

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

**Merritt
Timber Supply Area**

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

Effective March 30, 2016

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Chief Forester**

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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 as chief forester of British Columbia in making my determination, under Section 8 of the *Forest Act*, of the allowable annual cut (AAC) for the Merritt 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 thank staff of the BC Ministry of Forests, Lands and Natural Resource Operations (FLNR) in the Cascades Natural Resource District and the Forest Analysis and Inventory Branch (FAIB). I am also grateful to the First Nations, the public, and the licensees who have provided input.

Description of the Merritt Timber Supply Area

Located in the southern interior region of British Columbia, the Merritt TSA covers an area of about 1.13 million hectares. It is bounded to the north by the Kamloops TSA, to the east by the Okanagan TSA, to the west by the Fraser and Lillooet TSAs, and to the south by Manning and Cathedral Parks and the Canada-U.S.A. border. The Merritt TSA is located within the Thompson Okanagan Natural Resource Region and is administered by the Cascades Natural Resource District in Merritt.

The topography of the TSA varies from the mountainous terrain and steep river valleys of the Cascade Mountains in the west, to the drier, relatively flat Thompson Plateau in the east. Two major river systems transect the TSA: the Similkameen River in the south and the Nicola River in the north. These diverse landscapes provide a variety of wildlife habitats including grasslands, lakes and wetlands, forested slopes, and alpine areas. Over 20 species of wildlife and fish identified in the provincial Identified Wildlife Management Strategy are present in the TSA.

The Merritt TSA includes the overlapping territories of the following First Nations: Adams Lake Indian Band, Ashcroft Indian Band, Stuctwewsemc (Bonaparte Indian Band), Boothroyd Band, Boston Bar First Nation, Chawathil First Nation, Seabird Island First Nation, Spuzzum First Nation, Stó:lō Nation, Yale First Nation, Coldwater Indian Band, Cook's Ferry Indian Band, Kanaka Bar First Nation, Lower Nicola Indian Band, Lytton First Nation, Nooaitch Indian Band, Shackan Indian Band, Siska Indian Band, Stk'emlupsemc te Secwepemc Nation, Tk'emlups, Skeetchestn, Upper Nicola Band, Upper Similkameen Indian Band, Oregon Jack Creek Indian Band, Lower Similkameen Indian Band, Neskonlith, Nicomen Indian Band, Okanagan Indian Band, Penticton Indian Band, the Nlaka'pamux Nation and the Westbank First Nation.

Communities located in the Merritt TSA include: Merritt, Princeton, Tulameen, Brookmere, Missezula Lake, East Gate, Douglas Lake, Spences Bridge and Allison Lake. First Nations communities located within the TSA include: Coldwater, Cooks Ferry, Nooaitch, Shackan, Upper Nicola, Lower Nicola and Upper Similkameen.

History of the AAC

In 1996, the AAC for the Merritt TSA was determined to be 1 454 250 cubic metres of which 250 000 cubic metres was partitioned to small-diameter pine types. In 1999, the AAC was set at 2 004 250 cubic metres, which reflected a two-year uplift of 550 000 cubic metres per year to address the recovery of fire-damaged wood and a mountain pine beetle infestation in the southern

portion of the TSA and maintained the 250 000-cubic metre small-diameter pine partition. In 2001, the salvage uplift was removed and the AAC was set at 1 508 050 cubic metres, which represented the pre-uplift AAC and a 62 500-cubic metre increase in the small-diameter pine partition from 250 000 cubic metres to 312 500 cubic metres. In 2005, the AAC was increased to 2 814 171 cubic metres reflecting new inventory and site productivity information collected under Innovative Forestry Practices Agreements and a temporary uplift of 1 000 000 cubic metres to address mountain pine beetle infestation. The small-diameter pine type partition of 312 500 cubic metres was maintained.

The current AAC, determined in December, 2010 is 2 400 000 cubic metres, which includes a 720 000-cubic metre partition to limit the amount of non-pine (specifically spruce and Douglas-fir) harvested, while still encouraging spruce beetle management in the Merritt TSA.

The harvestable volume for the area is currently apportioned as shown in Table 1.

Table 1. Apportionment of 2010 AAC

Apportionment	Cubic metres per year	Percentage
Forest licences – replaceable	920 605	38.36
Forest licences – non-replaceable	974 486	40.60
BCTS Timber Sale Licence	389 520	16.23
Community Forest Agreement	20 000	0.83
Forest Service Reserve	95 389	3.97
Total	2 400 000	100

New AAC determination

Effective March 30, 2016 until March 29, 2021, the new AAC for the Merritt TSA will be 1 500 000 cubic metres. Effective March 30, 2021, the AAC will be 1 200 000 cubic metres. This AAC will remain in effect until a new AAC is determined, which is required to take place within 10 years of this determination.

Information sources used in the AAC determination

Information considered in determining the AAC for the Merritt TSA includes the following:

- *Forest and Range Practices Act* and regulations;
- *Forest Act*;
- *Ministry of Forests and Range Act*;
- *Forest Practices Code of British Columbia Act* and amendments and guidebooks, January 31, 2004;
- *Heritage Conservation Act*;
- *Land Act*;

- The following designations and objectives set by government were considered:
 - Order establishing Ungulate Winter Range #U-3-003
http://www.env.gov.bc.ca/wld/documents/uwr/uwr_u3_003.pdf
 - Orders establishing Wildlife Habitat Areas for Coastal Tailed Frog #8-077, 8-078, 8-079, 8-080, 8-081, 8-082
http://www.env.gov.bc.ca/wld/documents/wha/ASTR-8-077_ord.pdf
http://www.env.gov.bc.ca/wld/documents/wha/ASTR-8-078_ord.pdf
http://www.env.gov.bc.ca/wld/documents/wha/ASTR-8-079_ord.pdf
http://www.env.gov.bc.ca/wld/documents/wha/ASTR-8-080_ord.pdf
http://www.env.gov.bc.ca/wld/documents/wha/ASTR-8-081_ord.pdf
http://www.env.gov.bc.ca/wld/documents/wha/ASTR-8-082_ord.pdf
 - Order establishing Wildlife Habitat Areas for Grizzly Bear #8-083, 8-084, 8-085, 8-086, 8-087, 8-088, 8-089
http://www.env.gov.bc.ca/wld/documents/wha/URAR_8-083to89_Cascades_ord.pdf
 - Old growth
 - https://www.for.gov.bc.ca/tasb/slrp/policies-guides/old-growth/Old_Growth_Order_May18th_FINAL.pdf
- *Identified Wildlife Management Strategy—Accounts and Measures for Managing Identified Wildlife*, Version 2004, Province of BC; *Procedures for Factoring Visual Resources into Timber Supply Analyses*, 1998, BC Ministry of Forests, and the update bulletin, *Modelling Visuals in TSR III*;
- *Integration of GIS Analysis and Field Evaluation to Identify Young Lodgepole Pine at Risk to Mountain Pine Beetle. Phase 3: Impact and Severity Projections (Draft)*, 2009, Hodges, J. And Maclauchlan, L., Ministry of Forests and Range; *Merritt TSA Timber Supply Review: Nlaxapum'x Nation Tribal Council and FLNR Board* March 2016, NNTC/FLNR;
- *Site Index Adjustment for the Merritt IFPA Area Final Report*, (report prepared for the Nicola-Similkameen Innovative Forestry Society), 2003, J.S. Thrower and Associates;
- *A First Look at Visually Effective Green-up in BC*, 1994, Ministry of Forests;
- *Clearcutting and Visual Quality: A Public Perception Study*, 1996, Ministry of Forests;
- *Procedures for Factoring Visual Resources into Timber Supply Analyses*, 1998, Ministry of Forests;
- *Merritt TSA Timber Supply Analysis Discussion Paper*, July 22, 2015, FLNR Forest Analysis and Inventory Branch;
- *Merritt TSA Rationale for AAC Determination*, December 2, 2010, Chief Forester J. Snetsinger, RPF, Ministry of Forests and Range;
- *Guidance on Landscape and Stand level Structural Retention on Large-scale Mountain Pine Beetle Salvage Operations*, December 2005, Chief Forester J. Snetsinger, Ministry of Forests and Range;
- *Letter from the Minister of Forests and Range to the Chief Forester stating the economic and social objectives of the Crown*, July 4, 2006;

- *Letter from the Minister of Forests and Range to the chief forester stating the economic and social objectives of the Crown regarding mid-term timber supply in areas affected by the mountain pine beetle*, October 27, 2010;
- Discussions with and information received from First Nations representatives during meetings held in Merritt on October 26, 2015, and December 21, 2015; in Kamloops on December 16, 2015; and in Vancouver on January 29, 2016, and February 23, 2016. Conference calls were also held on November 12, 2015; November 13, 2015; December 8, 2015; January 4, 2016; January 21, 2016, February 2, 2016; and February 9, 2016;
- *First Nations Consultation Summary Cascades Resource District, Decision on the Allowable Annual Cut (AAC) for Merritt TSA – Timber Supply Review V*, March 2016 Ministry of Forests, Lands and Natural Resource Operations;
- Discussions and information received from timber licence holders in the Merritt TSA at a meeting in Merritt on October 26, 2015;
- Discussions with and information received from members of the public at meetings held in Merritt on August 19, 2016 and in Princeton on August 20, 2016; and
- Technical review and evaluation of information and current operating conditions in the Merritt TSA through comprehensive discussions with staff from FLNR, including the AAC determination meeting held in Merritt, BC, October 26 and 27, 2015.

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 Merritt 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 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 mountain pine beetle (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

Aboriginal Title Lands and other areas, such as Treaty 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 legal obligation to consult with First Nations regarding their asserted 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 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 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 jurisdiction, 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 Merritt TSA

Harvest level projections, even those prepared using the same information, data and timber supply model, are dependent on the harvest flow objectives used in the analysis. The harvest flow objectives used in preparing the base case for this determination include:

- Maintain harvest levels at or above the initial harvest level in order to maximize post-mountain pine beetle (MPB) harvest levels;
- Increase projected harvest levels from the lowest point in the forecast as quickly as possible;
- Delay the timing of an increase to the long-term harvest level if required to achieve higher harvest levels during the first 40 years of the forecast;
- Attain a stable or increasing growing stock for the last half of the forecast period, and end the harvest projection with the same amount of growing stock that was available at the beginning of the forecast;
- Attain a long-term harvest that is the same as the pre-MPB AAC of 1.5 million cubic metres; and,
- Reflect current demonstrated harvest performance by limiting the harvest of stands with volumes of less than 200 cubic metres per hectare but greater than 150 cubic metres per hectare to no more than 10 percent of the volume from clearcut stands.

A base case harvest projection was prepared using these objectives. The results showed that the highest initial harvest level that could be achieved that met these criteria was 1.16 million cubic metres per year. This projected harvest level can be sustained for 50 years from the beginning of the forecast period (2014) before increasing to 1.34 million cubic metres per year. The long-term harvest level of 1.5 million cubic metres per year is reached 80 years from the beginning of the forecast period.

Although included in the total base case harvest levels, the harvest from uneven aged dry-belt Douglas-fir stands was forecast separately. The base case and alternative forecasts to the base case and the sensitivity analyses discussed in this rationale are net of non-recoverable losses and the projected harvest of dead pine.

The total growing stock available for harvest at the beginning of the base case is about 79 million cubic metres. Of this volume, about 36 million cubic metres is attributable to stands with volumes greater than 200 cubic metres per hectare where the management prescription is clearcut harvesting and about 43 million cubic metres is attributable to stands with volumes greater than 150 cubic metres per hectare but less than 200 cubic metres per hectare where the management prescription is clearcut harvesting. In 2030, the total growing stock reaches a low of about 50 million cubic metres before it begins to increase to the long-term level of 61 million cubic metres. This increase in growing stock corresponds to the timing of when the new stands established after recently salvaged MPB-impacted stands begin to reach merchantable size.

In the base case, not all existing natural stands are harvested before harvest begins in managed stands. This occurs for three reasons. The harvest level of the low volume natural stands was modelled as an even-flow, and in even-flow harvest forecasts the harvest level for the entire forecast period is limited by the harvest level at the most constrained time in the forecast period. As well, MPB infestation reduced the volume of some natural stands below the minimum volume threshold for harvest. And the harvest of faster growing managed stands instead of low productivity natural stands improved the overall harvest forecast.

During the public review, Weyerhaeuser commented: “Need to ensure that flow constraints (such as the requirement to have ending AAC of 1.5 million cubic metres per year) are reasonable and appropriate.”

Based on my review of the base case and alternative harvest forecasts, I conclude that the harvest flow objectives used in the base case provide a reasonable balance between maximizing the short-term harvest levels with the requirements for other values, such as old growth, wildlife, riparian areas, and the long-term timber supply. Although I am aware of the alternative harvest forecast in which removing the 1.5 million cubic metres per year long-term harvest requirement increases the short-term harvest level by four percent, I am not willing to maximize short-term harvest levels at the expense of the long-term productivity of the Merritt TSA.

I have reviewed in detail the assumptions and methodology incorporated in the base case; as well as the total growing stock, the harvest contributions from managed and unmanaged stands, the average volumes per hectare, the total area harvested annually, and the average ages of the forest stands harvested. Based on my review, I am satisfied, subject to the qualifications accounted for in this document that the information presented to me provides a suitable basis from which I can assess the timber supply for the Merritt TSA.

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 appropriately represents current management or 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 factors for which base case modelling assumptions have been accepted

Forest Act section and description	Factors accepted as modelled
8(8)(a)(i) Land base contributing to timber harvesting	<ul style="list-style-type: none"> • Private and alienated Crown land • Area-based tenures • Non-forest • Future roads, trails and landings • Parks and ecological reserves • Problem forest types
8(8)(a)(i) Composition of the forest and expected rate of growth	<ul style="list-style-type: none"> • Forest inventory • Volume estimates for natural stands • Site productivity estimates
8(8)(a)(ii) Expected time for the forest to be re-established following denudation	<ul style="list-style-type: none"> • Regeneration delay
8(8)(a)(iii) Silvicultural treatments to be applied	
8(8)(a)(iv) Standard of timber utilization and allowance for decay, waste, and breakage	<ul style="list-style-type: none"> • Utilization standards
8(8)(a)(v) Constraints on the amount of timber produced by use of the area for other purposes	<ul style="list-style-type: none"> • Heritage trails • Visual quality • Community fire interface
8(8)(a)(vi) Other information	<ul style="list-style-type: none"> • Climate change
8(8)(b) Short and long-term implications of alternative rates of timber harvesting from the area	<ul style="list-style-type: none"> • Alternative harvest flows
8(8)(d) Economic and social objectives of the government	<ul style="list-style-type: none"> • Socio-economic information
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"> • Forest health management (non-MPB)

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. I have applied the same principles to discussion of public input as I applied to First Nations' interests; that is, when information is brought forward that is outside of the chief forester's jurisdiction, this information will be forwarded to the appropriate decision makers for their consideration. Specific considerations identified by the public in relation to my powers under Section 8 of *the Forest Act* and the AAC determination are addressed in the various sections of this rationale.

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 harvest

- general comments

The total area of the Merritt TSA is about 1.13 million hectares. Of the total TSA area, about 806 000 hectares or 71 percent is classified as productive Crown forest land base (CFLB).

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 productive Crown forest land base (CFLB). 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 has no bearing on how it will be managed and whether or not it will be harvested.

For the Merritt TSA, the THLB used in the base case is 592 687 hectares, which is approximately 29 000 hectares or six percent smaller than in the previous TSR. A significant proportion of this difference is due to the ungulate winter range requirements, which in this timber supply analysis were accounted for using area reductions instead of forest cover constraints. The area reduction approach is more consistent with the intent of the legal requirements for the area. For further information see '*ungulate winter range*'.

Several First Nations indicated that the THLB does not account for all culturally sensitive areas and areas of special interest of which the government is currently unaware. I accept that the THLB derived for this determination may not account for all areas of interest to First Nations and will discuss this factor in greater detail in '*cultural heritage resources*'.

For this determination, I conclude that the best available information was used to estimate the THLB and is adequate for use in this determination.

The factors listed in this section of the rationale do not include all of the areas excluded from the THLB: some factors have been listed in Table 2, as noted above, while others are referred to later in this document.

- current roads, trails and landings

The total road and trail length identified using the 2012 consolidated roads data set was 20,248 kilometres, which is slightly higher than the 19,525 kilometres identified in the previous timber supply review.

A review of 40 harvested blocks across the Merritt TSA using Google Earth, found that on average there is one landing for every 12.74 hectares harvested and each landing occupies an average area of 0.3 hectare. In combination this means that 2.4 percent of each hectare harvested is occupied by landings.

Application of a 2.4 percent per hectare reduction for each hectare logged and a 10-metre road width buffer to each kilometre of road resulted in a gross area of 24 705 hectares. After accounting for areas excluded from the THLB for other factors, the net area excluded to account for existing roads, trails and landings was 19 841 hectares.

At a meeting with the Nicola Chiefs, Stuwix Resources Ltd. (“Stuwix”) informed me that it fully rehabilitates roads once they are no longer needed, and as well constructs roads that are narrower than the 10-metre wide buffer accounted for in the base case. Stuwix noted that if all licensees engaged in similar road management practices, the loss of productive forest land in the TSA could be reduced.

I accept that the area excluded from the THLB to account for the area occupied by roads, trails and landings reasonably reflects current road management at a TSA level. I agree with Stuwix Resources that road rehabilitation and construction of narrower roads can reduce the loss of productive forest commonly associated with roads and other access structures, and I commend them on their efforts in this regard. I encourage all licensees to consider incorporating similar practices in order to mitigate the loss of productive forest, while maintaining road safety requirements.

- environmentally sensitive areas and operability

In the derivation of the THLB for this timber supply analysis, areas considered unsuitable for timber harvesting due to factors such as high avalanche risk, difficult stand regeneration, unstable soils, water intake areas etc. and inoperability were excluded. After allowing for overlaps with areas already excluded from the THLB for other reasons, about 48 000 hectares and 35 000 hectares, respectively, were excluded to account for environmentally sensitive areas (ESAs) and inoperable areas.

Terrain stability mapping, which is generally considered the most accurate information for identifying areas of unstable terrain and defining operability, is available for about 15 percent of the Merritt TSA. Where terrain stability information was not available a combination of ESA and slope information – wherein areas larger than one hectare with slopes greater than 65 percent were considered inoperable - was used to identify areas for exclusion from the THLB. District staff commented that licensees use terrain stability mapping and/or the results of site assessments for operational planning rather than ESA information.

Operability lines for the Merritt TSA were delineated by district staff using 1991 air photos. The characteristics used to define these operability lines included slope, topography, road access, soil instability, elevation, and timber value. Licensees reviewed the operability lines with district staff and made adjustments where appropriate. With the exception of previously harvested areas, areas outside of the operability lines were excluded from the THLB.

Having reviewed the information, I conclude that although the ESA information and operability assessment are likely outdated, they represent the best available information and I will make no adjustment on this account. However, to assist with both future AAC determinations and operational and strategic-level planning, I encourage district staff and licensees to expand the available terrain stability mapping, particularly in areas of steeper slopes to better estimate the area suitable for timber harvesting. This recommendation is summarized under the ‘**Implementation**’ section of this document.

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

Harvesting in the Merritt TSA increased significantly about 30 years ago and the establishment of stands by planting commenced at about the same time. Volume estimates for naturally established (not planted) stands, including all stands older than 30 years and all balsam-leading stands, were generated using the ministry's Variable Density Yield Projection (VDYP) model version 7.

With the exception of balsam-leading stands, all stands younger than 30 years were classified as managed stands. Managed stands were separated into three categories: old managed stands aged 10 to 30 years; new managed stands less than 10 years and future managed stands. Future managed stands included all stands regenerating after initial harvest in the timber supply model. The volume estimates for managed stands were generated using the ministry's Table Interpolation Projection of Stand Yield (TIPSY) model version 4.3. The provincial standard operational adjustment factors (OAF) values of 15 percent and 5 percent were used for OAF 1 and OAF 2, respectively.

After stand establishment, either naturally or by planting, the number of trees per hectare (stand density) naturally decreases over time due to competition between the trees for light, nutrients, moisture, etc. TIPSY uses stand density at the time of stand establishment to project the volume of managed stands. For the base case, the managed stand volume estimates projected using TIPSY were underestimated because the stand density information from free-growing surveys was used instead of establishment densities.

For example, in order for a pine stand with a site index of 19 metres to have a stand density of 1200 stems per hectare by the time it reaches free growing 15 years after planting, the initial planting density would have to have been about 1500 stems per hectare. At age 60 years, a pine stand established at 1200 stems per hectare will have six percent less volume than a similar stand established at 1500 stems per hectare.

With the exception of the stand establishment density and genetic gain information (see next factor), I conclude that the best available information was used to estimate the volumes of managed stands for use in the base case. The use of free-growing stand densities instead of stand establishment densities results in a six percent underestimation in the base case harvest levels starting in 2066 and I will account for this in my determination as discussed under '**Reasons for Decision**'.

- genetic gain

The Chief Forester's Standards for Seed Use require the use of the best available seed when replanting Crown land. Therefore, Class 'A' select seed, which is produced by trees that have been bred for better growth, disease resistance etc. is used instead of Class 'B' seed collected from wild stands, when available. The superior growth of Class 'A' select seed over Class 'B' seed is expressed in terms of 'genetic worth' (GW). For example, trees grown from Class 'A' select seed with a GW of 10 percent are projected to gain 10 percent more volume at a given age than Class 'B' seed.

In the Merritt TSA, reforestation using seedlings grown from Class 'A' select seed began in about 2004. In order to calculate the GW for use in the base case, data from the ministry's Tree Improvement Branch was summarized for those stands planted since 2004. Prorating the GW based on the degree of deployment resulted in GW values for pine and spruce of 1.69 percent and

13.3 percent, respectively. These genetic gains were applied to both the ‘new managed stands’ and ‘future managed stands’.

The genetic worth of Class ‘A’ seed available for use in the Merritt TSA has improved over time, such that the genetic worth values for pine and spruce planted since 2010 have increased by two percent and four percent, respectively. Using these values instead of the values based on planting since 2004 increases the stand yields for pine and spruce stands at age 60 years by two percent and five percent, respectively.

As described in volume estimates for regenerating stands, the term ‘future managed stands’ applies to stands after they have been harvested for the first time in the timber supply model. As these stands will be planted with class ‘A’ seed with genetic worth values at or above the values for seedlings planted since 2010, I conclude that the base case harvest level is underestimated in the range of two to five percent, beginning in 2066. I will account for this in my determination as discussed in the ‘**Reasons for Decision**’ section of this document.

- minimum harvest criteria

Minimum harvest criteria are used to establish the minimum requirements that all stands must meet before they are eligible for harvest in a timber supply model. In the base case, both natural and managed stands that were clearcut had to attain a minimum volume of 0.2 cubic metres per tree as well as a minimum stand volume of 150 cubic metres per hectare. Partially harvested stands (dry-belt Douglas-fir stands) had to achieve a minimum volume of 0.2 cubic metres per tree and at least 120 cubic metres per hectare. In order to prevent young stands that had reached the minimum volume criteria from being harvested in the model before they had reached peak productivity, all stands were also required to reach a minimum harvest age of 60 years.

The minimum volume criteria were developed using recent appraisal data provided by Tolko, Weyerhaeuser and BC Timber Sales. Weyerhaeuser and BC Timber Sales provided both gross and net volumes, in an attempt to equate volumes more closely to the inventory volumes (net volumes can reflect coarse categorical adjustments to account for dead timber). Tolko provided net and realized volumes.

Analysis of the Weyerhaeuser and BC Timber Sales data showed that 95 percent of the area harvested had gross volumes of at least 202 cubic metres per hectare, and half of the area harvested had gross volumes of 375 cubic metres per hectare. Tolko’s data showed similar results.

Although the base case minimum volume criterion for clearcut stands was set at 150 cubic metres per hectare, a limit was placed on the contribution of lower volume stands with volumes above between 150 and 200 cubic metres per hectare. The contribution of these stands was limited to 10 percent of the total harvest level projected in the base case to reflect that there is a low level of demonstrated harvest performance in these stands.

Input received from Weyerhaeuser suggested that the minimum merchantable stand volumes be reduced to 75 cubic metres per hectare, noting that past performance in these stands was limited because better stands were available and salvage activity was focused the in higher volume beetle-impacted stands. The licensee cited that harvest in adjacent areas includes these lower volume stands. Weyerhaeuser also stated that the minimum age criterion for regenerating stands should be removed noting that it unnecessarily constrains timber supply.

Similar input was submitted from Tolko, noting that minimum volumes of 80 and 120 cubic metres per hectare for pine and non-pine stands, respectively, would be more appropriate. Tolko also requested that the constraint on the harvest of low volume stands in the base case be removed. Tolko also recommended removal of the minimum harvest age criterion. Input

received from Aspen Planers stated that the minimum stand and stem volume restrictions as well as the minimum age requirement were not realistic, noting that their mill can accommodate smaller piece sizes from younger trees.

In response to the input, several sensitivity analyses were prepared to assess the impacts of changes to minimum harvest criteria on timber supply. As well, licensee harvest performance data from adjacent TSAs was reviewed.

A sensitivity analysis in which the minimum harvest volume constraint was removed showed that the initial harvest level could increase by 9.5 percent to 1.27 million cubic metres per year. In addition, the harvest level increased to 1.43 million cubic metres per year after 50 years. The long-term level was the same as in the base case. In the initial five years of the sensitivity analysis forecast, approximately 50 percent of the harvest volume came from low volume stands.

Another sensitivity analysis in which the low stand volume constraint was removed, the minimum age was reduced to 45 years, and low volume stands were modelled as an even-flow contribution showed an initial harvest level of 1.3 million cubic metres per year with a contribution of 250 000 cubic metres per year from stands with less than 200 cubic metres per hectare.

An additional sensitivity analysis in which the age constraint was removed showed the same results, suggesting that the minimum age of 45 years was not constraining to the timber supply.

Review of the appraisal data in the Cariboo TSAs did show demonstrated performance in low volume stands. However, the performance in the adjacent TSAs showed that only 16 percent of the Kamloops TSA harvest and five percent of the Okanagan TSA harvest were attributable to low volume stands. Data from the Merritt TSA, when adjusted to exclude the period when small diameter pine licences were active, showed the harvest contribution from stands with less than 200 cubic metres per hectare to be 13 percent. The area weighted average between 1996 and 2014 indicates that 8.4 percent of the harvest in the Merritt TSA occurred in lower volume stands.

I accept that a 60-year minimum harvestable age reasonably reflects the average criteria for all commercial tree species in the TSA. I acknowledge that in the future, there could be opportunities in the Merritt TSA for licensees to access stands with lower volumes and smaller piece sizes than historically harvested, and that this possibility if realized suggests the projected timber supply decline in the Merritt TSA could be mitigated to some extent by the harvest of these stands. The sensitivity analysis results indicate timber supply could be greater than suggested in the base case if licensee practices were to shift to harvest in these lower volume stands. However, for this determination, I note that current demonstrated performance supports the assumptions for the minimum harvest criteria applied in the base case. I note that in the sensitivity analysis in which a higher initial harvest level was attained requires that 50 percent of the harvest originate from low volume stands. While this may reflect potential future operational practices, it does not reflect the current situation in the Merritt TSA. Based on all of the considerations discussed above, I accept the minimum harvest criteria used in the analysis and will make no adjustment to the base case on this account.

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

- silviculture systems

In the base case, dry-belt fir stands - largely all Douglas-fir leading stands on south-facing slopes were assumed to be harvested using uneven aged silviculture systems. To reflect this in the base case, 20 percent of the dry-belt fir stands were modelled as clearcut with reserves, and 80 percent were modelled as single tree selection with 50 percent of the stand basal area removed at the time of harvest. These stands were assumed to regenerate naturally and therefore natural stand yield

curves were used to represent their development. Stands were required to have a minimum volume of 120 cubic metres per hectare in order to be eligible for harvest. The contribution of these stands to the base case harvest forecast was modelled as an even-flow of 51 000 cubic metres per year. All other stands in the base case were assumed to be harvested using clearcut systems.

Staff indicate that the predominant silviculture system used in the Merritt TSA is clearcut with reserves comprising over 98 percent of the area harvested between 2008 and 2013. They also note that although there has been very little harvesting in the dry-belt fir stands over the past 30 years, they expect that licensees will resume harvesting these stands now that the salvage of dead pine is ending.

The dry-belt fir sites are subject to unique reforestation challenges due to the drought stress as a result of low growing season precipitation and high temperatures. These stands have a variety of canopy layers and gaps between and within stands and contain high wildlife values for biodiversity, species at risk and ungulate winter range, cultural heritage resource values and values for visual quality. Staff indicate that the minor amount of harvesting using clearcut with reserves that has occurred in the Merritt TSA has resulted in regeneration challenges, due both to their unique characteristics as well as the inclination of cattle to forage in the open areas.

For this determination I accept that the silvicultural system assumptions used in the analysis are adequate and I will make no adjustment to the base case on this account. However, I encourage licensees to develop and implement appropriate harvest and management regimes that recognize the unique characteristics and high resource values associated with these stands. If harvesting does not occur in the dry-belt fir stands in the period after this determination, it may be necessary to exclude them from the THLB used in the next timber supply review. This would further reduce the mid-term timber supply and may necessitate further decreases in the AAC.

(iii) silvicultural treatments to be applied to the area:

- incremental silviculture

In the Merritt TSA, there has been very little incremental silviculture due to the need to focus on the reforestation of areas burned by wildfires. District staff indicate that approximately 813 hectares were fertilized in 2012, with an expected volume increase of 4.5 percent for the fertilized stands. This equates to an additional 11 405 cubic metres at the time of harvest.

Although there is some uncertainty as to whether the potential gross incremental volume associated with stand fertilization will be realized as it depends on future natural events in these stands, I accept that the total volume available for harvest in the mid - to long-term has been underestimated by up to 11 405 cubic metres. While this volume may be significant at an operational level, it is not large enough to affect the harvest levels projected in a strategic-level timber supply forecast and I will make no adjustment to the base case on this account.

(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:

As noted in Table 2, I accept that the factors related to this section of the *Forest Act* were appropriately addressed in the analysis, and I will not discuss them further in this document.

(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 and Range (now the Ministry of Forests, Lands and Natural Resource Operations) is required under the *Ministry of Forests and Range 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 objectives for various forest resources and values affect timber supply must be considered in AAC determinations.

- archaeological sites and First Nations cultural use and sensitive sites

First Nations have a long history of cultural resource use in their territories as evidenced by archaeological sites, structural features, heritage landscape features and traditional use sites. This factor considers both resources that are strictly archaeological and resources that are not exclusively archaeological (e.g., sites with ongoing traditional uses, including sacred sites).

A variety of archaeological tools are used in the Merritt TSA: Archaeological Inventory Studies (AIS), Archaeological Impact Assessments (AIA), Preliminary Field Reconnaissance (PFR), Traditional Use Studies (TUS), and Archaeological Overview assessments (AOA). Licensees have been working with First Nations through PFRs and other operational planning processes to conserve cultural heritage resources while minimizing the effect on timber production. New sites identified through operational planning processes between First Nations and licensees are typically excluded from timber harvesting.

In order to account for known archaeological resources, a gross area of about 2160 hectares was excluded in the derivation of the THLB. These areas were identified using the mapped polygon information from the FLNR's Remote Access to Archaeological Data (RAAD) website. This database is updated with new information on monthly basis. After accounting for overlaps with areas excluded from the THLB to account for other factors, such as riparian areas, wildlife habitat areas and old-growth management areas, about 20 percent of the gross area, 588 hectares was excluded from the THLB solely to account for known archaeological resources.

A review of RAAD data used in the previous timber supply review indicated that about 40 new archaeological sites are identified each year, for a total of about 45 to 50 hectares per year. Although archaeological sites identified following an AAC determination are accounted for at the time of the next determination, protection of the sites during operations begins as soon as they are identified.

Stoyoma Mountain is a spiritually significant area in the Merritt TSA. The Stoyoma Area of Interest is estimated to occupy about 6969 hectares or 1.25 percent of the current THLB. In the absence of legal direction from government regarding land use in this area, and in recognition that my authority in determining AACs does not include the establishment of land use objectives, the area was assumed to be available for harvest in the base case.

Current practice in the Cascades Natural Resource District is to involve First Nations to a very high degree where requested in the planning and harvest monitoring in the Stoyoma area. Licensees are encouraged to communicate any plans to harvest on Stoyoma Mountain with the District Manager in order that the district may work proactively with the licensees and First Nations on the planning phases. A proposed cutting permit in the Stoyoma Area that was

intended to help develop a better understanding of the relationships between harvest levels and resource values was initiated, but not supported by First Nations leaders. There has been little operational activity in the Stoyoma area and no harvest since 2009. District staff indicate the area includes dead pine and some cutblocks have been laid out but nothing is proceeding. There has been very little operational activity in the Stoyoma area.

In response to a request from the Nooaitch, a sensitivity analysis was conducted to assess the impact of not harvesting timber in the Stoyoma area. The Stoyoma area boundaries were made available by Chief Walkem in 2011 via Tolko; therefore, the 2011 boundary area for the purposes of the sensitivity analysis. In the sensitivity analysis, excluding the Stoyoma area from the current THLB decreased the base case short- to mid-term harvest levels by 1.25 percent and 2.25 percent, respectively

A XeXe, which is a spiritually important area, exists in the Missezula Lake area. No map of the area has been made available; however, based on a description of the area provided by First Nations, district staff believe that it occupies approximately 619 hectares of THLB. In the absence of legal direction from government, and in recognition of the limitations of my authority, the Missezula XeXe spiritual area was included in the THLB in the base case.

I am aware that culturally sensitive sites are often able to be managed during the operational planning process that provides for consultation and adaptations at the cutting permit level. However, given the extent of the two spiritually significant areas identified so far in the Merritt TSA, the high likelihood that additional sites will be identified, and the potential isolation of some stands by licensees accommodating First Nations interests it is unlikely that the management of these areas will not have an effect on timber supply. In order for this effect to be quantified and accounted for in an AAC determination, the location and extent of known culturally sensitive sites (and new sites as they are identified) needs to be made available to district staff.

I have considered the assumptions for archaeological sites, First Nations cultural use and sensitive sites used in the base case and the input provided by First Nations, as well as the direction provided by the provincial government. From this I conclude that although it is incomplete, the best available information was used in the base case. As discussed under '**Implementation**', I request that FLNR, licensees and First Nations work together to formalize a plan for the areas that respects the identified values and intended management for the areas. Where appropriate, I encourage these groups to seek legal direction from the provincial government. The new information and any changes in legal land use requirements can then be addressed in the next AAC determination.

- riparian requirements

During a review of the timber supply analysis, district staff found that the amount of area reserved to buffer streams had been underestimated. Staff indicated that this underestimation resulted in a one percent overestimation in the size of the THLB, which represents about a one percent overestimation in the base case harvest levels.

Draft fisheries sensitive watershed orders under the Government Action Regulation (GAR) have been proposed for the Coldwater River and Spius River watersheds in the TSA. These orders, if approved, will contain objectives designed to manage the fisheries-sensitive nature of these watersheds, including retaining vegetation, minimizing adverse sedimentation and regulate water flow. In addition, temperature sensitive stream designation under GAR is contemplated for the Nicola River watershed. These orders are in draft form at the time of this determination.

I accept that riparian requirements were not fully accounted for in the analysis and that this results in a one percent overestimation in the base case harvest levels. I will account for this in my determination as discussed under '**Reasons for Decision**'.

With respect to the GAR orders, I commend the work that is underway to improve the management of these resources. Timber harvesting will have to comply with the GAR orders after they are issued and the AAC implications of those orders can be accounted for in a subsequent AAC determination.

- wildlife habitat areas

In the Merritt TSA, a total of 122 wildlife habitat areas (WHAs) established through GAR orders were approved for the following species prior to September 2015: coastal tailed-frogs, grizzly bear, western rattlesnake, Williamson's sapsucker, spadefoot toad, Lewis's woodpecker and western screech owls. The management of these areas ranges from exclusion from harvest to constraints on the rate of harvest. Accounting for these areas resulted in the exclusion of a net area of 3645 hectares from the THLB used in the base case.

Following the timber supply analysis (in September 2015), 34 new Williamson's sapsucker WHAs were approved. In order to account for these areas, an additional 995 hectares should have been excluded from the THLB.

I have considered the information regarding the accounting for WHAs and I accept that the THLB has been overestimated by 0.2 percent. However, when taken in the context of a strategic level timber supply forecast, a THLB overestimation of this magnitude will have little effect on the base case and I will make no adjustment to the base case on this account. As noted in the previous factor, I encourage an analysis of co-location of other value requirements be undertaken.

- old growth management areas (OGMAs)

Under the Provincial Non-Spatial Old Growth Order forest licensees must maintain the target number of hectares of old forest by biogeoclimatic variant within each landscape unit stated within the order.

Non-legal spatial OGMAs have been identified on 114 467 hectares within the 12 landscape units in the Merritt TSA to meet the intent of the legal order. In the base case, the net area excluded from the THLB to account for these OGMAs was 56 758 hectares.

The Nlaka'pamux Nation Tribal Council asked how much OGMA volume has been impacted, whether any of the volume currently being considered for release is available and how replacement areas are tracked.

In response, district staff indicate that forest licensees are managing for old growth by incorporating the non-legal spatial OGMAs into their Forest Stewardship Plans. OGMA data provided by licensees for a 2014 old growth monitoring project showed that between 2005 and 2013, 689 hectares of OGMAs were deleted and 1134 hectares of forest were identified as OGMA replacements, for a net increase of 445 hectares in OGMAs. The harvest of OGMAs does not increase the volume available for harvest because licensees are expected to replace any harvested OGMAs with equivalent areas.

In a meeting with Chief Walkem of Cook's Ferry Indian Band, Chief Sampson of Siska Indian Band, and representatives from Coldwater, Nooaitch, Upper Nicola Band, Lower Nicola Indian Band, and Shackan Indian Band on October 26, 2015, I heard from Chief Walkem that they were concerned regarding the practice of harvesting and replacing OGMAs because the original OGMAs were often co-located with areas of cultural importance to the First Nations.

With respect to the practice of replacing OGMA's, I note that the 2014 OGMA monitoring project recommended value checks on the replacement areas to ensure the areas contain the suitable species, age classes and seral stages and provide for the original set of resource values. In addition, it is important to ensure that prior to the harvesting any OGMA's, licensees and district staff work with First Nations to ensure that cultural heritage values are appropriately managed. I support the 2014 OGMA monitoring recommendation and discuss it further under '**Implementation**'.

I have considered the information regarding how OGMA's were modelled in the base case, and I accept that these values have been adequately accounted for in the base case.

- ungulate winter range

Mule deer ungulate winter range (UWR) in the Merritt TSA was established through a January 2008 Government Action Regulation (GAR) order. This order also establishes UWR requirements for bighorn sheep, elk and white-tailed deer. There are over 1100 individual UWR planning cells in the TSA, and each contains a target percentage of snow interception cover based on species composition, age and crown closure of stands. The target varies for deep, moderate or shallow snowpack zones.

Targets for the deep and shallow snowpack zones were not explicitly modelled in the base case because the deep snowpack zone includes only 293 hectares. The targets for the shallow snowpack zone were assumed to be met operationally.

Due to limitations in the sophistication of the growth and yield model used in the analysis and the complexity of the order, the moderate snowpack requirements were modelled as a land base reduction in the base case. Applying the snow interception cover target of 33 percent, the total Crown forest area requirement was 48 868 hectares. While cover targets were met in 480 planning cells, they could not be met in 177 planning cells in the model, leading to a deficit of 5703 hectares or one percent of the THLB.

I have considered the information regarding the assumptions used to meet UWR requirements in the base case. I accept that meeting the objectives of the GAR order results in a one percent reduction in the timber supply projected in the base case across all time horizons. I will discuss this further in '**Reasons for Decision**'.

The base case harvest originates from stands of various species composition, terrain types, silviculture types (clearcut, selection), and volume composition. Therefore, the AAC I determine is predicated on the assumption that licensees will operate in the full range of stand types included in the THLB used in the base case. Therefore, as discussed in '**Implementation**', it is my expectation that licensees will harvest approximately 200 000 cubic metres per year from the UWR planning cells. Avoidance of these areas will impact mid-term timber supply and require additional decreases in the AACs. In order to monitor harvest performance, I expect licensees to report harvesting activities in the UWR planning cells (and dry-belt Douglas-fir as discussed under *silvicultural systems*) to the district. I request that the district monitor harvest performance and report this information to me on an annual basis.

- IRM-adjacency

Past practices in the Merritt TSA due to MPB salvage includes leniency on adjacency constraints to facilitate salvage of MPB-impacted stands. In the base case, adjacency requirements were modelled based on regulated forest stewardship plan requirements.

Adjacency was approximated by limiting the amount of area occupied by stands less than three metres in height within any watershed to 33 percent of the THLB. District staff note that

the constraint on timber supply of managing for adjacency operationally can be greater than demonstrated in the model, as operationally the projected harvest can be scattered across many watersheds and across the TSA.

Having considered the information about adjacency, and discussed it with district staff, I concur that timber supply is likely more constrained than demonstrated in the model, in particular due to the impact of the extensive salvage as a result of the MPB. For this determination, I will take into account that timber supply has been overestimated on this account by a small, unquantified amount, and will discuss this further in '**Reasons for Decision**'.

- *community watersheds*

There are nine designated community watersheds within the Merritt TSA. Interior Watershed Assessment Procedures (IWAPs) and Overview Hydrologic Assessments (OHAs) have been completed for most of these watersheds. Operationally, these areas are managed as per commitments in licensee's forest stewardship plans for a maximum allowable equivalent clearcut area (ECA) at any one time. Community watershed requirements were not modelled in the base case.

Staff indicate that if the 10 000 hectares in community watersheds was all available for timber harvesting it would represent 1.7 percent of the THLB. After accounting for the harvest constraints within community watersheds that allow timber harvesting albeit at a lower rate than in unconstrained areas of the THLB, including community watershed requirements would decrease the base case by less than one percent.

The Nlaka'pamux Nation Tribal Council asked whether reduced harvest levels in community watersheds were taken into account in the AAC calculations. In response, I note that under Section 8 of the *Forest Act* I am required to consider a wide range of non-timber values, which would include the effect of harvest constraints in community watersheds on timber supply, and that I have done so in this AAC determination.

For this AAC determination, not applying harvest constraints in areas identified as community watersheds results in up to a one percent overestimation in the base case and I will account for this in my determination as discussed in my '**Reasons for Decision**'.

- *wildlife tree retention*

Current requirements for wildlife tree retention to manage for stand level biodiversity objectives under the *Forest and Range Practices Act (FRPA)* depend on the biogeoclimatic zone in which harvesting occurs.

Although licensees have committed to a four-percent retention level in their forest stewardship plans, which is consistent with the FRPA requirements, actual wildlife tree retention is significantly higher. District staff used data from Forest and Range Evaluation Program (FREP) monitoring to determine the average percent retention occurring for cutblocks harvested between 2005 and 2013. The results suggest that after accounting for overlaps with areas excluded from the THLB for other factors, there is an additional retention of 8.1 percent for wildlife tree retention. District staff expect that wildlife tree retention will continue to be higher as licensees will likely continue to accommodate First Nations interests during their operations.

Following the release of the *Discussion Paper*, an error was discovered in the netdown procedures used to account for wildlife tree retention. A modification to the procedure to correct for this error resulted in a harvest forecast with a short- to mid-term harvest levels that were 30 000 cubic metres per year greater than the base case.

Having considered the information about wildlife tree retention, I note that the base case, while accounting for a higher retention than committed to in FSPs, does reflect current operational practices on the land base, and I accept it as the best available information for this determination. I conclude that due to the error in the land base exclusion applied for wildlife tree retention, the short- to mid-term harvest levels in the base case have been underestimated by 30 000 cubic metres per year. I will account for this in my determination as discussed in '**Reasons for Decision**'.

In addition, I encourage licensee and district staff to monitor retention performance, given the extent of areas harvested for MPB salvage and the importance of ensuring requirements for wildlife habitat are met. Any information available from this monitoring could inform whether FREP data, FSP data or an alternative approach best reflects operational practices for wildlife tree retention in future timber supply reviews.

- visual quality

An inventory of visually sensitive areas within Merritt TSA has been in place since the early 1990s, covering major highways, communities, lakes, and some trails. A lakeshore classification process was completed in 1998, and visual quality objectives were established for all 'A', 'B', and 'C' class lakes by the district manager on July 02, 1999. An updated visual landscape inventory for major travel corridors in Merritt TSA was completed in 2002, and visual quality objectives were subsequently established for these areas on September 30, 2003.

Visual quality objectives were modelled through specifying a maximum percentage of forest land within each visual polygon that could be below a given visually effective green-up height at any one time. These cover constraints were applied within each visual polygon. VQOs apply to approximately 16 percent of the TSA.

I have considered the information about the objectives for visual quality in the TSA and how it was modelled in the base case, and I accept that it was modelled appropriately. In response to licensee input regarding the level of constraint imposed as a result of visual quality objectives, I encourage licensees to work with FLNR staff to assess if any revisions are necessary, in particular given the amount of salvage in this area and the implications of this area being a significant transportation corridor. If appropriate, the visual inventory upon which the assumptions were based can be updated to ensure this particular FRPA value is being met effectively, and any new information can be incorporated into the next timber supply review.

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

- climate change

Current climate projections for the Thompson-Okanagan Region suggest that the region could see an increase in mean annual temperature of 1.6 to 4.4 Celsius. Southern portions of the region, including Merritt, may experience an even greater degree of warming. In addition, the region may experience more winter precipitation, in the form of rain, and less summer precipitation.

Climate changes of this magnitude will have major impacts on the forest ecosystems in the Merritt TSA. In the drier interior Douglas-fir and ponderosa pine ecosystems forests may shift to grasslands on southern aspects and at lower elevation due to the decrease in moisture and increase in fire frequency. Wetter and cooler ecosystems will be the least impacted by drought and may develop into new types of ecosystems.

In determining AACs it is not my practice to account for the potential climate change effects on timber supply and other resource values in any single AAC determination. However, due to the requirement for regular AAC determinations, these changes will be accounted for over time. In this decision, for example, I have considered information that has been updated to reflect the shifts that have occurred in stand composition due to the loss of mature lodgepole and ponderosa pine due to beetle infestations. However, without knowing what the magnitude or management responses will be to insect infestations or changes in fire frequency, tree growth, ecosystems etc. that have not yet occurred, I have not accounted for them in this AAC determination.

I have provided a more detailed description of how I account for climate change in AAC decisions under the *Guiding principles for AAC determinations* section of this rationale.

- cumulative effects

The Government of BC has supported the phased implementation of the Cumulative Effects Framework (CEF) that aims to provide relevant information and supporting policy. An operational trial associated with the CEF was a cumulative effects assessment (CEA) in the Merritt TSA area, focusing on fish habitat, moose, grizzly bear, mule deer, OGMAs, and visual quality.

I have considered the information presented through the cumulative effects assessment and note that it provides good information regarding the cumulative effects of all activities as well as natural events on the land base. I note that it is difficult to extrapolate from this information potential implications to timber supply, noting that the relationship of harvesting activities to the assessment results is not clear. I look forward to the refinement of these assessments over time, so that it might be possible to understand the timber supply implications and possible mitigation measures in future timber supply reviews.

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

- harvest performance

From 2010 to 2014 inclusive, 72 percent of harvested volume in the Merritt TSA was pine. I would like to commend licensees for their focus on salvage of the MPB-impacted stands as indicated by the data from the harvest billing system. The salvage harvest of volume from as many MPB-impacted stands as possible helps to ensure the majority of these damaged stands can be reforested and regenerated to productive stands for future timber supply.

- alternative harvest flows

In order to assess the potential implications of a higher initial harvest rate, two alternative harvest forecasts were prepared.

In both of these forecasts the initial harvest level was set between the level of the current AAC and the base case initial harvest level.

In the first alternative forecast, the initial harvest level was set at 2.0 million cubic metres per year for five years, after which the harvest level decreased to 1.08 million cubic metres per year, or about seven percent lower than in the base case. This level is maintained for 45 years before the harvest level begins to increase to the same long-term level as in the base case (1.50 million cubic metres per year).

In the second alternative forecast, the initial harvest level is set at approximately the level of the 2002 AAC of 1.5 million cubic metres per year. After five years the harvest level decreases to

1.13 million cubic metres per year, a level that is about three percent lower than in the base case. This level is maintained for 45 years before the harvest level begins to increase to the same long-term level as in the base case.

I have considered the results of these sensitivity analyses and note that both suggest there is very little flexibility in the initial harvest level. Increasing the initial harvest level above that suggested in the base case results in a greater decline after the first five years, which continues for 45 years. I have considered these results, specifically the lack of flexibility in the initial harvest levels, in my AAC determination.

(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;

Economic and Social Objectives

First Nations consultation

There are 26 First Nations Bands and 6 nation/tribal organizations whose territories encompass areas within the Merritt TSA. Eight First Nations are actively involved in the forestry sector and have obtained area- or volume-based forest tenures within the Merritt TSA. Currently 17 First Nations whose territories lie within or encompass portions of the Merritt TSA have Forest Consultation and Revenue Sharing Agreements (FCRSA's) with FLNR. Of these 17 First Nations, two communities and one tribal organization are signatories to the Stó:lō Strategic Engagement Agreement (SSEA), which contains provisions for consultation on administrative decisions including AAC determinations. These provisions were followed during the consultation process.

In 2010, when the current AAC was determined, the chief forester indicated that the Merritt TSA would likely need to be re-determined early than the 10-year requirement in the *Forest Act*. In January 2014, an initial letter was sent to First Nations informing them that a new TSR was going to be initiated. The letter also indicated that the process was going to be expedited due to concerns about the sustainability of timber supply and the stewardship risks to both timber and non-timber values in the Merritt TSA associated with the current AAC. First Nations were invited to meet with district staff prior to the start of the TSR to discuss the process. Two additional letters were sent to First Nations inviting them to meet with staff and to provide any information regarding their aboriginal interests.

In July 2015, First Nations were provided with a copy of the Merritt TSA timber supply analysis discussion paper. As indicated in the discussion paper, consultation was scheduled to end on October 15, 2015; however, during the formal consultation period as well as after it ended, I received requests from a number of First Nations for deeper consultation and to postpone my AAC determination.

In recognition of an existing agreement between the Nlaka'pamux Nation Tribal Council (NNTC) and the provincial government, I agreed to extend the consultation period for all First Nations until March 2016. Prior to my AAC determination I had opportunities to hear their concerns and recommendations provided by First Nations, both in person and by phone. In making this AAC determination, I have considered both this direct communication, as well as the written submissions provided by First Nations.

The discussions with First Nations covered a wide range of topics, including:

- preliminary strength of claim assessments and level of consultation undertaken;
- scope and extent of aboriginal interests and how they might be affected by an AAC determination;
- lack of meaningful consultation, mitigation and accommodation measures;
- requests to delay the determination of a new AAC;
- need to improve the information available about First Nations cultural values and the processes used to manage culturally sensitive sites;
- inadequate land use objectives and lack of appropriate protection of cultural values in some areas;
- inadequate access to wood fibre and economic benefits associated with timber; and
- requests for additional analysis and technical information.

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 (e.g., I informed regional tenures staff of the requests I received for enhanced participation in the apportionment and disposition of the AAC following this determination).

Additional sensitivity analyses were completed in the timber supply analysis to explore some of the questions raised by First Nations, including the Stoyoma and Mizzuela Xe Xe spiritually significant areas.

In keeping with agreements between the NNTC and the province, the NNTC in partnership with FLNR developed and implemented an information-sharing and shared-decision making pilot in the Merritt TSA. The process included the establishment of a joint NNTC/FLNR technical group who met to review the technical information, improve information sharing and develop a draft report for the NNTC Board. Following its consideration of this report, the NNTC Board met with me to provide its recommendations, which included the establishment of an information project to address the inclusion of cultural heritage and resource values and cumulative effects information in timber supply analysis; and establishment of a comprehensive forestry agreement process to facilitate and enable better forestry decision making.

Prior to this determination, I also met with members of the Siska and Cook's Ferry Indian Bands to discuss their concerns regarding: the timber supply review process and AAC determination, apportionment and disposition of the AAC, forest stewardship practices, land use requirements and cultural resource values.

Many of the comments I received, both during meetings and in written submissions (including the NNTC Board Report), included concerns about the inadequate accounting for cultural heritage resources in the base case. My consideration of these concerns is provided earlier in this rationale under '*archaeological sites and First Nations cultural use and sensitive sites*'.

I have considered the information received from First Nations and, where appropriate, I have addressed these concerns in my decision. I note that there were concerns identified which are not within my authority under Section 8 of the *Forest Act*, and other concerns identified that are being or can be addressed operationally. I am unable to speculate on decisions not yet made by other decision makers, such as land use decisions. I have, however, wherever possible, worked to bring concerns to the attention of other government authorities so that progress can be made to resolve issues that may be impacting operations and relationships in the Merritt TSA.

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.

- Minister's letter

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.

The Minister also emphasizes the mountain pine beetle outbreak in the interior of British Columbia. He indicates 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.

The minister, in another letter dated October 27, 2010 provided the Crown's objectives with respect to mid-term timber supply in areas affected by the mountain pine beetle.

With respect to the 2006 letter, 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 satisfied that the base case has incorporated the best available information regarding the impacts of the mountain pine beetle epidemic on stands in the Merritt TSA. As discussed elsewhere in this document, the mountain pine beetle epidemic in the Merritt TSA has ended, and much of the salvage of damaged pine stands has been completed.

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. In the applicable sections of this document I have provided my consideration of input from the public as well as First Nations.

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

- mountain pine beetle

The recent mountain pine beetle (MPB) epidemic started in the Merritt TSA in 2004, peaked in 2007 and declined significantly in 2010. The inventory data used in the timber supply analysis accounted for the epidemic through the provincial BCMPB model.

District staff indicate that the base case assumptions have accurately captured the impact of the MPB epidemic in the TSA.

I have reviewed the assumptions to account for MPB in the Merritt TSA, and I am satisfied that the impact on stands has been appropriately reflected in the base case and accompanying sensitivity analyses, and I will make no adjustments to the base case on this account.

- volume from dead pine

Dead pine volume was not included in the base case harvest levels because it is uncertain to what extent, if any, licensees will continue to harvest dead pine as it continues to deteriorate. In a sensitivity analysis, including the dead-pine volume increased the harvest in the first five-year period above the level in the base case by 150 000 cubic metres per year, 100 000 cubic metres per year and 50 000 cubic metres per year in the first, second and third five-year periods in the base case, respectively, for a total volume contribution of 1.5 million cubic metres over 15 years. After 15 years, the dead pine volume drops to zero because the timber is assumed to have degraded beyond the point where it has any further economic value.

In deciding whether to include the dead-pine volume in the AAC I have considered the extent to which Section 17(6) Cut Control Regulation grade 4 credits have been used in the Merritt TSA.

Section 17 (6) of the Cut Control Regulation allows licensees to apply to have grade 4 logs that are delivered to a non-lumber or veneer facility not count towards the volume attributed to their licence (this is often referred to simply as “grade 4 credit”). This allows the licensee to harvest an additional cubic metre of timber for each cubic metre that is approved under Section 17(6). Grade 4 logs are mostly from dead pine stands but can also originate from other species and be either live or dead.

District staff inform me that the grade 4 credit has proven to be an effective tool to encourage the salvage of beetle-killed timber in the Merritt TSA and has been used extensively. A review of cut control information shows that between 2007 and 2014, a total of 1 451 609 cubic metres or about six percent of the total volume harvested over the period was attributed as grade 4 credits.

District staff expect that the volume of grade 4 credits will continue to decrease over time as the dead pine continues to deteriorate; however, staff are still concerned that over harvesting the AAC will likely result if the volume is not accounted for at this time.

Input received from Weyerhaeuser stated that the modelling of the grade 4 harvest in the analysis was aligned with current policy, and noted that if grade 4 credits were to be discontinued this volume should be included in the AAC. Ledcor commented that volume from the dead pine should continue to be allowed as grade 4 credits and specifically, that cant facilities should continue to be eligible for the credits.

During our meetings, First Nations expressed their concern regarding the volumes attributed to grade 4 credits in the TSA, noting that this practice results in harvest levels that are higher than the AAC and creates sustainability issues. I share their concern and agree that if I assume that

dead pine volume contributes to the AAC and the practice of grade 4 credits continues harvesting may exceed the AAC I determine.

I am also aware of the risk that by excluding dead pine volume from the AAC licensees may choose to abandon any further salvage of dead pine in favour of green wood harvest. However, district staff believe that due to the significantly reduced timber supply, licensees will continue to salvage dead pine as long as it retains economic value and that the volume of grade 4 credits will continue to decrease.

In order to balance the risk of over-harvesting the AAC with the risk that licensees may abandon the salvage of dead pine I have decided to exclude 100 000 cubic metres per year of dead pine volume from contributing to the AAC. This means that during the first five years following this determination about 50 000 cubic metres per year of dead pine volume will be included in the AAC. If the amount of grade 4 credit exceeds 100 000 cubic metres per year in the Merritt TSA, it is my expectation that FLNR staff will ask the minister to issue an order limiting the volume of grade 4 credit available in the Merritt TSA. I will discuss this factor further in '**Reasons for Decision**' and '**Implementation**'.

- non-recoverable losses

The modelling of non-recoverable losses is intended to account for the merchantable volume losses due to natural processes such as fire, wind and forest health.

Since 1999, losses due to spruce beetle have been steadily increasing in the Merritt TSA and averaged about 7000 cubic metres year in 2013. In addition, staff estimate losses from wind throw to average 18 000 cubic metres per year and losses from fire to average 22 000 cubic metres per year.

As discussed in the previous factor, dead pine volume was excluded from the base case. However, no accounting was made for the volume losses attributable to spruce beetle, wildfire or wind throw in the base case.

Having considered the information from district staff, I conclude that the base case harvest levels have been overestimated by about 47 000 cubic metres per year and I will account for this in my decision as discussed in '**Reasons for Decision**'.

Reasons for Decision

In reaching my AAC determination for the Merritt TSA I have considered all of the factors required under Section 8 of the *Forest Act* and I have reasoned as follows.

In the base case, the highest initial harvest level that could be obtained without subsequent decreases was 1.16 million cubic metres per year. This level could be maintained for five decades before increasing to 1.34 million cubic metres per year in 2064. The long-term harvest level of 1.5 million cubic metres per year was reached in 2094, which is eight decades from the beginning of the forecast period.

I am satisfied that the assumptions applied in the base case forecast for the majority of the factors applicable to the Merritt TSA were appropriate. However, I have identified a number of factors which, considered separately, indicate that the timber supply may be either greater or less than that projected in the base case. Some of these factors can be readily quantified and their impact on the harvest level assessed with reliability. Others may influence timber supply by adding an element of risk or uncertainty to the decision, but cannot be reliably quantified at this time. Following is my consideration of those factors for which I consider it necessary to further account for their implications to the timber supply.

I have identified the following factors in my considerations as indicating that the timber supply projected in the base case may have been overestimated:

Riparian requirements – the area reserved from harvesting to account for riparian values was underestimated by about one percent, resulting in about a one-percent overestimation in the base case harvest levels across the entire forecast;

Ungulate winter range – the area reserved from harvesting to fully account for the GAR ungulate winter range area was underestimated by about one percent, resulting in about a one-percent overestimation in the base case harvest levels across the entire forecast;

Community watersheds – the harvest constraints applied in the base case to account for community watersheds were underestimated, resulting in up to a one-percent overestimation in the base case harvest levels across the entire forecast; and

Non-recoverable losses – the non-recoverable losses due to spruce beetle, wind throw and wildfire were not excluded from the base case resulting in about a 47 000-cubic metres per year or four percent overestimation in the base case harvest levels across the entire forecast.

In addition, I concluded that the following factors were indicative of a potential overestimation in the timber supply to a degree that currently cannot be quantified with accuracy:

IRM-adjacency – the actual operational harvest constraints due to adjacency requirements are likely higher than reflected in the base case, resulting in a small unquantified overestimation in the base case harvest levels across the entire forecast.

I have identified the following factors in my considerations as indicating that the timber supply projected in the base case may have been underestimated:

Volume estimates for regenerating stands – as a result of stand density information from free-growing surveys being used in the base case instead of from establishment densities, the base case mid-term timber supply has been underestimated by six percent, beginning in 2066;

Genetic gain – as a result of an underestimation in the base case of the amount of class A seed used, the base case mid-term harvest level has been underestimated by between two and five percent, beginning in 2066; and

Wildlife tree reserves – an error in the application of the land base reduction applied to account for wildlife tree retention leads to an underestimation in the short- to mid-term timber supply of 30 000 cubic metres or 2.5 percent per year.

In addition to the adjustments to the base case listed above, and as discussed throughout this document, I have also considered the information and recommendations that I received from First Nations during our meetings, collaborative work undertaken with the NNTC, and in written submissions. Many of these considerations are described earlier in this document and have not been repeated in this section.

I agree with First Nations that the number and magnitude of culturally sensitive sites in the areas of the Merritt TSA encompassed by their traditional territories are underestimated. I also note that although culturally sensitive sites are often able to be managed during operational planning and by adaptations at the cutting permit level, this may not alleviate all of the associated timber supply impacts as more of these areas are encountered and made known to government.

I have considered the ongoing identification of areas of cultural importance to First Nations and the timber supply risks associated with these areas in this decision. As more information about the location and extent of known culturally sensitive sites that were not accounted for in the base case is made known and government provides land use objectives for these areas, I will be able to account for these areas more explicitly in AAC determinations.

In response to the recommendations I received from First Nations, I am prepared to review any new information and/or the land use objectives established by government as they become available. If the new information and/or requirements suggest that maintaining the AAC could significantly increase the risk to timber supply sustainability, forest stewardship or First Nations interests, I am prepared to determine a new AAC for the Merritt TSA earlier than required in legislation.

In addition to the factors summarized above, I also note that I am accounting for an additional 50 000 cubic metres per year of dead pine volume for the next five years, an amount that was not accounted for in the base case, which therefore represents an increase in timber supply of 4.3 percent in the short term. An additional 100 000 cubic metres of volume from dead pine stands is assumed to be available in the short term outside the AAC.

I have also considered one of the alternative harvest forecasts, which showed that an initial harvest level of 1.5 million cubic metres could be maintained for five years before decreasing to 1.13 million cubic metres for the second five-year period. This lower level could then be maintained for 45 years.

I note that the factors discussed above, in summation, suggest that the short- to mid-term timber supply is somewhat greater than suggested in the base case and alternative harvest forecasts. I am aware that reducing the harvest from its current level of 2.4 million cubic metres to the level projected in the base case or in the alternative harvest forecast discussed above represents a significant decrease and that this has serious implications for the economic stability of local communities in the Merritt TSA.

In consideration of all the information, I have decided to establish a two-tiered AAC for the Merritt TSA. Effective immediately and for the next five years, the new AAC will be 1.5 million cubic metres, after which it will be 1.2 million cubic metres. I am not going to establish a partition in the AAC at this time. However, I am deeply concerned that if after this determination licensees do not harvest low-volume stands (stands with volumes between 150 and 200 cubic metres per hectare) and dry-belt fir stands to the extent assumed in the base case and alternative harvest forecasts, the mid-term timber supply will be negatively affected and that this may require further reductions in the AAC.

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 and that reflects current management practices as well as the socio-economic objectives of the Crown, can be best achieved in the Merritt TSA by establishing an AAC of 1 500 000 cubic metres for the five-year period between March 30, 2016 and March 29, 2021. Effective March 30, 2021, the AAC will be 1 200 000 cubic metres. This AAC will remain effect until a new AAC is determined, which is required to take place within 10 years 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 FLNR staff and licensees to undertake the tasks and studies noted below that I have also mentioned in above sections of this document.

I recognize that the ability of staff to undertake these projects is dependent on available time and funding. These projects are, however, important to help reduce the risk and uncertainty associated with key factors that affect the timber supply in the TSA:

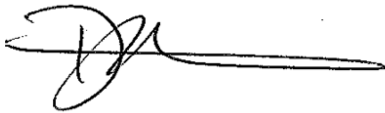
Environmentally sensitive areas and inoperable areas – I recommend that district staff and licensees expand the available terrain stability mapping, particularly in areas of steeper slopes, to better estimate the area suitable for timber harvesting.

Cultural heritage resource, spiritually significant areas – I strongly encourage FLNR, licensees and First Nations to work together to formalize a plan for these areas that respects the identified values and intended management for the areas.

Old growth management areas – as recommended in the 2014 OGMA monitoring project, I request that value checks be conducted on replacement OGMA areas to ensure they contain at least equivalent attributes for old growth, and that prior to harvesting of an OGMA, licensees and district staff work with First Nations to ensure that the values supported by the original areas are maintained.

Community fire interface - I support the implementation of a system to track these minor depletions over time, so that they can be appropriately factored into timber supply analysis.

Harvest performance – I expect licensees to perform in the stand profile assumed to contribute to timber supply – including dry-belt fir and lower volume stands of between 150 and 200 cubic metres per hectare and report on this performance to the district. I expect district staff to report this harvest performance information to me on an annual basis.



Diane Nicholls, RPF
Chief Forester

March 30, 2016

Appendix 1: Section 8 of the *Forest Act*

Section 8 of the *Forest Act*, Revised Statutes of British Columbia 1996, c. 157, (current to March 9, 2016), 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 March 9, 2016) 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

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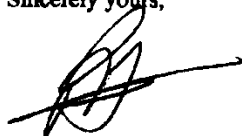
Jim Snetsinger

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.

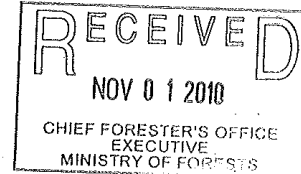
You should also consider important local social and economic objectives expressed by the public during the Timber Supply Review process, where these are consistent with the government's broader objectives as well as any relevant information received from First Nations.

Sincerely yours,

A handwritten signature in black ink, appearing to be 'RC', 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
Land Management Bureau

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