at the landscape level in a beetle management unit (BMU) classified as suppression for that insect”. As noted above, in transition OGMA, harvest may also occur if “conifer mortality exceeds 50 percent of stand basal area in the transition OGMA”. Permanent-Rotating OGMA were intended to rotate through the landscape, but have now been converted to Permanent-Static OGMA.

I have considered the information regarding the assumptions in the analysis to account for landscape-level biodiversity values and discussed the information with district staff. I am satisfied that the base case assumptions reflect current practices. However, I am aware that the impact of the MPB epidemic on the areas reserved to provide for these resource values is a source of uncertainty and it is not clear whether the biodiversity and wildlife values of old forests are being provided by the areas.

As described under ‘**Implementation**’, I expect FLNRO staff to assess the areas currently reserved as OGMA to determine if these areas on balance reasonably reflect the expected attributes for old forest for the natural disturbance types found in the Quesnel TSA. As well, I request that FLNRO staff explore the possibility of spatializing the areas currently delineated as Permanent-Rotating so as enable them to better meet the requirements for recruitment areas.

- *scenic areas*

Visual resource management includes identifying and classifying scenic landscapes, and managing forestry activities on the landscape to meet the needs of the public, visitors and other resource users. The management of known scenic areas is guided by visual quality objectives (VQOs) that were established under the CCLUP order. The visually sensitive area in the TSA comprises 66 144 hectares or 6.5 percent of the THLB.

Commitments to manage for VQOs are included in the licensee’s FSPs.

In the base case, visual resource management requirements were modelled using values for VQOs recommended in *Procedures for Factoring Visual Resources into Timber Supply Analyses* (1998). The total area in a disturbed state following harvest was limited within each visual polygon in order to reflect how landscapes are managed operationally.

FLNRO staff have reviewed current performance in visual management using data available through Forest and Range Evaluation Program (FREP) monitoring and two FLNRO Compliance and Enforcement cases. The review indicates that disturbance limits have been exceeded for approximately 40 percent of the areas in retention and partial retention VQOs and 19 percent of the areas in modification VQOs. FLNRO staff confirm that, as in other areas of the province severely impacted by the MPB outbreak, the limits on the area disturbed in visually sensitive areas were not

enforced throughout the majority of the MPB outbreak period. For areas where disturbance limits were exceeded, licensees were required through their FSP commitments to complete an assessment under FRPA.

New field data has been acquired for the visual landscape but has not yet been included in the inventory of visually sensitive areas.

Several sensitivity analyses were conducted to assess the implications to timber supply of changing the assumptions for the management of scenic areas, such as increasing or decreasing the maximum disturbance percentages allowed in the visually sensitive areas. Results indicate that timber supply is not overly sensitive to changes in the assumptions.

West Fraser requested that all visually sensitive areas be modelled at the lowest visual absorption capability, due to the opinion that visual impact analysis work has a high degree of subjectivity. The results of a sensitivity analysis in which all visually sensitive areas were modelled with a low visual absorption capability showed mid-term and long-term timber supply would be reduced by 1.1 percent and 0.9 percent, respectively.

District staff indicate that the base case assumptions for the management of visually sensitive areas were an appropriate reflection of legal requirements under FRPA. However, the assumptions did not reflect the exceptions made in recent years to allow salvage harvest of the MPB-impacted stands in visually sensitive areas. Staff note that such exceptions will no longer be made now that the salvage is nearing completion.

I have considered the information regarding the management of visually sensitive areas. I note that timber supply is not overly sensitive to adjustments in the requirements as seen in the sensitivity analysis results mentioned above, likely due to the small size of the area relative to the remainder of the TSA. However, I note that there is likely to be a small impact to the short- and mid-term timber supply as a result of restricted harvest in the visually sensitivity areas where the disturbance levels have been exceeded, until the disturbed area recovers to allowable limits.

I acknowledge that licensees have technically met the requirements under FRPA for areas in which disturbance limits have been exceeded through their completion of assessments. However, with the end of the MPB epidemic, it is my expectation that licensees will adhere to visual quality objectives and maximum disturbance rates as required under FRPA, and request that they work to return these areas to the desired state through the development of a plan to meet visual quality objectives over time.

- adjacency, cutblock size and patch size

Adjacency and cutblock size restrictions under FRPA Forest Planning and Practices Regulation (FPPR) Sections 64 and 65 require that recently harvested areas must achieve a desired condition of green-up before nearby or adjacent areas can be harvested. As well cutblocks must be less than 60 hectares in total size. Currently licensees in the Quesnel TSA are exempt from these requirements for a number of reasons. Some licensees have provided strategies in their Forest Stewardship Plans to emulate natural disturbance patterns. Under current practice, cutblocks are typically established with boundaries that follow natural contours and wildlife tree reserve areas protect areas that are less frequently disturbed by natural processes, such as riparian reserves. Licensees are allowed an exemption under Section 12.4 of the FPPR if harvesting activities are emulating natural disturbance patterns, even if not explicitly committed to in the Forest Stewardship Plan.

District staff note that the majority of harvest over the past 10 years has been in MPB-damaged stands. Section 64(2) of the FPPR exempts agreement holders where timber harvesting is being carried out to recover trees damaged by fire, insect infestations, wind or other similar events.

The CCLUP intended that objectives for landscape-level biodiversity attributes including spatial adjacency be established. The Higher Level Plan Order can be interpreted to bring legal effect to targets and strategies for these other landscape-level biodiversity attributes. However, implementation of the CCLUP did not include establishing sufficiently descriptive parameters to these attributes in a manner that would operate as objectives set by government.

In the base case, to reflect current practice, block size and adjacency restrictions were not modelled. The potential effect of enforcing adjacency requirements on timber supply was approximated by a sensitivity analysis in which a limit was placed on the total area of the THLB that could be in a disturbed condition within each landscape unit. Restricting the disturbed area to no more than 25 percent of the THLB throughout the forecast suggested that mid-term timber supply would be reduced by 3.5 percent and long-term timber supply by 4.2 percent.

District staff indicate that the modelling assumptions applied in the base case are reflective of current practice.

Input received from West Fraser stated that patch size targets should have been modelled in the base case to show consistency with the CCLUP spatial constraints. District staff note that patch size assessments were discontinued over the course of the MPB epidemic and replaced with reliance on stewardship and emulation of natural disturbance patterns. Staff also note that the majority of the salvage harvest of MPB-impacted stands occurred in stand types where historic natural disturbances have resulted in a patch size distribution comprised of large patches.

I have considered the information about patch size and adjacency and discussed it with FLNRO staff. I note that regulating patch size distributions is a potential strategy to achieve targets in the CCLUP. As indicated under **'Implementation'**, with the MPB epidemic now subsided and salvage harvest nearing completion, I expect district staff and licensees to update the patch size distribution information so that it can guide operational practices across the TSA. The Quesnel TSA is now in transition from the MPB era to the future and it is timely to rehabilitate the forest to reflect all the values desired for the TSA.

Any additional information that becomes available about the implications to timber supply of emulating patch sizes distributions can be incorporated into the next timber supply analysis.

- mule deer winter range

Mule deer winter range (MDWR) boundaries were legally designated as ungulate winter range (UWR) in 2004 under the Government Action Regulation (GAR), and general wildlife measures (GWM) were established under GAR in 2007. Mule deer winter ranges cover 1.2 percent of the THLB in the Quesnel TSA.

Objectives and strategies for the maintenance of MDWR are included in the CCLUP, including the *CCLUP Integration Report* (1998) and in the Identified Wildlife Management Strategy (1999).

Mule deer winter range areas are to be managed to maintain and promote Douglas-fir and maintain or enhance the number of large, old trees that provide the best snow interception and litter fall essential to wildlife habitat. Two variants of the selection system are prescribed for MDWR areas. Small group selection systems are used in the transition and deep snowpack zones, and clumpy single tree selection systems are used in the shallow and moderate snowpack zones. Silviculture must enhance the amount of Douglas-fir in the stands, relative to the composition of the stands pre-harvest. Those stands without a component of Douglas-fir are to be managed under a clearcut with reserves silvicultural system.

District staff confirm that harvesting in the MDWR is currently limited to a small amount of sanitation harvest for Douglas-fir bark beetle. This is likely a result of the focus on salvage harvest and is expected to change in the future.

In the base case, the selection harvesting systems specified for each of the snowpack zones and stand structure habitat classes in the MDWR were modelled by regulating the amount and timing of harvest. The assumptions used were developed under the guidance of the regional land and resource specialist with expertise in the regional MDWR strategy.

The TNG asked if clearcutting in MDWR was allowed. FLNRO staff respond that only patch cuts are allowed in these areas, depending on the quality of the MDWR provided by the area.

Having considered the assumptions applied in the base case to account for mule deer winter range, I am satisfied that the assumptions reflect the requirements under the CCLUP intended to protect the habitat values for mule deer. I expect district staff to work with licensees to ensure the appropriate management in mule deer winter range is conducted over the term of this determination.

- caribou habitat

Woodland caribou are a threatened species and of special concern within the Quesnel Natural Resource District and the TSA. Mountain and Northern Caribou are subspecies of Woodland Caribou.

The habitat boundaries for the Northern Caribou herd in the TSA, known as the Itcha Ilgachuz herd, were legally designated as wildlife habitat areas (WHA) in 2004. General wildlife measures were established in 2005 and amended in 2011 under GAR. Mountain Caribou habitat boundaries and GWMs were legally enacted in 2009.

In the base case, the habitat requirements for Mountain and Northern Caribou subspecies were modelled in accordance with the CCLUP Caribou Strategy, the *CCLUP Integration Report*, and the management recommendations of the Mountain Caribou Strategy and the Northern Caribou Strategy.

The caribou WHAs designated as restricted from harvest were reserved from the THLB. In addition, an area totalling 25 percent of the WHA allowing enhanced conventional harvest was also excluded.

For the caribou WHAs where harvesting is permitted, there are general wildlife measures prescribing objectives that must be met during timber harvesting and forest management activities. The measures related to harvesting specify the use of group selection, irregular shelterwood, or clearcut with reserves silvicultural systems. In the base case, the silviculture systems were each modelled by regulating the amount and timing of harvest.

Public input commented that the Northern Caribou modified harvest WHA was amended to create the enhanced conventional WHA during the time of MPB salvage. The public input noted that now that the salvage is nearing completion, this WHA needs to be returned to a modified harvest designation to meet the habitat needs for breeding and winter range for the caribou. In response to this input, FLNRO staff note that area was added to the modified harvest WHA (#5-086) to account for areas that changed designation from modified to enhanced conventional areas (new WHAs #5-872 and #5-873).

First Nations observed that caribou migrations have been changing and they were uncertain of the reason. FLNRO staff note that caribou are easily disturbed and although there was some harvesting activity in the habitat areas more than five years ago, due to MPB salvage, harvest planning and activity has increased recently in the WHAs. They note that the Caribou Committee is conducting ongoing research in these areas and will monitor effects on caribou herds. FLNRO staff inform me that licensees are meeting the legal requirements operationally for caribou.

I have reviewed the information regarding the modelling assumptions to account for caribou habitat and discussed them with FLNRO staff. I am satisfied that the legal requirements for managing the needs of caribou present in the Quesnel TSA were appropriately reflected in the analysis and I make

no adjustments in this regard. I recognize licensees for their practices that meet the legal habitat requirements for caribou, and encourage increased consideration wherever possible to preserve or enhance habitat so as to ensure practices are fully aligned with the intent of the general wildlife measures. As well, I support the ongoing work of the CCLUP caribou strategy committee and encourage the committee and licensees to continue to work together to ensure activities support habitat needs of the caribou.

- other wildlife habitat

In addition to those wildlife habitat areas established for mule deer winter range and caribou, as discussed previously, the Quesnel TSA has established wildlife habitat areas for American White Pelican and Blue Heron.

Blue Heron core habitat areas as well as the management area buffer defined by GWMs in the WHA were excluded during the delineation of the THLB.

Two lakes in the TSA are important pelican feeding lakes. The WHA for American White Pelicans were established under a GAR order that describes GWMs limiting new permanent forest service roads and restricting access by season. There was no explicit accounting in the base case to reflect this GWM as the requirement only restricts access by season.

High value wetlands in the TSA for moose require site specific management actions under the LUO. Harvesting systems must retain sufficient vegetation to provide security and thermal cover for wintering moose adjacent to identified high value wetlands.

District staff believe that the variety of other reserves and management zones adjacent to wetlands, including OGMAs, wildlife tree reserve areas, critical fish habitat areas, riparian reserves and management zones, in combination with operational retention of shrub and immature tree layers, meet these requirements for moose. In the base case, there was no additional explicit accounting for moose.

No grizzly bear WHAs have been established in the Quesnel Natural Resource District. Areas of critical grizzly bear foraging habitat requiring protection and site specific management actions were identified under the LUO. In particular, the LUO specifies retention of security cover adjacent to critical foraging habitat such as salmon and trout spawning reaches and shoals as well as herb-dominated avalanche track and run-out zones on southerly and westerly aspects.

District staff believe the requirements for grizzly bear are addressed through other reserves and retention that are adjacent to critical foraging habitat. No additional explicit accounting for grizzly bear habitat management was done in the base case.

Public input commented that winter range and breeding ground designations for moose and mule deer is paramount to survival of both species.

First Nations requested an assessment of the adequacy of the protection of thermal cover for moose considering both the habitat area lost from the increased rate of salvage harvesting as well as the crown closure lost in stands where the overstorey has been impacted by MPB. The Nazko First Nation expressed concern about moose breeding grounds and provided a map of moose range and breeding grounds within their traditional territory. FLNRO staff note that a portion of the area of moose habitat overlaps with existing caribou habitat, and the requirements to manage for moose habitat and caribou habitat are complementary to one another. The Lhtako Dene Nation requested that the future identification and mapping of reserve areas for WHAs for northern caribou be done in consultation with the Nation so as to ensure valuable input regarding traditional ecological knowledge of the caribou is included. FLNRO staff commit to continuing to include First Nations in planning.

District staff indicate that they think that the GWMs for the established WHAs as well as requirements for moose and grizzly bear as outlined under the CCLUP, have been appropriately reflected in the base case. However, there is concern about the declining moose populations in the TSA, and whether the existing requirements for management of their habitat are adequate for maintenance of the populations. The salvage harvest resulted in greater access across the land base through roads which has increased hunting and predation of moose and potentially impacted their use of historic travel corridors.

I have considered the information regarding the accounting in the base case for wildlife, and accept that the management requirements as legally established including requirements under the LUO were reflected. In light of the concerns regarding moose management, especially considering the post-MPB forest condition in the TSA, I expect licensees, district and regional staff to work together with First Nations to ensure that the most up-to-date information on moose management is continuously incorporated into operational plans.

- recreation and historic trails

The LUO identifies regionally important trails and defines a 50-metre management zone on either side of trails. As specified in the LUO, at least 85 percent of the current forest basal area must be maintained in the buffer zone.

In the base case, this requirement was approximated by excluding 85 percent of the management zone area from the THLB.

The Nuxalk-Carrier Grease Trail (formerly the Alexander Mackenzie Heritage Trail) is recognized and protected under the *Heritage Conservation Act*. The trail was designated through an order in council in 1987, and is managed in accordance with a June 1993 Management Plan, which requires a 200-metre buffer zone along the trail. This buffer was inadvertently not accounted for in the base case.

District staff conducted an assessment that indicated that accounting for the buffer would have resulted in the exclusion of 979 hectares of THLB, which represents about 0.1 percent of the total THLB. However, discrepancies between the LUO trails dataset and the one used to conduct the district assessment suggest that the THLB impact is significantly less than 979 hectares. Given the magnitude of the overestimation, I will make no adjustment to the base case on this account. I also note that inclusion of the buffer area in the THLB used in the timber supply analysis does not affect how this area will be managed.

Staff inform me that the areas retained around trails, in particular the Nuxalk-Carrier Grease Trail, have not been evaluated for their potential to contribute towards OGMA requirements. In consideration of this, as indicated under '**Implementation**', I expect staff to inventory the stands covered by the 200-metre trail buffer to determine what area, if any, might be suitable for OGMA retention. The inventory would also provide improved information for use in the next timber supply review. I also expect district staff to ensure better consolidation and alignment of the conflicting trails information sources for the next timber supply review.

- cultural heritage and archaeological resources

Archaeological values, which are managed under the *Heritage Conservation Act*, and archaeological sites include physical evidence of how and where people lived in the past.

The *Forest Act* defines cultural heritage resources (CHR) as an object, site or location of a traditional societal practice that is of historical, cultural or archaeological significance to British Columbia, a community or an aboriginal people. CHRs are managed through FRPA. CHRs include traditional use features that are associated with past and current aboriginal use, and include hunting grounds, fishing areas, travel corridors and camp/seasonal village sites. These are predominately found along major water courses in the TSA, although they can be found inland. Other traditional use sites that First

Nations have indicated are within the TSA include spiritual sites, battle sites, gathering sites for berries or medicinal plants, and burial sites.

The Quesnel TSA archaeological overview assessment (AOA) is used as a coarse filter approach to assessing the potential of archaeological sites that may be in specific areas in the TSA. Most areas believed to be high to moderate potential areas are located near and around water bodies such as lakes, creeks and wetlands. In operational practices, FLNRO staff note that known archaeological sites tend to be incorporated within riparian reserve areas or wildlife tree retention areas. Due to the overlap with areas already excluded from the THLB no additional reductions were applied to explicitly account for CHRs.

Major licensees include in Forest Stewardship Plans results and strategies to detail how they intend to address cultural heritage values that become known during operations. Accommodations offered by licensees include creation of wildlife tree retention areas or other reserves, modification of cutblock boundaries, stubbing (a process of cutting high stumps) of culturally modified trees (CMTs) or stubbing trees along aboriginal trails.

Input received from the Lhtako Dene Nation recommended that additional area should have been excluded from harvest in the modelling to account for CHRs. Input received from the Saikuz First Nation asked about how the timber supply review would impact wildlife, riparian areas, berries, medicinal plants and water. The Ulkatcho First Nation expressed that their members have the right to hunt, fish, trap, gather and use the lands for ceremonial and spiritual purposes and expressed the concern that the AAC levels have the potential to impact their ability to exercise those rights.

District staff note that additional specific information regarding cultural practices including where and how First Nations conduct these practices would be a valuable input for operational planning. With regards to the Lhtako Dene Nation input, staff note that available Traditional Use Studies (TUS) information indicates many areas are expected to fall within protected parks or within lakeshore management areas around lakes that also require reserve zones. Staff believe that accommodation to account for CHRs typically involves co-location of reserves for other values with CHR values and does not additionally impact timber supply.

Having considered the information regarding cultural heritage and archaeological resources and discussed the information with FLNRO staff, I am satisfied that the base case assumptions reflect current practices, and that these resource values are being appropriately managed for at the operational level. I encourage First Nations and district staff to continue to work together with licensees to ensure sharing of all information available to support the ongoing protection of cultural heritage and archaeological values.

Section 8 (8) (a) (vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber:

Harvest performance

Over the past decade, harvest levels in the TSA have not reached the level of available AAC. This has resulted in a total of approximately 4.5 million cubic metres of potential harvest that has accumulated since the AAC apportionment following the 2011 determination for the Quesnel TSA.

District staff note that in recent years, licensees have communicated an intention to move away from targeting MPB-killed stands and focus on live and non-pine timber. Harvest data shows that since 2013, the harvest rate in the TSA has begun to decline to levels below 3.0 million cubic metres per year.

I have considered the information regarding harvest performance in the Quesnel TSA and discussed it with FLNRO staff. I am aware that in the base case, an initial harvest level of 4 000 000 cubic metres per year was maintained for five years, and was comprised of 3 280 000 cubic metres of salvage volume from dead pine stands as well as a 720 000 cubic metres per year harvest of live volume ('live volume bycatch'). The temporary uplift for salvage was then removed and dead pine stands were no longer prioritized for harvest, resulting in the harvest declining to the mid-term harvest level of 1 617 000 cubic metres per year.

Corresponding sensitivity analysis results indicate that extending the salvage harvest of dead pine stands where feasible can result in a higher long-term harvest level than shown by the base case due to the conversion of poorly stocked, dead stands to productive regenerating stands on these sites. As mentioned elsewhere in this document, I encourage harvest and conversion of dead pine stands wherever possible. I am also aware that sensitivity analysis results showed that timber supply is reduced in the mid term if operations vary greatly from the base case assumption that harvesting will focus on dead pine salvage in the short term. With this in mind, and as indicated under '**Implementation**', it is my expectation that district and regional staff monitor harvested volume from non-pine, live pine and dead pine stems. Should this monitoring identify any concerns regarding contributions that vary greatly from what was assumed in the base case, I request that I be notified so as to assess implications to timber supply.

I will discuss my consideration of current harvest performance in '**Reasons for Decision**'.

- grade 4 and waste

To encourage utilization of Grade 4 logs and limit the amount of timber left in the bush, Section 17(6) of the Cut Control Regulation allows licensees to apply for a cut control credit for any Grade 4 log shipped to a facility other than a sawmill or veneer plant. Although such logs can support secondary manufacturers such as pulp, chipping and pellet plants, timber harvested as Grade 4 is not included within the cut control of a forest licence. Therefore, the use of Grade 4 credits can result in a rate of harvest higher than the AAC.

There is currently no restriction or cap on the volume of Grade 4 cut control credit in the Quesnel TSA. Very little Grade 4 credited volume had been harvested until the most recent two-year period, when the volume increased from essentially zero to approximately 25 000 cubic metres and then 130 000 cubic metres. Although not yet demonstrated to be a significant issue, district staff are concerned that the use of the Grade 4 cut control credit could result in over harvesting the AAC and adversely impact mid-term timber supply. The FLNRO *Draft Quesnel Natural Resource Area Fibre Strategy* suggests that the Minister place a cap on the Grade 4 cut control credits of 100 000 cubic metres per year. I agree with this recommendation and expect district staff to monitor the level of Grade 4 credits and to report to the chief forester if the level continues to exceed 100 000 cubic metres per year, as indicated under '**Implementation**'.

License holders are required to perform waste assessments in accordance with the *Provincial Logging Residue and Waste Measurement Procedures Manual*. District staff indicate that operations within 80 kilometres of Quesnel employ excellent practices and little waste is left on site. Higher levels of waste were observed in harvest operations more distant from Quesnel presumably due to higher operating costs. The majority of harvest over the last five years has been conducted under cruise-based cutting permits to facilitate MPB-salvage, and as such all of the stand volume is assumed to be accounted for within the AAC and waste reporting is not required.

District staff anticipate that there will be a shift to scale-based permits as harvesting shifts from the salvage of dead pine to the harvest of live pine and non-pine stands. Scale-based permits require post-harvest waste assessments and district staff are concerned about the poor accuracy of ocular waste assessments, as suggested by studies done in other TSAs. Due to the potential implications for timber

supply in the Quesnel TSA, I expect district staff to monitor the potential shift from cruise-based permits to scale-based permits and their associated waste assessments, and conduct a study on the levels of waste in the district. The resulting information can be used to inform the next timber supply review for the TSA. I will discuss this further under ‘**Implementation**’.

First Nations considerations

The Crown maintains a duty to consult with and accommodate, as necessary, those First Nations for whom it has knowledge of claimed Aboriginal rights and/or title (Aboriginal Interests) that may be impacted by a proposed decision, including strategic level decisions such as AAC determinations. The AAC determination as a strategic decision sets the stage for other decisions such as AAC apportionment and disposition, leading to issuance of cutting authorities. AAC determinations do not determine particular harvesting areas or patterns, and as a result do not relate directly to the manner in which timber is utilized or managed on the ground. The relationship to claims of Aboriginal title is not a direct one. The AAC considers the sustainable harvest level from a particular geographic area which may include lands claimed as Aboriginal title lands but not yet declared by a court to be such. While under claim, such lands remain Crown lands and are considered to be part of the harvestable land base. Whether timber is actually ultimately harvested from those lands is an issue that is subject to allocation decisions, and the AAC determination does not determine that matter.

In the case of Aboriginal rights claims, the overall AAC can affect various resource values on which First Nations may have or still do rely in the exercise of such rights. Information gained through consultation with potentially affected First Nations about Aboriginal rights claims has been taken into account in the development of this determination.

There is a diverse Aboriginal history in the Quesnel TSA with several overlapping asserted territories. Thirteen First Nation communities fall within the Quesnel TSA, including the Nazko First Nation; Lhoosk’uz Dene Nation (Kluskus Band); Lhtako Dene Nation (Red Bluff Band); ?Esdilagh (Alexandria (Tsilhqot’in Nation)); Tl’etingox (Anaham (Tsilhqot’in Nation)); Tsi Del Del (Alexis Creek Band (Tsilhqot’in Nation)); T’exelc (Williams Lake Indian Band); Ulkatcho First Nation; Saik’uz First Nation; Skin Tyee First Nation; Lheidli T’enneh Band; Xats’ull First Nation (Soda Creek Indian Band); and the Cheslatta Carrier Nation.

First Nations consultation was undertaken as per the Haida consultation spectrum and consistent with Forest Consultation and Revenue Sharing Agreement (FCRSA) or Strategic Engagement Agreement (SEA) consultation requirements. Consultation was undertaken at a deeper level with bands that have stronger interests within the TSA with additional engagement through meetings, including discussions about the TSR process.

Consultation was conducted with all First Nations whose traditional territories overlap the Quesnel TSA on the timber supply review and the AAC determination. Many of the First Nations in the Quesnel TSA are signatory to a Forest Tenures Opportunity Agreement (FTOA) with the Province, which results in either a Replaceable Forest Licence (RFL) or a First Nations Woodland Licence (FNWL). All First Nations are signatories to a Forest Consultation and Revenue Sharing Agreement (FCRSA), Strategic Engagement Agreement (SEA), or an interim Forestry Revenue Sharing Agreement with the Province of BC.

Consultation on the Quesnel timber supply review commenced December 15, 2014 with an initial information sharing package that included information about the timber supply review consultation process. This was followed by consultation on the data package initiated in April – June 2015, and consultation on the discussion paper initiated in May 2016.

Several First Nations responded to the data package and the discussion paper consultation letters. Concerns and comments received from First Nations included those related to wildlife; available data including inventory data; cumulative effects; rehabilitation of stands; forest health factors; cultural heritage resources and Aboriginal Interests including impacts to wildlife, riparian areas, berries, medicinal plants and water; partitions; and, access to tenures and volume.

Consultation ended in July 2016, although conversations continued up until the determination meeting in Quesnel at the end of September. As with other decisions I was willing to consider any new information provided to me before I completed my determination. Meetings were held with specific First Nations in September 2016 and additional correspondence was received in late 2016 and early 2017.

Discussions with First Nations included a range of topics such as scope and extent of Aboriginal Interests and how they might be affected by an AAC determination; lack of meaningful consultation, mitigation and accommodation measures; the need to improve available information about First Nations cultural values and the processes used to manage culturally sensitive sites; and increased access to wood fibre and economic benefits associated with timber. I note that where the information, concerns or recommendations I received are within my authority as chief forester, I have considered them in my AAC determination. Where the information, concerns or recommendations are outside of my authority, I have endeavoured to share the information, concerns or recommendations with the appropriate decision makers.

I have considered the information received from First Nations and, where appropriate, I have addressed these concerns in my decision. Some concerns were identified that are not within my authority under Section 8 of the *Forest Act*, and other concerns were identified that are being or can be addressed operationally.

I have reviewed the information regarding the consultation undertaken with First Nations and discussed it in detail with district, regional and branch staff. I am satisfied that the consultation was conducted appropriately and that reasonable efforts were made by district staff to engage and inform First Nations in the timber supply review process, collect information regarding their interests and understand how these may be affected by the AAC determination. If new information regarding First Nations' Aboriginal Interests becomes available that significantly varies from the information that was available for this determination, I am prepared to revisit this determination sooner than the 10 years required by legislation.

Cumulative effects

In its 2007 decision on *William*, the BC Supreme Court ruled that decision makers must consider credible information on wildlife values associated with First Nations rights and needs (e.g., hunting, trapping, fishing and in the case of the Tsilqot'in, trading), and the potential implications of the decision on wildlife and First Nations' needs. The Government of BC has supported implementation of the Cumulative Effects Framework (CEF) that aims to provide relevant information and supporting policy for decision-making needs. The timber supply review process has leveraged CEF wildlife value assessments to provide information to meet the requirements outlined in the *William* decision. For the Quesnel TSA, the CEF focused on the resource values of fish habitat, landscape-level forest biodiversity and marten.

The cumulative effects assessment looked at the current condition of each resource value, the trend since 2003 and the potential future effects of resource development on the value. The reference points for interpreting value conditions were based on government expectations found in guidance, best management practices or policy. Information presented included both direct effects (e.g., amount of area affected by timber harvest) and indirect effects (e.g., spatial pattern of harvest, future impacts from road development) that may result from the harvesting at the base case level.

The cumulative effects assessment findings indicate that for forest biodiversity, there has been a significant decline in the amount of old and mature forest in the TSA over the last decade. However, when averaged at the biogeoclimatic (BEC) subzone scale across multiple landscape units, the amounts of old and mature forest remain consistent with expected historical range of variation (HRV) estimates. In some landscape units, salvage harvesting of MPB-impacted timber has led to deficits relative to targets for old and mature forest. This potentially impacts biodiversity as well as species dependent on old and mature forest. Concerns related to deficits of old and mature forest are exacerbated by the fact that upper thresholds on early seral forest area have been exceeded, particularly in the central part of the TSA. This has occurred both in areas where old and mature objectives are met or are in deficit, and the proportion of early seral forest has exceeded CCLUP guidance targets and is beyond expected HRV estimates. The forest condition in effect creates a hostile environment for some species dependent on old and mature forest, and is believed to be unable to sustain some species like woodland caribou and American marten.

Provision of adequate habitat for American marten is intended to be met through forest biodiversity objectives and CCLUP seral guidance targets. The cumulative effects habitat assessment results suggest that forest harvesting to salvage MPB-killed pine in the last decade has reduced the amount, quality, number of potential territories, and connectivity of marten habitat in all portions of the TSA, with the greatest potential impact in the central portion of the TSA. Again, the effect of significant increases of early seral forest has reduced the effectiveness of old and mature forest by fragmenting or isolating old and mature forests between patches of unsuitable early seral forest. Assessment results are further supported by a structured survey of trappers that operate within the TSA. The majority reported poor trapping conditions and decreased numbers of marten. Trappers also verified current habitat suitability and capability ratings from the assessment within their operating areas.

Regional staff are currently working to refine the expectations for forest licensees to develop strategies to maintain and recruit habitat in heavily impacted landscape units. Ideal consideration for marten is to manage towards forest seral requirements recommended by CCLUP. In situations where this is not possible, unsalvaged dead pine, in combination with some non-pine overstorey and understory trees can benefit American marten now and in the near future. In addition, large amounts of coarse woody debris retained in early-seral landscapes (e.g., not burning waste piles) also benefits marten.

For fish habitat, two distinct assessments were undertaken, current condition and 10-year historic trend, as well as future looking scenarios compared to the base case. Assessments evaluated the trends of indicators associated with riparian function, streamflow effects and excessive sedimentation, all related to the condition of fish habitat. Assessments were applied at the large watershed scale and were consistent with the intent of CCLUP objectives for hydrologic sensitivity, salmon and trout.

Although the CCLUP identified specific watersheds important for fish habitat, the assessments looked at all watersheds to ensure alignment with the extent of First Nation Aboriginal Interests. The results of the current condition and 10-year historic trend assessments indicate that in 15 of the 19 large watersheds, risks of impaired riparian function and elevated streamflow-related effects on fish habitat have increased in the last decade, with a significant extent of high risk for the watersheds in the central portion of the TSA. Hazards driving the increased risk were associated with harvesting near streams as well as increases in equivalent clearcut area (ECA). The Cottonwood watershed, a hydrologically sensitive system, has exceeded ECA levels of concern identified by CCLUP; however, there has been improvement in hydrological recovery in the Cariboo watershed. The assessment did not find that indicators associated with sedimentation (e.g., road density, roads near streams) were an issue, possibly due to the broad scale of analysis and/or morphology of the watersheds. Known sedimentation issues from historic and contemporary placer mining were not assessed and staff note this would be an additional hazard to consider.

The assessment results suggest that watershed conditions and fish habitat risk are likely inconsistent with CCLUP objectives to manage for trout in the Blackwater, for restoration of fish habitat in Baker Creek, for salmon in select watersheds and for hydrological stability in the Cottonwood system. Staff note that the CCLUP objectives for watershed condition, salmon and trout likely require clarification and refinement. Staff note it would facilitate operational planning and practice to clarify the CCLUP objectives and related expectations for watershed condition, salmon and trout.

Three future looking scenarios investigated the potential impact of the area harvest projected in the base case on indicators (e.g., ECA) associated with streamflow-related effects on fish habitat. Potential future effects of timber harvesting on other relevant indicators of direct sediment or riparian function, which are related to the condition of fish habitat (e.g., road density, harvesting near streams), were not explored. In all three scenarios, the results indicated that a reduced annual harvest compared to the base case would result in faster hydrologic recovery and reduced ECA at the TSA scale.

I have considered the information regarding the Cumulative Effects Framework assessment work completed in the TSA and discussed it with FLNRO staff. I commend the work undertaken to date to better understand the cumulative effects of all activities as well as natural events on the land base, and I support the continuation of this work to provide better information for timber supply review processes and to guide operational planning.

I am aware that the forest management and harvesting practices in the Quesnel TSA by licensees have adhered to current legislative requirements and the assessment results do not highlight a lack of compliance on the part of licensees. In addition, there are other activities on the land base that have the potential for impacts on hydrological values apart from the activities of the forest sector. However, the results of the assessments do indicate a compelling need for changes to operational practices and behaviour in watersheds in order to ensure that multiple resources are managed consistent with the intent of the CCLUP.

The resource values assessed for the Quesnel TSA are of particular importance to First Nations, and I expect FLNRO staff and licensees to continue to work with First Nations on planned actions for ongoing management of these resource values.

In consideration of fish habitat values, I am aware that salvage harvest of MPB timber may have contributed to a delay in hydrological recovery for many watersheds in the TSA. FLNRO research suggests that hydrological recovery takes longer than previously anticipated by Interior Watershed Assessment Procedure guidelines. In consideration of this information, I recommend using watershed hydrological assessments to inform harvest planning, and expect FLNRO staff to provide clear expectations to licensees for the development of watershed assessments to guide the amount and spatial location of harvest, road development and management activities. It is imperative that hydrological recovery time is again prioritized in forest management activities in these areas impacted by MPB to address the intent of CCLUP objectives for hydrological stability, salmon and trout.

With respect to landscape-level forest biodiversity, I am aware that the proportions of old, mature and early seral forest in many landscape units in the TSA are inconsistent with the objectives of the CCLUP. As such, I expect FLNRO staff to assess and provide guidance to operational implementation of future allocated harvest.

With respect to American marten, I am aware that the species has no current legal designation and its management is included with and assumed to be met by landscape-level biodiversity requirements. As noted in other recent determinations, I expect regional staff to establish guidelines for the management of American marten habitat and consider developing specific objectives if landscape-level biodiversity objectives are unlikely to sustain American marten populations. I am aware that habitat for this species is enhanced by coarse woody debris retention on harvested stands and, where appropriate, encourage licensees to leave piles of dead wood for marten. I encourage

consideration of stand attributes to inform both this work and forest restoration opportunities supported through FFT, Forest Enhancement Society, and the Forest Carbon Initiative.

I will discuss my consideration of this factor – in particular the finding that reduced harvest compared to the base case would accelerate hydrological recovery at the TSA scale, and indications that such recovery would enhance achievement of the CCLUP objective - in combination with other factors under '**Reasons for Decision**'.

Climate change

Climate change is predicted to impact forest ecosystems in a number of ways, including general increases in temperatures, changes in precipitation patterns and an increase in the frequency and severity of disturbances. The trends are generally consistent but the magnitude of the changes as well as their spatial and temporal distribution is uncertain.

In the Cariboo Natural Resource Region, drought, fire and insects are expected to be the major disturbance agents.

No specific accounting for the implications of climate change was applied in the base case. Utilizing the most current inventory information can help ensure climate implications to forest growth are incorporated into timber supply reviews.

District staff are satisfied that the base case assumptions reflect the current forest conditions for the Quesnel TSA.

I accept that the best available information was used to prepare the base case forecast and I make no adjustments in this regard. As discussed under '**Implementation**', I expect FAIB staff to work with other government agencies and FLNRO staff including climate change experts to determine how best to incorporate climate change information and implications into timber supply review processes.

AAC partitions

Section 8(5) of the *Forest Act* allows the chief forester to specify a portion of the AAC that is attributable to certain types of timber, terrain, or areas of the TSA. This is referred to as an 'AAC partition'.

Historically, AAC partitions identified problem or marginal timber in order to encourage harvest performance in these stands. More recently, AAC partitions delineate timber that is typically of a higher value and/or in a more limited supply that is at risk of over-harvesting. The AAC partition therefore identifies the maximum harvest volume that the chief forester considers is available within the specified timber or terrain type. An AAC partition informs licensees and the public of a harvest limit but it does not directly regulate the harvest from that type of timber. Section 75.02 of the *Forest Act* authorizes the minister to issue partition orders to ensure that licensees abide by the partition established by the chief forester.

The current AAC for the Quesnel TSA includes a partition of 650 000 cubic metres per year attributable to volume from non-pine species. The previous chief forester reasoned that non-pine stand types will be relied on to support timber harvest through the mid term and that harvest exceeding the partition limit would put the mid-term timber supply at risk. Monitoring by district staff shows that licensees have been in compliance with the partition volume allocation, harvesting about 90 percent of the volume on average over the past five years.

As salvage of the MPB-killed pine nears completion and harvesting transitions to stands with lower levels of pine mortality I am now also concerned with the protection of the pine that has survived the MPB outbreak, as well as non-pine trees. Live pine trees also have the potential to contribute to the mid-term timber supply and should be reserved from harvest wherever feasible. The base case projected that even when the stands with highest proportion of dead volume were prioritized for harvest there was still approximately 720 000 cubic metres per year of volume from the live component of these stands for the first five years of the harvest forecast.

I received input from several sources on the topic of partitioning a component of the harvest to non-pine species. West Fraser suggested that a live tree partition, supported by a ministerial partition order, be set at the base case mid-term harvest level, with the remainder of the AAC comprised of pine salvage. They also expressed support for ongoing Forest Enhancement Program and Forests For Tomorrow programs to facilitate stand rehabilitation. Tolko suggested a partition to separate live harvest from salvage harvest, suggesting definition of salvage stands by mortality percentages and live volume thresholds. Input from the Lhtako Dene also expressed support for a partition for live harvest supported by a ministerial partition order.

Prior to the 2011 AAC determination, the AACs for the Quesnel TSA have included small partitions (20 000 – 40 000 cubic metres per year) for the harvest of deciduous stands. FLNRO staff confirm that deciduous species in the TSA have not been utilized to a significant extent in the past. However, they note that as pine salvage nears completion several licensees have expressed interest in harvesting and milling deciduous volume. As an example, C&C Wood Products have expressed an interest in developing a harvest and manufacturing program to utilize the small diameter aspen stands.

As indicated under ‘*areas considered inoperable*’, a total of 52 149 hectares of deciduous-leading stands were included in the THLB in order to assess their potential timber supply contribution. In a sensitivity analysis, excluding deciduous-leading stands from the THLB decreased the mid-term harvest level by 127 000 cubic metres per year or 7.9 percent lower than the base case. The long-term harvest level was decreased by 159 000 cubic metres per year or 7.4 percent lower than the base case. These results indicate that the harvest of deciduous-leading stands could significantly improve mid-term timber supply.

I have considered the input received about instituting a live volume partition in the AAC and the potential contribution of deciduous-leading stands to mid-term timber supply. I will discuss my consideration of AAC partitions in combination with other factors under ‘**Reasons for Decision**’.

Section 8 (8) (b) the short and long term implications to British Columbia of alternative rates of timber harvesting from the area:

Alternative harvest forecasts

At the time of this determination, salvage harvest in the Quesnel TSA is nearing completion, and there is uncertainty about future harvesting behaviour of licensees and the extent to which harvest will continue in MPB-impacted stands. Three alternative harvest forecasts were prepared to examine the implications of this uncertainty to timber supply.

In the first alternative harvest forecast, the initial harvest was set at 1 617 000 cubic metres per year, which is the highest level that could be maintained until the end of the mid term. As in the base case, dead pine was assumed to remain viable for the first five years and stands with the highest proportion of dead pine were prioritized for harvest. The transition from the mid term to the long term was delayed by one decade and the long-term harvest level was 2 005 000 cubic metres per year, which is 6.3 percent lower than in the base case.

In the second alternative harvest forecast, dead pine was assumed to have deteriorated to the point that it was no longer commercially-viable and stands with the highest proportion of dead pine were no longer prioritized for harvest. In this forecast, the initial harvest level was set at 1 490 000 cubic metres per year, which is the highest level that could be maintained until the end of the mid term. The transition from the mid term to the long term was also delayed by one decade and the long-term harvest level was 2 034 189 cubic metres per year which is 4.9 percent lower than in the base case.

In the third alternative harvest forecast, dead pine was assumed to remain commercially-viable for an additional five years and stands with the highest proportion of dead pine were prioritized for harvest for an additional five years. In this scenario, the initial harvest level of 4.0 million cubic metres per year could be maintained for an additional five years beyond what was projected in the base case. The additional MPB-damaged stands that were converted to managed stands in the extended salvage period contributed to a long-term harvest level that was 51 000 cubic metres per year or 2.4 percent higher than that in the base case.

An additional set of harvest forecasts were completed in which the initial harvest level was decreased in increments of 500 000 cubic metres per year, and the implications to the long-term harvest level were assessed. Initial harvest levels of 3.5 million cubic metres per year, 3.0 million cubic metres per year and 2.5 million cubic metres per year resulted in 1.8 percent, 3.6 percent and 5.5 percent decreases in the long-term harvest levels, respectively. The decreases in long-term harvest levels were due to the decrease in the number of MPB-impacted stands that were harvested and replaced with more productive managed stands.

Based on my review of the information described above I conclude that the mid- to long-term timber supply in the Quesnel TSA is sensitive to the extent to which MPB-impacted stands are converted to managed stands, either by salvage or stand rehabilitation, and I will discuss this further under ‘**Reasons for Decision**’.

Section 8 (8) (c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities:

This section of the *Forest Act* has been repealed [2003-31-2 (B.C. Reg. 401/2003)]

Section 8 (8) (d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia:

- Minister’s letters

Government provided direction regarding the economic and social objectives of the Crown to the chief forester in two letters dated July 4, 2006 and October 27, 2010.

The first letter is dated July 4, 2006 (attached as Appendix 3). In this letter, the minister asked for consideration, during AAC determinations, of the importance of a stable timber supply in maintaining a competitive and sustainable forest industry while being mindful of other forest values. As well, the minister suggested that the chief forester should consider the local social and economic objectives expressed by the public and relevant information received from First Nations.

In this 2006 letter, the Minister also emphasized the MPB outbreak in the interior of British Columbia. He indicated that of particular relevance to AAC determinations are the objectives of encouraging long-term economic sustainability for communities affected by the epidemic; recovering the greatest value from dead timber before it burns or decays, while respecting other forest values; and conserving

the long-term forest values identified in land-use plans. As well, the Minister requested that the chief forester consider the local social and economic objectives expressed by the public, and information received from First Nations.

In a further letter dated October 27, 2010, the Minister provided the Crown's objectives with respect to mid-term timber supply in areas affected by the MPB. In particular, the minister asked for reassessment of management objectives and administrative approaches developed prior to the MPB outbreak in order to enhance understanding of how best to balance objectives for non-timber values with timber supply objectives, in order to achieve a range of socio-economic benefits. As well, he requested that innovative practices and incremental silviculture be assessed to determine if they could mitigate mid-term timber supply shortfalls, and to determine if flexibilities could be found in timber supply administration.

With respect to the Minister's letters, I note that in the base case as well as in the alternative harvest projections prepared for this determination that a primary objective has been to attain a stable, long-term harvest level where the growing stock is also stable. I am also aware that FLNRO staff have considered if reassessment of objectives and approaches could improve mid-term timber supplies in the TSA.

During my consideration of the factors required under Section 8 of the *Forest Act*, I have been mindful of the local objectives as well as the interests and objectives of First Nations. I have also reviewed the public consultation process undertaken by the district and considered the input received in making my determination. On this basis, I am satisfied that this determination accords with the objectives of province as expressed by the minister.

Local objectives

The Minister's letter of July 4, 2006, suggests that the chief forester should consider important social and economic objectives expressed by the public during the timber supply review process, where these objectives are consistent with the government's broader objectives as well as any relevant information received from First Nations.

I am aware that many of the communities in the Quesnel TSA, including the City of Quesnel, continue to be resource-based community with significant dependence on the forest sector. The City of Quesnel provided comments during the public consultation period. I note that I have provided my consideration of input from the public as well as First Nations in the appropriate sections of this document.

Section 8 (8) (e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area:

Unsalvaged losses

Unsalvaged losses is the volume lost to periodic natural disturbances in stands caused by extreme weather, fire or epidemic forest health factors, that is not salvaged. These volume losses are typically accounted for in timber supply analyses by calculating the average periodic losses reported from these factors over the recorded time frame to determine an annual loss value. This annual average was estimated to be 128 526 cubic metres per year in the Quesnel TSA. In the base case, this was reflected by disturbing an area with this total volume each year of the analysis horizon.

Comments received from First Nations and the public expressed concern about the potential for a large spruce beetle outbreak in the TSA given other outbreaks occurring elsewhere in the province. The data used to calculate the unsalvaged losses, collected through overview flights, has not recorded any significant losses due to spruce beetle in recent years. District staff inform me that licensees are seeing increased spruce beetle losses during cutting permit cruising and staff believe this may be indicative of the potential for a future outbreak.

I have reviewed the information regarding unsalvaged loss assumptions, and I accept the best available information was used and I make no adjustments on this account. With respect to my knowledge of increasing spruce beetle populations being experienced in areas north of the TSA, I expect district staff to work with regional forest health staff to conduct sampling and assess the expected behaviour and impact of the spruce beetle in the Quesnel TSA, as indicated under **‘Implementation’**.

Reasons for Decision

In reaching my AAC determination for the Quesnel TSA, I have considered all of the factors presented above and have reasoned as follows.

In the base case, which starts in 2015, the initial harvest level was set at 4 000 000 cubic metres per year, which is the level of the current AAC. This level was selected, even though it is significantly higher than recent harvest performance, in order to explore the potential for the continued salvage of dead pine in the short term. The initial harvest level includes 720 000 cubic metres per year of live volume incidentally harvested during the salvage of predominately dead stands (‘live volume bycatch’). In addition, all of the base case harvest levels include 127 000 cubic metres per year of deciduous-leading stand volume.

After five years, when the dead pine is no longer considered a commercially-viable source of timber, the harvest level decreased to 1 617 000 cubic metres per year, which is the highest non-declining mid-term level. This level is maintained until decade seven, when enough of the stands established since the start of the MPB outbreak become eligible for harvest, at which point the harvest level increases to the long-term level of 2 139 000 cubic metres per year.

In determining AACs I will typically identify factors which, considered separately, indicate reasons why the timber supply may be either greater or less than the harvest levels projected for various periods throughout the base case. Some of these factors can be quantified and their implications assessed with reliability. Others may influence the assessment of the timber supply by introducing risk or uncertainty, but cannot be quantified reliably at the time of the determination and must be accounted for in more general terms.

One factor was identified as indicative of a potential underestimation in the timber supply, and that is the ability of VDYP to project yields using the available inventory data for stands with complex stand structures, such as the post-MPB stands. Although sensitivity analysis suggests that an underestimation of existing stand yields of 10 percent could impact mid-term timber supply by 10.1 percent and long-term timber supply by 2.6 percent, the extent to which existing stand yields have been underestimated is not yet known. The sensitivity of mid-term timber supply is not surprising given the shortage of available timber supply in the mid term before managed stands are broadly available for harvest. Further, these sensitivity analysis results do not include an assessment of the longer term implications of a portion of stands not meeting minimum harvest volume requirements and therefore not contributing to timber supply over several rotations. For this determination, I note that the mid- to long-term timber supplies for the Quesnel TSA could be greater than projected by the base case. However, this uncertainty does not affect the short-term timber supply, which is shown in the base case to be maintainable for only five years at the current level before necessitating a decline to the mid-term harvest level. On this basis, I will make no adjustments to the base case referenced in this decision.

This decision is highly dependent on the extent to which the salvage of mountain pine beetle-impacted stands can be maintained and the timber supply implications of continuing or discontinuing salvage.

As evidenced by the alternative harvest forecasts, if dead pine is no longer a commercially-viable source of wood fibre, and the stands with the largest dead volumes are no longer prioritized for harvest the initial harvest level immediately decreases to 1 490 000 cubic metres per year, which is 7.9 percent lower than in the base case. In this scenario, the duration of the mid term is prolonged by one decade and the long-term harvest level is 4.9 percent lower than in the base case. Alternatively, if dead pine is available for salvage for an additional five years, the initial harvest level is maintained at the same level as in the base case for an additional five years, and the long-term harvest level is 2.4 percent higher than in the base case. These results highlight the importance of maintaining a focus on the salvage of MPB-impacted stands for as long as possible.

In assessing the continued viability of dead pine I look to the harvest performance information that indicates that the harvest of pine in the Quesnel TSA has been steadily decreasing, while the harvest of non-pine has been increasing, within the limits of the 650 000 cubic metre non-pine partition. This decline has reached the point where the average harvest over the past three years has been about 2.7 million cubic metres per year. This information is consistent with the observations of both licensees and district staff who advise me that the salvage of MPB-impacted stands is reaching its conclusion and the focus will continue to shift over time to live stands.

In addition to the alternative forecasts discussed above, I am also mindful of the scenarios in which decreasing the initial harvest levels to 3 500 000 cubic metres per year, 3 000 000 cubic metres per year and 2 500 000 cubic metres per year reduced the long-term harvest levels by 1.8 percent, 3.6 percent and 5.5 percent, respectively. These results demonstrate the long-term benefits of converting MPB-impacted stands to managed stands, either through continued salvage or stand rehabilitation.

Prior to 2011, the Quesnel TSA AACs included partitions for deciduous volume to encourage the use of these species. In 2011, the chief forester decided that there was sufficient deciduous harvest performance to include the volume in the AAC without continuing the deciduous partition.

The base case prepared for this determination included 127 000 cubic metres per year of deciduous-leading stand volume. In a sensitivity analysis, excluding the deciduous volume decreased the mid-term harvest level to 1 490 000 cubic metres per year, which is 7.9 percent lower than in the base case and decreased the long-term harvest level to 1 980 000 cubic metres per year, which is 4.7 percent lower than in the base case. Given the benefits to the mid- and long-term timber supply, I will include the deciduous-leading stand volume in the AAC. However, to avoid the potential overharvest of coniferous stands, I will establish a partition in the AAC attributable to deciduous-leading stands.

Based on the considerations described throughout this document, I have decided to set the AAC at a level that supports the continued salvage of dead pine, as this shortens the duration of the mid-term timber supply shortage and maximizes the long-term productivity of stands in the THLB. However, in recognition of the fact that the remaining MPB-impacted stands include both pine that survived the MPB infestation and non-pine and that these trees will be harvested incidental to the salvage of the dead pine, the AAC I establish must also provide for the harvest of live volume bycatch. In order to ensure that non-pine stands and the green pine in predominately live MPB-impacted stands is conserved for harvest in the mid term, I have decided to establish a live volume partition in the AAC.

Therefore, effective June 16, 2017, the new AAC for the Quesnel TSA is 2 607 000 cubic metres, including 1 250 000 live conifer volume, 1 230 000 dead conifer volume and 127 000 cubic metres of deciduous volume.

In addition, I note that the reduction I am making in the AAC for the Quesnel TSA will support hydrological recovery, which the cumulative effects assessment indicates is a priority for watersheds in the TSA. I am also aware that unsalvaged dead pine in combination with some non-pine overstorey and understory trees, can play a role in the management of American marten and other furbearers. I am satisfied that the decrease in the volume available to salvage dead pine can assist with this endeavour.

I am aware of information that suggested a trend towards some level of harvest in smaller, green stands in the TSA. I note that sensitivity analysis demonstrated that up to 100 000 cubic metres per year of harvest could come from younger, live stands without impacting the timber supply. The current harvest level in these stands is below this threshold and I strongly caution licensees to be mindful of the potential mid-term timber supply impacts if the level of harvest in these stands exceeds that threshold.

It is my expectation that district staff will monitor the harvest of live trees and report on harvest performance and adherence to the live tree partition. If it appears that the harvest of live trees exceeds the partition established in this AAC, I expect district staff to make recommendations to the minister to issue a partition order, as provided in legislation, as noted in **'Implementation'**. Furthermore, it is my expectation that timber management goals and objectives will be tracked as they relate directly to the assumptions used in TSR that could potentially affect future AACs.

Determination

I have considered and reviewed all the factors as documented above, including the risks and uncertainties of the information provided. It is my determination that a timber harvest level that accommodates objectives for all forest resources during the next 10 years and that reflects current management practices as well as the socio-economic objectives of the Crown, can be best achieved in the Quesnel TSA by establishing an AAC of 2 607 000 cubic metres per year, including a maximum of 1 250 000 cubic metres per year attributable to live conifers; 1 230 000 cubic metres per year attributable to dead trees; and 127 000 cubic metres per year attributable to deciduous-leading stands.

This determination is effective June 16, 2017, and will remain in effect until a new AAC is determined, which must take place within 10 years of the effective date of this determination.

If additional significant new information is made available to me, or major changes occur in the management assumptions upon which I have predicated this decision, then I am prepared to revisit this determination sooner than the 10 years required by legislation.

Implementation


In the period following this decision and leading to the subsequent determination, I encourage FLNRO staff, licensees and other major project proponents to undertake or support the tasks and studies noted below, the particular benefits of which are described in appropriate sections of this rationale document. These projects are important to help reduce the risk and uncertainty associated with key factors that affect the timber supply in the Quesnel TSA.

I expect, subject to available resources and priorities, that FLNRO staff:

- Monitor levels of harvest in young stands below culmination age.
- Monitor use of planting for stand regeneration as compared to direct seeding or reliance on natural regeneration.
- Monitor harvested volume contributions from dead pine, live pine and non-pine species and report annually to the chief forester.
- Make recommendations to the Minister if a partition order appears to be necessary to ensure correct implementation of the AAC partition.
- Staff monitor the level of grade 4 cut control credits and report to the chief forester if the level exceeds 100 000 cubic metres per year.
- Monitor waste assessment practices for changes in relative levels of cruise-based and scale-based assessments, and initiate a study of waste and utilization levels.
- Improve the integrity of past and future RESULTS data.
- Ensure effective amalgamation and alignment of all information being collected about the forested land base to support better information about stands, stand growth progression, and stand yields.
- Use inventory data to assess trail buffers along recreation and historical trails, ensure effective accounting for these features in timber supply reviews, and as well determine the suitability of any areas for meeting old-seral forest requirements. This includes working with data custodians to consolidate information sources for ownership layers through Natural Resource Permitting Project (NRPP) or other mechanisms.
- Obtain a better inventory of roads, including non-status roads, in order to support future economic planning in the region such as for tourism. As well ensure roads with no intended future use are deactivated and rehabilitated so as to protect wildlife and other values.
- Review and assess if the attributes of forest currently reserved to meet old-seral objectives reasonably reflect the expected attributes of old forest for these natural disturbance types, and explore permanently establishing the areas currently characterized as rotating.
- Review and update the patch size distribution targets outlined in the CCLUP, and support the operational use of these targets by licensees.
- Inventory the stands covered by the 200-metre trail buffer to determine what area, if any, might be suitable for OGMA retention and request that district staff ensures better consolidation and alignment of the conflicting trails information sources for the next timber supply review.
- Work with the regional forest health staff to conduct sampling and assess the expected behaviour and impact of the spruce beetle in the TSA.
- Continue to work to determine how to represent the implications of climate change into timber supply modelling.

As described elsewhere in this document, the ability to achieve the mid-term harvest level demonstrated in the base case while maintaining the values on the land base, is, for some factors, predicated on the ability of licensees to conduct operational practices in a manner consistent with base case assumptions. I therefore encourage licensees to ensure:

- That in the short term, harvest continues to focus, to the extent possible, on salvage of MPB-impacted stands.
- That practices protect the integrity of secondary stand structures (stems averaging less than 17 cm dbh) during the salvage of MPB-killed stands.
- That planting is used for stand regeneration wherever feasible.
- That practices meet the intent of VQOs for areas through ensuring adherence to allowable disturbance levels in visually sensitive areas.
- That practices adhere to CCLUP patch size distribution targets, including any future revisions.
- Practices meet habitat requirements for caribou, including adherence to the recommendations of the CCLUP caribou strategy committee; the habitat requirements of mule deer; and the habitat requirements for moose, including application of the most current information for management of moose habitat.
- That they conduct watershed level assessments in all sensitive watersheds and ensure operational practices adhere both to the recommendations provided by these assessments and to the intent of the CCLUP.



Diane Nicholls, RPF
Chief Forester

June 16, 2017

Appendix 1: Section 8 of the *Forest Act*

Section 8 of the *Forest Act*, Revised Statutes of British Columbia 1996, c. 157 reads as follows:

Allowable annual cut

8 (1) The chief forester must determine an allowable annual cut at least once every 10 years after the date of the last determination, for

(a) the Crown land in each timber supply area, excluding the Crown land in the following areas:

- (i) tree farm licence areas;
- (ii) community forest agreement areas;
- (iii) first nations woodland licence areas;
- (iv) woodlot licence areas, and

(b) each tree farm licence area.

(2) If the minister

(a) makes an order under section 7 (b) respecting a timber supply area, or

(b) amends or enters into a tree farm licence to accomplish a result set out under section 39 (2) or (3),

the chief forester must make an allowable annual cut determination under subsection (1) for the timber supply area or tree farm licence area

(c) within 10 years after the order under paragraph (a) or the amendment or entering into under paragraph (b), and

(d) after the determination under paragraph (c), at least once every 10 years after the date of the last determination.

(3) If

(a) the allowable annual cut for the tree farm licence area is reduced under section 9 (3), and

(b) the chief forester subsequently determines, under subsection (1) of this section, the allowable annual cut for the tree farm licence area,

the chief forester must determine an allowable annual cut at least once every 10 years from the date the allowable annual cut under subsection (1) of this section is effective under section 9 (6).

(3.1) If, in respect of the allowable annual cut for a timber supply area or tree farm licence area, the chief forester considers that the allowable annual cut that was determined under subsection (1) is not likely to be changed significantly with a new determination, then, despite subsections (1) to (3), the chief forester

(a) by written order may postpone the next determination under subsection (1) to a date that is up to 15 years after the date of the relevant last determination, and

(b) must give written reasons for the postponement.

(3.2) If the chief forester, having made an order under subsection (3.1), considers that because of changed circumstances the allowable annual cut that was determined under subsection (1) for a timber supply area or tree farm licence area is likely to be changed significantly with a new determination, he or she

- (a) by written order may rescind the order made under subsection (3.1) and set an earlier date for the next determination under subsection (1), and
- (b) must give written reasons for setting the earlier date.

(4) If the allowable annual cut for the tree farm licence area is reduced under section 9 (3), the chief forester is not required to make the determination under subsection (1) of this section at the times set out in subsection (1) or (2) (c) or (d), but must make that determination within one year after the chief forester determines that the holder is in compliance with section 9 (2).

(5) In determining an allowable annual cut under subsection (1) the chief forester may specify that portions of the allowable annual cut are attributable to one or more of the following:

- (a) different types of timber or terrain in different parts of Crown land within a timber supply area or tree farm licence area;
 - (a.1) different areas of Crown land within a timber supply area or tree farm licence area;
 - (b) different types of timber or terrain in different parts of private land within a tree farm licence area.
- (c) [Repealed 1999-10-1.]

(6) The minister must determine an allowable annual cut for each woodlot licence area, in accordance with the woodlot licence for that area.

(7) The minister must determine an allowable annual cut for

- (a) each community forest agreement area in accordance with the community forest agreement for that area, and
- (b) each first nations woodland licence area in accordance with the first nations woodland licence for that area.

(8) In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

- (a) the rate of timber production that may be sustained on the area, taking into account
 - (i) the composition of the forest and its expected rate of growth on the area,
 - (ii) the expected time that it will take the forest to become re-established on the area following denudation,
 - (iii) silviculture treatments to be applied to the area,
 - (iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area,
 - (v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production, and
 - (vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber,
- (b) the short and long term implications to British Columbia of alternative rates of timber harvesting from the area,
- (c) [Repealed 2003-31-2.]

(d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia, and

(e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

(9) Subsections (1) to (4) of this section do not apply in respect of the management area, as defined in section 1 (1) of the *Haida Gwaii Reconciliation Act*.

(10) Within one year after the chief forester receives notice under section 5 (4) (a) of the **Haida Gwaii Reconciliation Act**, the chief forester must determine, in accordance with this section, the allowable annual cut for

(a) the Crown land in each timber supply area, except the areas excluded under subsection (1) (a) of this section, and

(b) each tree farm licence area

in the management area, as defined in section 1 (1) of the *Haida Gwaii Reconciliation Act*.

(11) The aggregate of the allowable annual cuts determined under subsections (6), (7) and (10) that apply in the management area, as defined in section 1 (1) of the *Haida Gwaii Reconciliation Act*, must not exceed the amount set out in a notice to the chief forester under section 5 (4) (a) of that Act.

Appendix 2: Section 4 of the *Ministry of Forests and Range Act*

Section 4 of the *Ministry of Forests and Range Act* (current to May 17, 2017) reads as follows:

Purposes and functions of ministry

4 The purposes and functions of the ministry are, under the direction of the minister, to do the following:

- (a) encourage maximum productivity of the forest and range resources in British Columbia;
- (b) manage, protect and conserve the forest and range resources of the government, having regard to the immediate and long term economic and social benefits they may confer on British Columbia;
- (c) plan the use of the forest and range resources of the government, so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated, in consultation and cooperation with other ministries and agencies of the government and with the private sector;
- (d) encourage a vigorous, efficient and world competitive
 - (i) timber processing industry, and
 - (ii) ranching sectorin British Columbia;
- (e) assert the financial interest of the government in its forest and range resources in a systematic and equitable manner.

Appendix 3: Minister's letter of July 4, 2006



JUL 04 2006

Jim Snetsinger
Chief Forester
Ministry of Forests and Range
3rd Floor, 1520 Blanshard Street
Victoria, British Columbia
V8W 3C8

Dear Jim:

Re: Economic and Social Objectives of the Crown

The *Forest Act* gives you the responsibility for determining Allowable Annual Cuts-decisions with significant implications for the province's economy, communities and environment. This letter outlines the economic and social objectives of the Crown you should consider in determining Allowable Annual Cuts, as required by Section 8 of the *Forest Act*. This letter replaces the July 28, 1994 letter expressing the economic and social objectives of the Crown, and the February 26, 1996 letter expressing the Crown's economic and social objectives for visual resources. The government's objective for visual quality is now stated in the Forest Practices and Planning Regulation of the *Forest and Range Practices Act*.

Two of this government's goals are to create more jobs per capita than anywhere in Canada and to lead the world in sustainable environmental management. The Ministry of Forests and Range supports these objectives through its own goals of sustainable forest and range resources and benefits. In making Allowable Annual Cut determinations, I ask that you consider the importance of a stable timber supply in maintaining a competitive and sustainable forest industry, while being mindful of other forest values.

The interior of British Columbia is in the midst of an unprecedented mountain pine beetle outbreak. Government's objectives for management of the infestation are contained in British Columbia's Mountain Pine Beetle Action Plan. Of particular relevance to Allowable Annual Cut determinations are the objectives of encouraging long-term economic sustainability for communities affected by the epidemic; recovering the greatest value from dead timber before it burns or decays, while respecting other forest values; and conserving the long-term forest values identified in land use plans.

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Minister of
Forests and Range
and Minister Responsible
for Housing

Office of the
Minister

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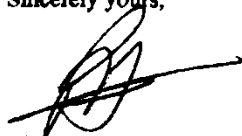
Jim Snetsinger

To assist the province and affected communities in planning their responses to the beetle infestation, it would be best to have realistic assessments of timber volumes that can be utilized economically. Therefore, in determining the best rate of harvest to capture the economic value from beetle-killed timber, I ask that you examine factors that affect the demand for such timber and products manufactured from it, the time period over which it can be utilized, and consider ways to maintain or enhance the mid-term timber supply.

The coast of British Columbia is experiencing a period of significant change and transition. In making Allowable Annual Cut determinations I urge you to consider the nature of timber supply that can contribute to a sustainable coast forest industry, while reflecting decisions made in land and resource management plans.

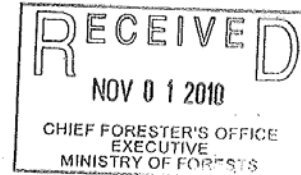
You should also consider important local social and economic objectives expressed by the public during the Timber Supply Review process, where these are consistent with the government's broader objectives as well as any relevant information received from First Nations.

Sincerely yours,

A handwritten signature in black ink, appearing to be 'Rich Coleman', with a long horizontal stroke extending to the right.

Rich Coleman
Minister

Appendix 4: Minister's letter of October 27, 2010



File: 280-30/MPB
Ref: 126097

OCT 27 2010

Jim Snetsinger, Chief Forester
ADM Forest Resource Stewardship Division
Ministry of Forests and Range
3rd Floor, 1520 Blanshard Street
Victoria, British Columbia
V8W 3C8

Dear Mr. Snetsinger:

Re: Economic and Social Objectives of the Crown Regarding Mid-Term Timber Supply in Areas Affected by the Mountain Pine Beetle

On July 4, 2006, Rich Coleman, former Minister of Forests and Range, wrote to you outlining the social and economic objectives of the Crown for AAC determination (in accordance with Section 8 of the *Forest Act*) with respect to issues associated with the Mountain Pine Beetle (MPB) epidemic. The aforementioned letter articulated the Crown's objectives of ensuring long-term economic sustainability for communities affected by the epidemic; recovering the greatest value from dead timber before it burns or decays, while respecting other forest values; and conserving the long-term forest values identified in land use plans. I am writing to you regarding the Crown's objectives with respect to mid-term timber supply in areas affected by the mountain pine beetle.

The MPB infestation has had a profound impact on the timber supply outlook for the interior of the province. In particular, forecasts of timber supply in the mid-term—the period between the ending of the economic shelf life of killed pine and the time when the forest has re-grown and again become merchantable—are now significantly lower than prior to the infestation. These shortages threaten the wellbeing of forest-dependent cities and towns. The

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Ministry of Forests and Range and
Minister Responsible for Integrated
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Minister's Office

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Jim Snetsinger, Chief Forester

Government of British Columbia is working closely with beetle action committees, municipalities, and the private sector to diversify economies. However, for many forestry-dependent towns mid-term timber supply shortages could still have significant socio-economic impacts.

During this challenging time it will be necessary to reassess management objectives and administrative approaches that were developed when forest conditions in the province's interior were very different than now exist. In this reassessment it will be important to enhance the understanding of how best to balance objectives for non-timber forest values with objectives for timber supply to achieve a range of socio-economic benefits. It will also be important to assess how innovative practices and incremental silviculture could mitigate mid-term timber supply shortfalls in MPB affected areas, and if flexibilities can be found in timber supply administration.

During the Timber Supply Review process, in addition to the considerations included in the July 2006 letter, I would like you to undertake analysis that can provide information on how changes to current management practices and administration could increase mid-term timber availability in MPB-affected areas. This information should be shared with Ministry of Forest and Range Executive and used to inform discussions among interested parties, and considered by appropriate land use and management decision makers. If formal changes are made to management objectives and administration, you will be in a position to incorporate those changes in Timber Supply Reviews and AAC determinations.

Sincerely,



Pat Bell
Minister

pc: Dana Hayden, Deputy Minister