BRITISH COLUMBIA

MINISTRY OF FORESTS, LANDS AND NATURAL RESOURCE OPERATIONS

Tree Farm Licence 18

held by

Canadian Forest Products Ltd.

Rationale for Allowable Annual Cut (AAC) Determination

Effective July 13, 2017

Diane Nicholls, RPF

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 in making my determination, under Section 8 of the *Forest Act*, of the allowable annual cut (AAC) for Tree Farm Licence 18 (TFL 18). This document also identifies where new or better information is needed for incorporation in future determinations.

Statutory framework

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

Description of the TFL

TFL 18 is held by Canadian Forest Products Ltd. ("Canfor" the TFL Holder) and is located immediately northwest of Clearwater, approximately 30 kilometres west of the Canfor sawmill in Vavenby, B.C. Other communities located near TFL 18 include Kamloops, Barriere and Little Fort. The Ministry of Forests, Lands and Natural Resource Operations (FLNRO) district that administers this TFL is the Thompson Rivers Natural Resource District which has offices located in both Kamloops and Clearwater. Economic activity in the area includes forestry, fishing, ecotourism and mining.

The TFL is a contiguous unit covering an area of 74 266 hectares of which 68 435 hectares are productive forest land. Terrain is undulating, within an elevation range of 516 to 1989 metres. The majority of the TFL is easily accessible by road.

The main commercial tree species are spruce, lodgepole pine, subalpine fir (also known as balsam), Douglas-fir, western hemlock and western redcedar.

There are four First Nations communities that have asserted traditional territory overlapping with the TFL 18 area: Adams Lake Indian Band, Canim Lake Indian Band, Neskonlith Indian Band, and Simpcw First Nation.

Adams Lake Indian Band, Neskonlith Indian Band, and Simpcw First Nation belong to the Secwepemc (Shuswap) Nation and the Shuswap Nation Tribal Council. Canim Lake Indian Band belongs to the Northern Secwepemc te Qelmucw (NStQ) Nation and the Northern Shuswap Tribal Council.

The Adams Lake Indian Band is a signatory to the Secwepemc Reconciliation Framework Agreement (RFA). The Secwepemc RFA is a Strategic Engagement Agreement that has been extended until April 2018. The Little Shuswap Lake Indian Band also signed this recently extended RFA. All four bands asserting territory in the TFL 18 have active Forest Consultation and Revenue Sharing Agreements (FCRSA's).

The Northern Shuswap Tribal Council (NStQ) is negotiating with British Columbia and Canada in the BC Treaty Process on behalf of its four member bands. The NStQ treaty group is at Stage Four of negotiations. The Province tabled a revised Agreement-in-Principle (AiP) offer on August 27, 2014, that was accepted in November 2014. The four NStQ communities held successful AiP votes in February and April 2016 triggering the first phase of Interim Treaty Agreement land transfers to the amount of 3760 hectares to

the four communities. The Canim Lake (Tsq'escen') Incremental Treaty Agreement was completed in 2016.

History of the AAC

TFL 18 originally issued in November 1954 to Clearwater Timber Products Ltd, was assigned to Slocan Forest Products Ltd in 1987 and then to Canfor in 2004.

The AAC for the TFL was set at 70 792 cubic metres in 1955 and increased incrementally to 210 000 cubic metres through to 1988. The increases were done primarily to incorporate the expanding use of lodgepole pine as a commercial species, closer utilization practices and improved inventory information. The AAC was then incrementally decreased between 1989 and 2000 to 177 650 cubic metres. In 2006, the AAC was increased to 290 000 cubic metres to address salvage harvesting of lodgepole pine-leading stands that had been attacked by the mountain pine beetle (MPB), and the salvage of other stands affected by other forest health agents such as the spruce bark beetle.

New AAC determination

Effective July 13, 2017, the new AAC for TFL 18 will be as follows:

- From July 13, 2017 to July 12, 2022, is 175 000 cubic metres.
- After July 12, 2022, until the next determination, the AAC will be 137 000 cubic metres.

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

Information sources used in the AAC determination

The information sources considered in determining this AAC for TFL 18 include the following:

<u>Legislation</u>

- *Forest Act* and regulations, BC Government, current to June 16, 2017;
- *Ministry of Forests and Range Act,* BC Government, current to June 16, 2017;
- *Forest and Range Practices Act* (*FRPA*) and regulations and amendments, BC Government, current to June 16, 2017;
- *Forest Practices Code of British Columbia Act,* BC Government, current to June 16, 2017, and regulations and amendments;
- Forest Practices Code of British Columbia Biodiversity Guidebook, Province of British Columbia, September 1995;
- *Land Act,* BC Government current to June 16, 2017;
- *Environment and Land Use Act,* BC Government current to June 16, 2017;
- *Parks and Protected Areas Statutes Amendment Act,* BC Government current to June 16, 2017;

- *Species at Risk Act,* Government of Canada (S.C 2002, c29) current to June 22, 2017;
- *Forestry Revitalization Act,* BC Government current to June 16, 2017;
- *Heritage Conservation Act,* BC Government current to June 16, 2017;
- *Interpretation Act,* BC Government current to August 17, 2016;
- *Oil and Gas Activities Act* and regulations and amendments, BC Government current to June 16, 2017;
- *Wildlife Act,* BC Government, current to June 16, 2017;

Minister's Letters

- Letter from the Minister to the Chief Forester, Re: Economic and Social Objectives of the Crown, July 4, 2006;
- Letter from the Minister to the Chief Forester, Re: Economic and Social Objectives of the Crown Regarding Mid-Term Timber Supply in Areas Affected by the Mountain Pine Beetle, October 27, 2010;

TFL Holder Plans and Timber Supply Review Documents

- Canadian Forest Products Ltd. Vavenby Division Tree Farm License #18 Management Plan #11, including Information Package and Timber Supply Analysis, Canadian Forest Products Ltd. January 17, 2017;
- Letter from Canadian Forest Products Ltd. requesting an AAC of 201 000 cubic metres, October 2016;
- Tree Farm Licence 18 Canadian Forest Products Ltd. Rationale for Allowable Annual Cut (AAC) Determination, BC Ministry of Forests and Range, March 9, 2006;

Land Use Documents

- Nicola Thompson Fraser Sustainable Forest Management Plan, January 2017;
- Kamloops Land and Resource Management Plan Higher Level Plan Order Amendment, February 2009;
- Identified Wildlife Management Strategy–Accounts and Measures for Managing Identified Wildlife, Coast Forest Region Version 2004, Province of BC, 2004;
- Government Actions Regulation (GAR) Orders applicable to TFL 18;
- Established old growth management areas, Ministry of Forests, Lands and Natural Resource Operations, current to July 1, 2016;
- Approved Ungulate Winter Ranges, Ministry of Environment, current to July 1, 2016;
- Approved Wildlife Habitat Areas, Ministry of Environment, current to July 1, 2016;

- Lakes Local Resource Use Plan, Lakeshore Management Guidelines, Clearwater Forest District, Ministry of Forests, August 1, 2001;
- Recovery Strategy for the Woodland Caribou, Southern Mountain population (*Rangifer tarandus caribou)* in Canada, Species at Risk Act Recovery Strategy Series, Environment Canada, 2014;

First Nations

- Updated Procedures for Meeting Legal Obligations when Consulting First Nations, May 7, 2010;
- First Nations Consultation Summary TFL 18, Ministry of Forests, Lands and Natural Resource Operations, Consultation Report and Tracking System – TFL 18 MP # 11 and TSR, July 2016;

Other related reports

- Adapting natural resource management to climate change in the Thompson-Okanagan Region: Considerations for practitioners and Government staff, Ministry of Forest Lands and Natural Resource Operations, February 22, 2016;
- Monitoring Harvest Activity Across 28 Mountain Pine Beetle Impacted Management Units, Huapeng Chen and Adrian Walton, March 2016;
- Protocol for Visual Quality Effectiveness Evaluation Procedures and Standards, Forest and Range Evaluation Program, BC Ministry of Forests and Range and BC Ministry of Environment, October 2008;
- Procedures for Factoring Visual Resources into Timber Supply Analyses, British Columbia Ministry of Forests, 1998;
- TFL 18 Documentation of Vegetation Resources Inventory Statistical Analysis prepared for Forest Analysis and Inventory Branch, Ministry of Forests, Lands and Natural Resource Operations by Margaret Penner, Forest Analysis Ltd. Huntsville, ON, November 16, 2012;
- TFL 18 Analysis of Intermediate Utilization (IU) Balsam Addendum to TFL 18 VRI Statistical Analysis prepared for Forest Analysis and Inventory Branch, Ministry of Forests, Lands and Natural Resource Operations by Margaret Penner, Forest Analysis Ltd. Huntsville, ON, December 12, 2012;
- Cumulative Effects Framework: Assessing and Managing Cumulative Effects in British Columbia, Ministry of Forest Lands and Natural Resource Operations June 2016;
- ClimateBCv5.40 climate model, University of British Columbia February 1, 2017;

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 TFL 18 I have considered the known limitations of the technical information provided. I am satisfied that the information provides a suitable basis for my determination.

Guiding principles for AAC determinations

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

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

When considering the factors required under Section 8, I am also mindful of my obligation as a steward of the forests of British Columbia, of the mandate of the FLNRO 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 purposes of the FLNRO is to plan the use of forest and range resources such that the various natural resource values are coordinated and integrated. In addressing the factors outlined in Section 8 of the *Forest Act*, I will 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:

1. 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
2. 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

Established (declared) Aboriginal title lands and other areas, such as Treaty Settlement Lands or Indian Reserves, are not provincial Crown land. Consequently, the timber on these lands does not contribute to the AAC of the timber supply area or tree farm licence with which they overlap. For other areas, where Aboriginal title has not been legally proven**,** the Crown has a constitutional obligation to consult with First Nations regarding

their asserted Aboriginal rights and title (Aboriginal Interests) in a manner proportional to the strength of their Aboriginal Interests and the degree to which the decision may impact these interests. In this regard, full consideration will be given to:

(i) the information provided to First Nations to explain the timber supply review process;

(ii) any information brought forward through engagement and consultation respecting First Nations' Treaty rights or Aboriginal Interests, including how these rights or interests may be impacted; and

(iii) any operational plans and/or other information that describe how First Nations' Treaty rights or Aboriginal Interests are addressed through specific actions and forest practices.

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

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

The role of the base case

In considering the factors required under Section 8 of the *Forest Act* to be addressed in AAC determinations, I am assisted by timber supply projections provided to me through the work of the Timber Supply Review (TSR) program 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 projections 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 projections, 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 projection 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 projections, 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 projection of timber supply, whose validity - as with all the other projections 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 supplies 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.

Timber supply analysis

The timber supply analysis for the TFL 18 Management Plan No. 11 (MP #11) was prepared for the TFL Holder by Ecora Engineering and Resource Group Ltd. using the forest estate model Patchworks. Patchworks is a spatially explicit forest management planning model in which targets for multiple objectives can be set within a goal planning framework. Based on review by FLNRO staff and my previous experience reviewing the results of this model, I am satisfied that Patchworks is capable of providing reasonable projections of timber supply that form a sound basis for AAC determinations.

The base case was intended to reflect current forest management objectives and practices in TFL 18. Given the substantial conclusion of pine salvage operations in the TFL, the TFL Holder determined at the onset of the analysis that the current AAC for TFL 18 of 290 000 cubic metres could not be achieved over the first decade of the harvest projection. For this reason, the base case was developed with an objective to maintain the highest initial harvest level that could be sustained in that decade. Concurrently, the harvest flow was restricted to declines of no more than 10 percent per decade while maintaining the highest mid-term harvest level possible and a minimum growing stock level of 4.8 million cubic metres during the last 25 years of the planning horizon, which is the minimum growing stock that the TFL Holder deemed necessary to support continuing operations. The harvest was also maximized throughout the 250 year projection. The extent to which these objectives were achieved was influenced by a weighting system applied within the optimization model. Greater weight was placed on achieving the highest sustainable harvest levels in the first five decades of the projection

than on achieving higher harvest levels through the remaining (mid- and long-term) of the projection.

Other modelling requirements applied in the base case include the requirement for cutblocks indicated in operational plans to be scheduled for harvest by the model in the first decade of the projection. Mature pine-leading stands in the current inventory, which were impacted by MPB, that are not scheduled for harvest in operational plans were regenerated in the model as natural stands following a 15 year regeneration delay period.

The timber supply indicated by the base case projection was net of estimated unsalvaged losses related to fire and wind throw. Losses attributed to mountain pine beetle, spruce bark beetle and spruce budworm outbreaks were accounted for by adjustments made to the live volume estimates of impacted stands.

The forested non-timber harvesting land base (non-THLB) was modelled for the base case in accordance with the natural disturbance return intervals specified in the Biodiversity Guidebook (Province of BC, September 1995). All non-timber resource values and land base objectives were respected throughout the harvest projections.

The base case harvest was projected to begin January 1, 2014, with an initial harvest level of 145 000 cubic metres for the first ten years. This was followed by a decline to 130 000 cubic metres in the second decade and then to the mid-term level of less than 119 000 cubic metres in the third decade. In the sixth decade, the harvest increased to 132 000 cubic metres, after which the harvest slowly increased to 184 000 cubic metres by the 25th decade.

Two alternate harvest projections were also completed to examine uncertainty around the base case. The first maximized harvest across the entire planning horizon (versus achieving the maximum possible in the short and mid-term), and the second projected a non-declining harvest level over the first 50 years of the planning horizon.

These harvest projections are predicated on the condition of the forest, including the amount of merchantable timber growing stock, at the time the information package was assembled for this analysis. The initial timber growing stock was not depleted to account for the potential future harvest of unharvested (undercut) AAC that has accumulated in the period before 2014. Therefore, any volume harvested – including undercut volume – above the levels projected in the base case would constitute use of the growing stock at a greater rate than projected in the base case.

I have reviewed the information and I accept these projections including the base case and alternate projections for the purposes of this determination.

As discussed and quantified throughout this rationale, and in consideration of the items described above, I am satisfied the base case projection and associated analyses presented in MP#11 provide an adequate basis from which I can assess the timber supply for TFL 18 in this determination.

Consideration of factors as required by Section 8 (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 1.

Table 1. List of accepted factors

***Forest Act* section and description**	**Factors accepted as modelled**
8(8)(a)(i) Composition of the forest and its expected rate of growth	• TFL 18 land base • Unstable terrain • Environmentally sensitive areas • Permanent sample plots • Deciduous • Non-merchantable stands • Site productivity • Volume estimates for future stands
8(8)(a)(ii) Expected time that it will take the forest to become re-established following denudation	
8(8)(a)(iii) Silvicultural treatments to be applied	• Silvicultural systems • Tree fertilization • Genetic gain for managed stands
8(8)(a)(iv) Standard of timber utilization and allowance for decay, waste, and breakage	• Utilization standards and compliance • Decay, waste and breakage
8(8)(a)(v) Constraints on the amount of timber produced by use of the area for purposes other than timber production	• Resource management objectives • Old growth management areas • Stand level biodiversity • Recreation • First Nations: cultural heritage and archaeological resources • Riparian management • Kamloops Land and Resource Management Plan • Sustainable Forest Management Plan
8(8)(a)(vi) Any other information that relates to the capability of the area to produce timber	
8(8)(b) Short and long term implications to British Columbia of alternative rates of timber harvesting	• Harvest sequencing and alternative harvest flows
8(8)(d)Economic and social objectives of the Crown	• Economic and employment implications • Economic and social objectives of the Crown • Social and economic objectives of the Crown Regarding mid-term timber supply in areas affected by the Mountain Pine Beetle • Summary of public input/local objectives

Table 1. List of accepted factors

Forest Act **section and description**	**Factors accepted as modelled**
8(8)(e) Abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area	

I discuss below, those factors for which more uncertainty exists, or where public or First Nations' input indicates contention, or where the issue is integral to my reasoning for this decision. I present these factors in accordance to the relevant section of the *Forest Act*.

Factors requiring additional explanatory consideration

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

Section 8 (8) (a) the rate of timber production that may be sustained on the area, taking into account

Section 8 (8) (a) (i) the composition of the forest and its expected rate of growth on the area 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

Land base contributing to timber harvesting

-general comments

As part of the timber supply modelling process, the land base that is available for harvesting in the model (i.e., the THLB) was derived based on consideration of ecological, economic and social factors. These considerations may be legally established no-harvest zones or may be modelling surrogates for current practices that restrict harvesting within the crown managed forest land base. As such, because the THLB is a strategic-level estimate derived for the purpose of timber supply modelling, the inclusion or exclusion of an area in the THLB may not always agree with whether or not it will be harvested operationally.

The total area of TFL 18 is 74 266 hectares. Of this total area, 53 306 hectares are deemed to be available as the THLB after deductions are applied for factors noted in Table 1 above and in factors discussed below. This THLB is 16 percent smaller than the THLB identified in the previous management plan. While some of the decrease in THLB is attributable to changes in forest management, much of the decrease is attributable to changes in the approaches to modelling. For example, sufficient old forest was retained in the previous analysis through the application of forest cover objectives, while sufficient old forest was retained in this analysis through the exclusion of old growth management area (OGMA) from the THLB. While this change in the approach to modelling results in a smaller THLB for this analysis, the timber supply impact of meeting OGMA objectives would be the same following either modelling approach.

-forest inventory

The forest inventory used for the analysis is a Vegetation Resource Inventory (VRI) that was created using aerial photography flown in 2007 and photo interpretation completed in 2009. The inventory was updated for depletions and recent silviculture activity using the Reporting Silviculture Updates and Land Status Tracking System (RESULTS) and attributes of stands were then projected to January 1, 2014.

Ground sampling, following the VRI Phase II protocol was conducted in 2011 for the purpose of calculating stand attribute adjustment factors intended to improve the accuracy of the inventory. Seventy-two VRI Phase II ground sample plots (21 plots in the immature and 51 plots in the mature forest) were established over the TFL. However, the development of adjustment factors was hindered by complexities related to the mountain pine beetle mortality that occurred between 2007 and 2011. FAIB staff have since determined that more Phase II sample plots are necessary in order to reliably adjust the inventory attributes. The Phase II VRI adjustments were not applied in the base case projection.

The results of a VRI statistical analysis prepared for FAIB in 2012 indicate that the unadjusted VRI underestimates the volume of the balsam species strata and overestimates the volume of Douglas fir, pine, spruce and other species strata. In addition, FAIB staff believe that recent tree mortality from the spruce bark beetle, western balsam bark beetle, two-year cycle budworm and Douglas-fir beetle infestations generates additional uncertainty in the volume estimates of the mature inventory. This uncertainty is due to a number of reasons, including: the lengthy delay between the flying of the aerial photography and the subsequent VRI Phase II inventory ground sampling; the significant levels of mortality that have occurred since the aerial photography was flown; and insufficient field data assessing the forest health concerns and their implications on timber supply.

In the previous TSR, noting the importance of residual balsam stands to support the mid-term harvest level, the deputy chief forester directed the TFL Holder to improve the estimates of existing stand volumes and the projected growth of residual balsam stands. However, due to the significant losses from the mountain pine beetle, spruce bark beetle, western balsam bark beetle and two-year cycle budworm, the TFL Holder has not placed a high priority on work to improve the volume estimates for the residual balsam stands.

As balsam is 25 percent of the merchantable volume in TFL 18 and is expected to be a significant component of the volume that will be harvested over the term of this AAC determination, improved volume estimates for balsam stands are needed. Therefore, I expect the TFL Holder to improve the estimates of volume and projected growth of balsam stands for the next AAC determination as summarized in the **'Implementation'** section.

Having reviewed this information with FLNRO staff, I conclude that although the base case projection utilized the best available forest inventory information for TFL 18 there is significant uncertainty with respect to the mature portion of the inventory, particularly for stands that have been impacted by recent insect infestations. Statistical assessments suggest that unadjusted VRI inventory, which was used in the base case, may

overestimate timber volumes by an unquantified amount. I discuss this further under '**Reasons for Decision'**.

-species composition

The following are the leading tree species in stands across the TFL 18 THLB: spruce (41 percent), balsam (25 percent), pine (25 percent) and other species (9 percent). Under healthy forest conditions I would expect timber harvesting to be distributed across a similar profile. However, given salvage activity following the recent MPB infestation, the harvest profile has included a higher proportion of pine. Operational cruise data indicates that, of the total volume proposed for harvest between 1999 and 2014, 44 percent was pine, 37 percent was spruce, 10 percent was balsam and 9 percent was other species. This harvest profile is expected to change since most of the viable dead pine has been harvested and the TFL Holder indicates future harvest will be focused on spruce and balsam stands that are experiencing higher than normal levels of mortality. With this in mind, I anticipate over the term of this AAC that up to half of the harvest could come from spruce leading stands and up to one-third could come from balsam leading stands.

While the district staff anticipate the shift in harvest focus from pine to infested spruce and balsam stands, they are concerned that if the high-value spruce stands are harvested in a proportion that is substantially greater than assumed in the base case and the lesser-value balsam stands are harvested at a lower proportion than assumed, the future value of the remaining forest will be diminished, which may result in a mid-term harvest level that is lower than projected in the base case.

I share the district concern about the timber supply consequences if the level of harvest of balsam assumed in the projection is not realized, particularly if the remaining balsam stems are infested with western balsam bark beetle and two-year cycle budworm. In order to reduce the risk of this happening, I expect the TFL Holder to report annually the volume harvested from balsam leading stands and for district staff to report this performance to the chief forester, as summarized in '**Implementation**'. I am willing to re-determine the AAC earlier than the 10 years as legislated if adequate harvest performance of balsam stands does not occur. Alternatively, I may specify an AAC partition under Section 8(5) of the *Forest Act* to ensure that harvesting is not unduly concentrated on a particular timber type, terrain or geographic area.

In the previous AAC determination (2006), the deputy chief forester noted the importance of non-pine in supporting the mid-term harvest level and directed the TFL Holder to report on the amount of non-pine volume retained when harvesting mixed-wood stands, taking into account factors like windthrow hazard. The deputy chief forester also indicated the TFL Holder was expected to direct harvesting to stands with more than 60 percent pine.

The TFL Holder indicates their focus on harvesting mature stands containing greater amounts of dead pine since the previous AAC determination has largely been completed. The 197 000 cubic metres of dead pine volume that remains in the base case exists in scattered patches within mixed species stands. Despite this, the harvesting focus is still on salvaging dead and infested stands within TFL 18 with a shift away from dead pine to dead or damaged non-pine stands that have been attacked by other forests pests.

While I agree with the TFL Holder that the desire to retain non-pine volume is no longer applicable, I do see the need to ensure non-infested volume and most specifically healthy non-balsam species are retained to support harvesting through the mid-term.

Expected rate of growth

-volume estimates for existing stands

In the base case projection, all unharvested stands and stands established in areas that were harvested prior to 1964 were considered to be unmanaged, and stands established in areas harvested after January 1, 1964, were considered to be managed stands. The timber yields of unmanaged stands were estimated using the Variable Density Yield Prediction model version 7 (VDYP7), which is an empirically derived growth and yield model developed by FLNRO to estimate the yield from natural stands. The yields of managed stands were projected using the Table Interpolation Program for Stand Yields version 4.3 (TIPSY4.3), which is a model developed and calibrated by FLNRO to estimate the yields of managed stands for which the original stand conditions are known.

FAIB staff questioned the use of TIPSY to estimate yields of all stands established in areas harvested before 1987, which is the year in which legislation assigned silviculture obligation to TFL holders. After 1987 the proportion of harvested areas planted in the province increased, and the planting success improved. The TFL Holder reported that 6906 hectares were harvested within TFL 18 during the period from 1964 to 1987. They also indicate that planting was first performed on a substantial proportion of this harvested area in 1964, and that after 1971 planting was consistently conducted on more than 50 percent of harvested areas.

I accept the yield estimates for unmanaged stands and stands harvested prior to 1964, which were developed using VDYP7, and the yield estimates for stands established since 1987, which were developed using TIPSY. Regarding the stands established in the period between 1964 and 1987, I recognize that not all of these stands were planted and tended and I believe that the TIPSY yield projections for them may be overestimated by an unknown amount and that the age at which these stands reach merchantable size may also be underestimated. For this reason, I conclude that the base case overestimates the timber supply in the mid-term portion of projection by an unquantified amount, and I will discuss this further in the '**Reasons for Decision'** section.

As summarized in '**Implementation**', I expect the TFL Holder to monitor the volume growth of managed stands, including stands established prior to 1987, through the term of this AAC determination and to use the results of this monitoring to improve the estimations of managed stand growth and yield for the next AAC determination.

-volume estimates for future stands

Yield estimates for future managed stands were developed using TIPSY4.3. Operational adjustment factors (OAFs) were applied to TIPSY4.3 yield estimates to account for the loss of timber productivity due to particular conditions such as small non-productive areas too small to be reflected in the inventory classification (OAF 1) and pests, decay, waste and breakage (OAF 2). In the base case, the provincial standard reductions of fifteen percent for OAF 1, and five percent for OAF 2 were applied. I accept that the

application of TIPSY together with OAFs is appropriate for modelling future managed stands in TFL 18.

The TFL Holder modeled the growth of future stands assuming all regeneration is composed of the preferred species from the stocking standards. While I do not believe this creates much change in the projected future stand yields, I note that this operational practice, as it pertains to species diversity, may not be consistent with the objective in the Kamloops Land and Resource Management Plan (KLRMP) 'to conserve the diversity and abundance of native species and their habitats throughout the Kamloops LRMP area.' I expect the TFL Holder to ensure the species compositions of the regenerating stands are reflective of the species that are harvested, particularly within the Interior Cedar Hemlock biogeoclimatic zone. This is important for maintaining the diversity of species, which provides increased resiliency to the effects of climate change and forest health.

In the previous AAC determination the deputy chief forester noted the mid-term timber supply is particularly sensitive to the estimated productivity of the managed stands and directed the TFL Holder to monitor managed stand growth to confirm or improve the estimated growth of these stands for the next analysis. The TFL Holder indicated no monitoring of managed stand growth has yet to be implemented, and that they may consider establishing such monitoring after the forest health issues have been addressed and salvage harvesting has been completed.

I note that improvements made to growth and yield estimates for managed stands in the TFL will provide greater certainty with respect to the level of harvest that can be supported through the mid-term. As summarized in the '**Implementation**' section, I expect the TFL Holder to monitor the volume growth of managed stands through the term of this AAC determination, and to use the results of this monitoring to improve the estimations of managed stand growth and yield for the next AAC determination.

-minimum harvestable volume

Minimum harvestable volume criteria indicate the thresholds at which a stand becomes economically viable to harvest. For the base case, the minimum harvest volume was set at 200 cubic metres per hectare of coniferous volume.

A summary of timber cruise data collected in TFL 18 over the period from 2003 to 2014, representing over 2 million cubic metres and 6844 hectares of harvest, indicates the minimum harvested volume was 195 cubic metres per hectare, and that only 2.9 percent of the harvest was from stands containing less than 200 cubic metres per hectare. This data suggests the base case reflects past harvest performance reasonably well.

The TFL Holder presented a sensitivity analysis that incorporates a lower minimum volume threshold of 160 cubic metres per hectare. This scenario permits a first decade harvest level of 156 000 cubic metres per year, a second decade harvest of 141 000 cubic metres per year followed by a decline to a mid-term harvest level of about 127 000 cubic metres per year. Compared to the base case, this is an increase in the first and second decades of 11 000 cubic metres per year, and an increase in the mid-term harvest of about 8000 cubic metres per year.

District staff commented that stands with volumes less than 200 cubic metres per hectare were not harvested extensively during the period of the recent mountain pine beetle

epidemic. The TFL Holder stated that other Canfor operations within BC harvest stands with merchantable volume as low as 160 cubic metres per hectare and that balsam stands, particularly the balsam intermediate utilization (IU) stands, are economical to harvest.

I note that the lack of recent harvest performance in low volume spruce and balsam stands does not necessarily reflect the economics of these stands, but is more a consequence of the recent focus on dead-pine salvage harvesting. There is a growing interest to harvest infested spruce and balsam by the TFL Holder and district staff advised me that the harvesting of spruce and balsam stands with volumes as low as 160 cubic metres per hectare is reasonable and necessary to support the mid-term harvest level. In addition, district staff advised that harvesting in the short term must be directed at lower volume stands containing dead and infested volume while avoiding the harvest of stands that have not yet achieved the age of culmination mean annual increment.

In a letter sent November 2016, the Simpcw First Nation commented on the need for harvesting to focus on salvaging beetle impacted stands in order to minimize the decline in mid-term harvest levels. However, the Simpcw First Nation does not believe an AAC uplift is required to facilitate this salvaging.

Based upon statements by the TFL Holder, the sensitivity analysis, the opinion of the of district staff, and recognizing, in light of the declining timber supply, that performance into lower volume stands is likely, I conclude it is reasonable and desirable for harvesting to occur in stands with conifer volumes as low as 160 cubic metres per hectare.

Given my willingness to accept a minimum volume threshold of 160 cubic metres per hectare, which will facilitate more salvage harvesting of dead and infested volume over the next decade, I will adjust the initial harvest level of the base case upwards by 11 000 cubic metres per year as discussed in the '**Reasons for Decision**'.

I note that if the volume harvested from low-volume stands is less than I have assumed in making my AAC determination, then the next AAC may be lower than projected in this analysis. Low-volume stands in this context are stands that will not produce more than 200 cubic metres per hectare. In order to reduce the risk of this occurring, I expect the TFL Holder to report annually the volume harvested from low-volume stands and for district staff to report this performance to the chief forester, as summarized in '**Implementation**'. I am willing to re-determine the AAC sooner than the 10 years from now if adequate harvest performance of low-volume stands does not occur.

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

<u>Regeneration delay and impediments to prompt regeneration</u>

-impediments to prompt regeneration

Regeneration delay is the time interval between the harvest and stand regeneration. In the base case projection, the modelled regeneration delay also takes in to account the age of planted tree seedlings relative to the 1-year-old seedling age applied in the TIPSY model.

The TFL Holder modeled regeneration delays of zero years for the Engelmann spruce-subalpine fir (ESSF) biogeoclimatic zone and one year for all other biogeoclimatic zones.

With ESSF representing slightly more than half of the THLB, the average modeled regeneration delay is less than half of one year.

FAIB staff advised me that RESULTS data for the period from 2011 through 2015 indicate the delay between harvest and regeneration in TFL 18 averaged 2.2 years. When adjustments are made to account for the age of planted tree seedlings in the TFL relative to the age applied in TIPSY, FAIB staff calculated that the modelled regeneration delay should have been between 1.8 and 2.0 years, which is 1.4 to 1.6 years longer than the delay applied in the base case.

Changes in the assumed regeneration delay affect the timing of when the regenerated stands from recent and future harvesting will become available to harvest. Extending the modelled regeneration age by 1.5 years would reduce the mid- and long-term harvest levels in the projection. Based on the average harvest age reported for the base case, FAIB staff estimated that an increase in the regeneration delay of 1.5 years would reduce mid- and long-term timber supply in the base case by about 1.5 percent. I will discuss this further in the '**Reasons for Decision**' section.

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

As noted in Table 1, 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.

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

As noted in Table 1, 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.

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

Integrated resource management objectives

-scenic resources

The visual direction for TFL 18 is provided through section 9.2 of the Forest Planning and Practices Regulation (FPPR) and the Kamloops Land and Resource Management Plan (KLRMP) Higher Level Plan (HLP) Order. The established FPPR scenic areas were modeled following the 1998 Procedures for Factoring Visual Resources into Timber Supply Analyses and the established KLRMP scenic areas were modelled by applying a rule that allowed no more than 25 percent of the productive forest land base in each area to be greater than three metres in height. I accept that methods applied to model scenic areas were appropriate. However, I recognize the past and current forest health issues have made it challenging to meet these legally established visual quality objectives in operations. Recognizing the challenges to achieving the visual objectives within TFL 18, I wish to affirm the importance of achieving the visual management objectives and my expectation that the TFL Holder will ensure visual quality objectives are achieved. As

summarized in '**Implementation**', I expect FLNRO district staff to monitor the achievement of visual quality objectives and to report this achievement to the chief forester.

-Lakes Local Resource Use Plan – Lakeshore Management Guidelines

The KLRMP HLP Order for riparian management states that "riparian areas, including streams, wetlands and lakes are to be managed in accordance with the Forest Planning and Practices Regulation and the Kamloops and Clearwater District Lakeshore Management Guidelines or other applicable management tools or agency agreements."

In 2001 the Lakes Local Resource Use Plan (Lakes LRUP) was approved as policy direction to guide lakeshore management in the former Clearwater Forest District. The LRUP was not legally established under the *Forest Practices Code Act of BC* and thus not rolled over into the *Forest and Range Practices Act* (FRPA). Under the LRUP, lakes were generally assigned to one of five 200-metre Lakeshore Management Zones (LMZ) classes–'A' through 'E'–with each class having a prescribed visual quality objective (VQO) ('A' being most constraining and 'E' being least constraining). The LMZ and/or VQO may have been adjusted on a lake by lake basis to achieve a consensus agreement among the members of the LRUP table. Additionally, 20 lakes were assigned Lake Visual Management Zones (LVMZ) which extends beyond the LMZ within which the TFL Holder is required to inventory visually sensitive polygons when harvest is proposed in these areas.

The TFL Holder indicates that its day-to-day planning and operations are guided by the Lakes LRUP. As per agreements through the LRUP, the company has made an operational commitment not to harvest the area around 13 specified lakes. Although, the implications of this commitment were not modelled in the base case, the TFL Holder estimated that had they been applied the THLB would have been reduced by eight hectares, after accounting for other factors such as OGMAs. I note that a decrease in the modelled THLB of this small amount would have a negligible impact on the projected timber supply so I will make no adjustment for this reason.

The TFL Holder prepared a sensitivity analysis that examined the impact of applying LMZs for 66 of the 69 classified lakes with LMZs in TFL18. The result was a negligible reduction in the projected timber supply compared to the base case. I note this sensitivity analysis did not model the LRUP direction for 20 additional lakes with assigned LVMZs. As the timber supply implications of what was modelled are negligible, I accept that the impact of the additional LMZs, associated with the non-modelled lakes, and LVMZs is also negligible.

I note that all legal requirements were modelled in the base case. I also note that there is increasing scrutiny from the public regarding management of visible areas and given the accessibility of TFL 18 to the residents of Clearwater and other visitors, there is a heightened need to manage for visual values, particularly in lakeshore areas.

Due to the importance of managing for other values such as visuals and riparian, I request under '**Implementation**' that FLNRO staff and the TFL Holder monitor the implementation and effectiveness of LMZs and LVMZs, and report this information to the chief forester prior to the next AAC determination.

-climate change

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

The 2016 FLNRO, Thompson-Okanagan Region, Extension Note titled, *Adapting natural resource management to climate change in the Thompson-Okanagan Regions*, used current climate change research to summarize projected climate changes and impacts to ecosystems for British Columbia. The following are excerpts from this extension note:

> *Provincial level changes*: "Climate: As a whole, BC has become warmer and wetter over the last century. Winter has warmed the most. Extreme rainfall and dry conditions have increased and snowpacks have decreased. Due to the effects of greenhouse gas emissions already in the atmosphere, climate scientists agree these warming trends will continue. By the end of this century, mean annual temperature in BC could be at least 1.7 to 4.6°C warmer than it was in the last few decades. More winter precipitation will likely fall as rain rather than snow, resulting in lower snowpacks, earlier and more rapid snowmelt, and longer fire seasons.
>
> *Regional differences*: Northern and southern interior regions of BC are expected to warm more than coastal BC and parts of central BC. Winter precipitation is expected to increase in all regions, but summer precipitation is expected to increase in northern BC and decrease in southern and coastal BC.
>
> *Impacts*: Ecosystems will likely undergo both predictable and unpredictable ecological shifts. Climate envelopes (the climate associated with an ecosystem today) for subalpine and alpine areas will diminish in most locations while those for grasslands, shrub-steppe and dry forested ecosystems are expected to expand. In response, ecological communities will disassemble and reassemble—sometimes into novel combinations—as populations decline, move or adapt. Many species, including trees, will not be able to migrate quickly enough to keep pace with shifting climate. During this evolution, ecosystems will be strongly influenced by disturbances and invasive plants. Natural disturbance dynamics will change: likely changes include increased fire and drought in southern and coastal BC, increased storms and windthrow on the coast, and more frequent and extensive mortality due to bark beetles, defoliators and diseases across BC. Invasive species will increase. Hydrological regimes will shift due to increased evaporation, altered vegetation communities, increased storm frequency and magnitude, decreased snow accumulation, seasonal changes to precipitation, and accelerated ice melt followed by diminished glacier extent."

Climate change projections outlined in the regional extension note were derived from the Pacific Climate Impacts Consortium's regional climate summary for the Thompson-Okanagan Region, the Plan2Adapt tool used for projecting future climate conditions, and the ClimateBC model developed by the University of British Columbia.

Projections for the period 2041 to 2070, using the ClimateBC model, suggest the climate over the area of TFL 18 may warm, on average 3.1°C, from 1961-1990 averages. These projections also suggest the summer precipitation may decline, on average by 9.4 percent, and the precipitation as snow may decline, on average 26.1 percent.

While projected climate changes are likely to affect forest productivity, forest health and hydrological balances (e.g., drought stress) the magnitude and extent of the effects are uncertain due to the limitations of ecological and climate models, and to alternative plausible emissions scenarios.

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. 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.

Having considered the information provided regarding climate change and the TFL 18 MP #11, I commend FLNRO staff for their work, most notably the information on climate change as articulated in the 2016 regional extension notes and the climate projections specific to TFL 18, which help to improve our understanding of climate change and the potential effects this will have on forests. I find the results of past and projected warming trends helpful in understanding the dynamics of climate change occurring within TFL 18. I support FLNRO staff continued consultation and collaboration with federal and provincial government agencies, First Nations, universities, and TFL Holders to better understand climate adaptation and mitigation challenges and opportunities in relation to forest management. Findings from research initiatives can be incorporated into the Southern Interior Area climate actions.

For this determination, I have considered the currently available climate change information. From this, I conclude that the level of uncertainty associated with climate change, and its implications for forest dynamics and management is too great to allow me to account for the potential timber supply impacts in this AAC determination. However, the requirement for the regular re-determination of AACs will ensure that as more information becomes available and the level of uncertainty is reduced, the necessary adjustments can be made. As summarized in the '**Implementation**' section, it is my expectation that FLNRO staff will continue to collect information, conduct analyses and monitor changes so that the appropriate forest management adaptations to climate change can occur within TFL 18.

-parks and protected areas

The boundaries for parks and protected areas, including federal, provincial and regional parks, are published by the Parks Planning and Management Branch of the Ministry of Environment. The most recent published data for parks and protected areas was not used in the analysis. Had the most recent published data for parks and protected areas been utilized, the TFL Holder indicates the timber harvesting land base would be 14 hectares larger due to an area of OGMA mistakenly being identified as park. An underestimation of the THLB of this small amount will have a negligible impact on the projected timber supply so I will make no adjustment for this reason. I recommend that the TFL Holder

ensure the most up-to-date published data for parks and protected areas be modelled in future timber supply analysis.

-mountain caribou

The Wells Gray-Thompson caribou (*Rangifer tarandus*) local population unit is part of the southern mountain population of caribou, which are listed as threatened under the Federal *Species at Risk Act* (*SARA*). A recovery strategy for southern mountain caribou was prepared by Environment Canada in 2014. The recovery strategy established three types of critical habitat for the Wells Gray-Thompson local population unit: 'high elevation summer (spring, calving, summer, fall/rut) and/or winter range', 'low elevation early winter and/or spring range' and 'Type 2 matrix range'.

There are approximately 7300 hectares of Type 2 matrix range associated with the Wells Gray-Thompson caribou local population unit within TFL 18. Type 2 matrix range is defined in the recovery strategy as areas with trace occurrences of caribou in dispersal zones between population units that are to have low predator densities (i.e., less than three wolves per 1000 square kilometres).

In 2007, the Province established a legal order, under the Government Actions Regulation, with the intent to stop the decline of mountain caribou populations over the subsequent seven years. This order does not overlap or affect TFL 18. As such the TFL Holder did not account for mountain caribou management in the base case or sensitivity analysis. I acknowledge that the TFL Holder is not legally obligated to ensure the federally proposed Type 2 matrix range contains low predator densities and therefore, the analysis is based upon the best available information.

The province is in the process of developing range plans for all caribou population units in British Columbia, which will clarify how the landscape in each caribou range is expected to be managed. I am willing to re-determine the AAC earlier than the 10 years if range plans are legally established and are found to have a substantive effect on the available timber supply in TFL 18.

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

<u>First Nations consultation</u>

The Crown has a duty to consult with, and accommodate as necessary, those First Nations for whom it has knowledge of the potential existence of aboriginal interests that may be impacted by a proposed decision. I must therefore consider information arising from the consultation process with First Nations respecting aboriginal interests and treaty rights that may be affected by my AAC determination. As well, I will consider other relevant information available to the ministry regarding aboriginal interests, including information gathered during other consultation processes.

There are four First Nations communities that have asserted traditional territories within parts of TFL 18: Adams Lake Indian Band, Canim Lake Indian Band, Neskonlith Indian Band, and Simpcw First Nation.

Adams Lake Indian Band, Neskonlith Indian Band, and Simpcw First Nation belong to the Secwepemc (Shuswap) Nation and the Shuswap Nation Tribal Council. Canim Lake

Indian Band belongs to the Northern Secwepemc te Qelmucw (NStQ) Nation and the Northern Shuswap Tribal Council.

The Adams Lake Indian Band is a signatory to the Secwepemc Reconciliation Framework Agreement (RFA), and was consulted with as per the RFA Engagement Process, which includes initiating consultation through the Single Window Administrative Portal (SWAP portal).

-Treaty processes

The Northern Shuswap Tribal Council (Northern Secwepemc te Qelmucw) is negotiating with British Columbia and Canada in the BC treaty process on behalf of its four member communities, the Tsq'escen' (Canim Lake), Stswecem'c/Xgat'tem (Canoe Creek/Dog Creek), Xat'sull/Cm'etem (Soda Creek/Deep Creek), and T'exelc (Williams Lake). The Northern Secwepemc te Qelmucw treaty group is at stage four of negotiations. The Province tabled a revised Agreement-in-Principle offer on August 27, 2014, that was accepted in November 2014. The four Northern Secwepemc te Qelmucw communities held successful Agreement-in-Principle votes in February and April 2016, triggering the first phase of Interim Treaty agreement land transfers to the amount of 3760 hectares to the four communities. The Canim Lake (Tsq'escen') Incremental Treaty Agreement was completed in 2016.

-consultation process

To determine the initial level of consultation, staff utilized the Thompson Okanagan Natural Resource Operations Impact Matrix. A general review of available information for First Nations was conducted using information including available traditional use studies, Remote Access to Archaeological Data (RAAD), the Stk'emlupsemc te Secwepemc Reconciliation Framework Agreement (Secwepemc RFA), notes from past consultation processes and existing Forestry Consultation Revenue Sharing Agreements. The initial level of consultation was derived by FLNRO staff based either on this information or as specified in agreements. For all four First Nations, an initial consultation level of 'normal' was selected.

For the First Nations which have contractually agreed upon consultation processes, FLNRO staff followed those agreed upon processes. For First Nations without a specific consultation process agreement in place, FLNRO staff were guided by the document, '*Updated Procedures for Meeting Legal Obligations When Consulting First Nations*' (May 7, 2010) and Government consultation policy. These guidelines and policy are based on the consultation principles set out in the Supreme Court of Canada Haida decision (2004) as amended or modified through subsequent court decisions. Consideration was also given to the June 2014 Supreme Court of Canada Tsilhqot'in decision, which provides additional detail in the assessment of the strength of Aboriginal title claims.

Correspondence and the draft Information Package for Management Plan #11 were provided to all First Nations with asserted territories in TFL 18 on September 25, 2014.

FLNRO sent a pre-consultation information sharing letter to all First Nations on October 6, 2016. This letter shared information about, and encouraged participation in the Timber

Supply Review (TSR) process and upcoming draft management plan review. A map of TFL 18 and a Timber Supply Review – Tree Farm Licences brochure were provided.

FLNRO sent a consultation letter advising on two upcoming administrative decisions, the TFL 18 allowable annual cut (AAC) determination and Management Plan #11 approval to all First Nations on October 20, 2016. The consultation letter also invited the First Nations to respond with questions or comments on the *Timber Supply Analysis Report* and the *Proposed Management Plan 11* for TFL 18. Follow up emails were sent on November 18, 2016.

In a letter sent to FLNRO on November 22, 2016, the Simpcw First Nation stated that the establishment and renewal of this area based tenure had taken place without Simpcw First Nation consent and that current accommodation measures offered by the Province are insufficient. The letter also brought forward several specific concerns related to the AAC recommended by Canfor in MP #11. These concerns include the following:

- Where and how much dead lodgepole pine, spruce and balsam volume exists to support the proposed elevated cut?
- To minimize the midterm fall down, any harvesting should focus on salvaging the remaining beetle impacted stands
- Addressing dead lodgepole pine or balsam stands should be part of base case harvesting strategy, not requiring an uplift
- Removal of 10 percent reduction in cut per year maximum rule and minimum harvestable volume rule seems to focus on short term volume/economic gains rather than local economic stability, ecosystem function or midterm supply concerns
- Sensitivity analysis seem to suggest impacts to mid-term supply could be reduced with a lower initial harvest level and a reduction in the minimum harvest volume criteria
- A recommended harvest level that is almost 40 percent higher than the base case and 14 percent above pre-beetle uplift level seems to focus on short term volume/economic interests rather than reducing impacts to the mid-term harvest or ecological concerns (biodiversity, ecosystem function).

Simpcw First Nation also had a number of technical questions related to some of these concerns, and Canfor responded to these on December 16, 2016. The tentative engagement end date of December 20, 2016, was extended until January 13, 2017, to provide additional time for Simpcw First Nation to respond. FLNRO staff followed up with Simpcw First Nation on January 9, 2017, and received no further comments.

With respect to the Simpcw First Nation's concerns regarding the renewal and terms of the TFL 18 licence, I note that these relate to decisions that are outside of the scope of my AAC determination. With respect to the concerns and comments raised about the contents of MP #11, I have addressed each of these points within the relevant factors discussed in this document.

No concerns or comments were received from the other First Nations.

-conclusion

I have reviewed the information regarding the information sharing and consultation undertaken with First Nations and I discussed it in detail with FLNRO district and branch staff. I am satisfied that the information sharing and consultation was conducted appropriately and that reasonable efforts were made by the TFL Holder and district staff to engage and inform First Nations with interests within the TFL 18 boundaries, to collect information regarding their Aboriginal Interests, and to understand how these Aboriginal Interests may be affected by this determination.

I encourage the TFL Holder to continue to engage with First Nations at the operational planning phase to ensure the First Nation interests are duly considered in forestry operations. Such engagement may inform future AAC determinations. For the current determination, I conclude that my AAC determination is unlikely to have a significant adverse effect on the Aboriginal Interests of the First Nations in the area of TFL 18. I expect that any adverse impacts upon any Aboriginal Interests within the area of TFL 18, stemming from forest development activities that occur subsequent to the AAC determination, can be appropriately mitigated or minimized through existing legislation, regulation, and most importantly through engagement with First Nations at the decision-making level where harvestable volume is converted into specific actions on the ground and where impacts on Aboriginal Interests of actual harvesting can be assessed and properly addressed/accommodated.

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.

Past harvesting

The analysis did not account for the amount of harvesting that has actually occurred during the period from 2014, the first year of the projection, to the date of this determination. The AAC over this period was 290 000 cubic metres per year, twice the initial level of the base case. In addition, there have been 25 000 cubic metres of low quality volume granted as Grade 4 credit since 2014. FAIB staff estimate the total amount of harvest that has occurred since 2014 that is not accounted for in the base case to be about 510 000 cubic metres.

The TFL Holder indicated that 36 percent of the volume harvested since 2006 has been dead, and that over 50 percent of the volume harvested in 2016 was dead. This suggests that a significant amount of the volume that has been harvested since 2014 was dead or infested. I note that sensitivity analyses provided by the TFL Holder showed that the first period harvest level could be increased by a measured amount without triggering a reduction to the mid-term harvest level if the additional volume harvested in the first period was dead and dying timber that would deteriorate if unharvested.

Based on the proportion of dead harvest indicated by the TFL Holder, FAIB staff estimate that approximately 370 000 cubic metres of the volume harvested since 2014 is attributed to dead and dying timber. Subtracting this amount from the total harvest not accounted for in the base case, 510 000 cubic metres, results in 140 000 cubic metres which is an estimation of the total volume of live harvest not accounted for in the base

case. This lump-sum volume equates to an annual volume of 7000 cubic metres per year when distributed over the first two decades of the projection. Based on this information, I conclude that the initial harvest level in the base case projection is overestimated by 7000 cubic metres per year as discussed under '**Reasons for Decision**'.

In a letter sent to FLNRO on November 22, 2016, the Simpcw First Nation commented on their desire for the TFL Holder to focus on salvaging beetle impacted stands in order to minimize the decline in mid-term harvest levels. In addition, the Simpcw First Nation does not believe an AAC uplift is required to facilitate salvaging. I share the Simpcw First Nation desire for the TFL 18 timber supply to be managed in a manner that ensures the highest possible mid-term harvest level by having the TFL Holder continue its demonstrated focus on the salvage harvest of dead and infested volume with the objective of minimizing the amount of dead volume that remains unharvested. For this reason, I expect the TFL Holder to report annually the dead volume harvested and for district staff to report this performance to the chief forester, as summarized in '**Implementation**'. I am willing to re-determine the AAC earlier than the 10 years as legislated if adequate harvest performance of dead volume does not continue to occur.

Grade 4 Credits

Operationally, the AAC within a TSA is monitored through various tenure decisions and the billing of harvest to those tenures. Volumes attributed to Grade 4 credits under Section 17(6) of the Cut Control Regulation are an exception for which volume is not accounted against the AAC of a specific tenure. Section 17(6) allows licence holders to harvest Grade 4 timber without having it counted against their licence's cut control if the timber goes to a primary facility (i.e., pulp, paper, bio-energy) other than a sawmill, veneer plant, or a facility that only produces cants (time limited) and application is made to the government for a credit. The Grade 4 credit provision of the Cut Control Regulation was developed to provide an incentive for the harvest of low quality logs and higher levels of fibre utilization, particularly in areas impacted by mountain pine beetle.

In TFL 18, there have been 24 843 cubic metres of low quality volume harvested and granted as Grade 4 credit since 2014.

I accept that the Grade 4 credit has proven to be an effective tool to encourage the salvage harvest of low quality beetle-killed timber in many management units throughout the province. I also note, as discussed under the *cut control* factor, that less volume is assumed to go unharvested and economically deteriorate when the initial harvest level is greater than assumed in the base case. Even so, as I have assumed all available volume within TFL 18 is used to support my AAC determination, I am concerned that the short-term harvest above AAC expectations, including the continued application of Grade 4 credit, may accelerate or deepen future declines in AAC over the next couple of decades.

As summarized in the '**Implementation**' section, it is my expectation that FLNRO staff will monitor and inform the chief forester of any volume, including Grade 4 credit, that is harvested and not charged against the AAC.

TFL Holder AAC recommendation

The TFL Holder recommended that, in making my determination, I consider its preferred scenario that incorporates a lower minimum volume of 160 cubic metres per hectare, an increase in the first decade harvest to 201 000 cubic metres per year followed by an immediate decline to a mid-term harvest level of 120 000 cubic metres per year in the second decade. The TFL Holder advised that the elevated first decade harvest will help reduce unsalvaged volume losses from outbreaks of spruce bark beetle, western balsam bark beetle and two-year cycle budworm by allowing up to 515 000 cubic metres of insect damaged timber to be harvested before it deteriorates in the second decade.

The Simpcw First Nation reflected on the TFL Holder's recommendation in a letter sent to FLNRO on November 22, 2016. The Simpcw First Nation indicated priority should be given to maintaining the mid-term at as high a level as possible and that they do not support increasing the AAC to 201 000 cubic metres. They also noted the information provided by the TFL Holder did not inform them as to the location nor the quantity of dead pine, spruce and balsam volume that exists within TFL 18. The Simpcw First Nation advised that the forest health issues within TFL 18 can be addressed at the base case projected harvest levels by focusing the harvest to the salvage of dead volume.

I note that the harvest policy applied in the TFL Holder's preferred scenario differs from the harvest policy described for the base case in that it allows for a 40 percent decline in the harvest level after the first decade and does not achieve the highest possible mid-term harvest level. This is illustrated by comparing the TFL Holder's preferred scenario with the sensitivity projection discussed under '*minimum harvestable volume'* which also applied a lower minimum volume of 160 cubic metres per hectare but with the same harvest policy described for the base case. This scenario had a first decade harvest level of 156 000 cubic metres per year, a second decade harvest of 141 000 cubic metres per year followed by a mid-term harvest level of about 127 000 cubic metres per year.

Although I believe that it is reasonable to increase the first decade harvest level so as to provide the TFL Holder with opportunity to undertake salvage harvesting of dead and infested volume over the next decade, I agree with the Simpcw First Nation that any such increase should not be at the consequence of a lower mid-term harvest level. The sensitivity analysis projection described under '*minimum harvestable volume'*, demonstrated that a mid-term harvest level of 127 000 cubic metres per year is possible when a minimum harvest volume of 160 cubic metres per hectare is applied together with base case harvest policy.

FAIB staff estimated that, after taking into consideration my adjustments made for minimum harvestable volume and other factors noted earlier in this AAC rationale, a maximum of 7000 cubic metres could be shifted from the second decade to the first decade without requiring the second decade harvest to fall below 127 000 cubic metres per year. I accept this as a reasonable adjustment to the first decade harvest level that would provide the TFL Holder with opportunity to undertake salvage harvesting of dead and infested volume over the next decade without causing further reduction to the mid-term harvest level. I will discuss my considerations of for this AAC determination further under '**Reasons for Decision**'.

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

No factors considered under this section require additional comment.

Section 8 (8) (c) repealed [2003-31-2 (B.C. Reg. 401/2003)] carbon

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

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

Economic and social objectives

-Minister's letter

Section 8 of the *Forest Act* requires the chief forester to consider the government's social and economic objectives, as expressed by the Minister, as well as the other items listed in Section 8. As Chief Forester I am guided by three Minister's letters, July 4, 2006 (Appendix 3), October 27, 2010 (Appendix 4) and April 12, 2013 (Appendix 5).

In the first letter, dated July 4, 2006, 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 requested that the chief forester consider the local social and economic objectives expressed by the public, and information received from First Nations.

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

During my consideration of the factors required under Section 8 of the *Forest Act*, I have been mindful of the 2006 Minister's objectives. I note that in the base case analysis and with my considerations described above, a primary objective has been to attain a stable, mid- and long-term harvest level where the growing stock also stabilizes while recovering the greatest value from dead timber. I have also considered with care the adequacy of the provisions made both in current practice, and assumed in the analyses, for maintaining a range of forest values.

The Minister's second letter, dated October 27, 2010, expressed objectives regarding mid-term timber supply in areas affected by the mountain pine beetle. While the second letter is focused to areas impacted by the mountain pine beetle, I have broadened the applicability of this letter to include areas affected by all forest health agents including the mountain pine beetle, spruce bark beetle, western balsam bark beetle and two-year cycle budworm. The second letter expresses the importance of forestry activities to both the local and provincial economies. I am aware of the local and provincial interest in ensuring forest activities, especially activities in close proximity to the communities, facilitate a diversity of economic activities. I have considered this in my determination.

The third letter, dated April 12, 2013, is focused on the Nanwakolas Reconciliation Protocol which is not specific to TFL 18.

The TFL Holder made the draft timber supply analysis information package available for public review and First Nations information sharing from September 25 to November 24, 2014. Draft Management Plan #11 was made available for review from October 17 to December 19, 2016. The TFL Holder received input on the Draft Management Plan #11 from the Simpcw First Nation.

I am satisfied that the timber supply analysis for TFL 18 in combination with information from, and discussions with, Ministry and TFL Holder staff has provided me with the information necessary to make a determination for TFL 18 that meets the objectives expressed in these letters. I have also considered the comments and information received from First Nations during consultation on this determination. On this basis, I am satisfied that this determination accords with the objectives of the province as expressed by the Minister.

I have considered the objectives expressed by the Minister in my determination for TFL 18. Where appropriate, I have discussed the input from the public and First Nations in the relevant sections of this rationale document.

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

Unsalvaged loss and forest health

Annual unsalvaged volume loss due to fire and wind throw was accounted for in the base case by the subtraction of 800 cubic metres per year from the modelled harvest level. I accept this estimate for the purposes of this determination.

Unsalvaged volume loss due to mountain pine beetle, spruce bark beetle, western balsam bark beetle and the two-year cycle budworm was accounted for through a combination of methods.

The Simpcw First Nation, in a letter sent November 2016, asked where and how much dead lodgepole pine, spruce and balsam volume exists to support the proposed elevated cut. Information provided by Canfor in MP # 11 and in a response to Simpcw First Nation provided approximate estimates of the dead volume in the TFL.

Approximately 197 000 cubic metres of MPB-killed pine located in scattered patches within mixed species stands was estimated to be present in the THLB at the onset of the projection. In the base case, the portion of this dead pine that was not scheduled for harvest in current operating plans was assumed to break-up and regenerate naturally.

Approximately 161 000 cubic metres of beetle and budworm killed spruce and balsam was estimated to be present in the THLB at the onset of the projection. Stand volume estimates of infested stands were adjusted downward to account for this loss. In addition, an annual volume reduction of 0.8 percent was applied to the spruce and balsam component of infested stands to account for future losses in the projection. When the residual volume of an infested stand fell below 200 cubic metres per hectare, the stand was assumed to break-up and regenerate naturally.

I accept that volume loss due to mountain pine beetle, spruce bark beetle, western balsam bark beetle and the two-year cycle budworm has been adequately accounted for in the base case projection.

While the mountain pine beetle infestation within TFL 18 is subsiding, the TFL Holder has indicated that infestations of spruce bark beetle, western balsam bark beetle and two-year cycle budworm are on the rise. The spruce bark beetle infestation is currently at an early intense period and is expected to last eight to 10 years. Spruce stems within infested stands are typically killed over a period of four to five years. Staff advised me that the mortality within spruce bark beetle infested stands is often greater than the mortality seen in mountain pine beetle infested stands.

The current two-year cycle budworm infestation is expected to grow and dissipate over the next decade. This insect typically attacks spruce and balsam trees that are slightly sub-dominant within the canopy of infested stands. Budworm defoliation slows the growth of the trees causing crown dieback and some tree mortality after multiple years of defoliation. It can also stress trees that would then be more susceptible to infestation by other forest health factors including spruce and western balsam bark beetles.

The TFL Holder indicates the majority of the spruce and balsam stands in the northern half of TFL 18 are dead or have been infested bark beetle, and that about 30 percent of the mature spruce and balsam volume within TFL 18 is dead as a result of current infestations. The company is harvesting an increasing amount of dead volume with the rise in spruce and balsam mortality.

While I expect the TFL Holder to continue to focus on the harvest of dead and infested volume, this focus should not be to the detriment of future timber supply. Rather, measures must be taken to ensure the mid-term harvest level is maintained at as high a level as is possible. These measures should include: the application of a consistent and widespread trap tree program to slow down the infestation; the use of partial harvesting to retain more live trees across the landscape; the avoidance of harvesting stands that are likely to be economic to harvest through the mid-term; the harvest of balsam stands and stands with residual balsam; and the harvest of low volume stands, particularly when they are dead or infested.

During the term of this AAC determination, I expect the TFL Holder to retain living stems to the greatest extent possible in order to minimize reductions in the mid- and long-term harvest levels and to ensure the full forest profile is harvested–particularly stands with balsam and residual balsam. I also expect the TFL Holder to monitor the forest health conditions within the TFL, including the spruce bark beetle, western balsam bark beetle and two-year cycle budworm, and to assess the associated risk to timber supply from the forest health issues for the next AAC determination.

Reasons for Decision

In reaching my AAC determination for TFL 18, I have considered all of the factors required under Section 8 of the *Forest Act*. I have made the considerations documented above, all of which are integral to the reasons for my decision, and from which I have reasoned further as follows.

I am satisfied that the assumptions applied in the base case for the majority of the factors applicable to TFL 18 were appropriate. In this section, I have summarized my considerations related to factors for which there is uncertainty, or the need for some adjustment, with respect to the analysis inputs, which in turn affect the base case timber supply.

The base case timber supply projection showed an initial harvest of 145 000 cubic metres per year could be maintained for 10 years. This was followed by declines in the harvest to 130 000 cubic metres per year in the second decade and to below 119 000 cubic metres per year in the third decade. Following the mid-term, in the sixth decade, the harvest level gradually increases to the long-term level of 184 000 cubic metres per year.

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

The following factor discussed in this document suggests that the timber supply projected in the base case might be underestimated:

- *Minimum harvestable volume* – the TFL Holder has provided assurance they will harvest low productivity stands down to 160 cubic metres per hectare within TFL 18. This practice increases the volume available annually over the next 10 years by 11 000 cubic metres.

The following four factors suggest that the timber supply projected in the base case might be overestimated:

- *Forest inventory* – there is significant uncertainty with respect to the timber volume estimates for the mature portion of the forest inventory, particularly for stands that have been impacted by recent insect infestations resulting in an unquantified overestimation in the base case mid- to long-term harvest levels.
- *Volume estimates for existing managed stands* – area harvested from 1964 to 1987 were projected in the base case as fully managed stands using the TIPSY growth model. Without substantiation that all of these stands were planted and received stand tending, there is uncertainty about the extent these stands will achieve the yields projected for them. For this reason, the timber supply through the mid-term is overestimated by an unquantified amount.
- *Regeneration delay* – the regeneration delay applied in the base case was zero years for the ESSF and one year for all other biogeoclimatic zones, which equates

to an average modeled regeneration delay of less than half a year which is about 1.5 years shorter than actual practice. This under representation of regeneration delay results in an overestimation of the mid-term timber supply by up to 1.5 percent.

- *Past harvest* – the actual volume of timber that has been harvested since 2014 that was not accounted for in the base case projection, after subtraction for the volume of salvaged timber, equates to an overestimation of the short-term timber supply by 7000 cubic metres per year.

In addition, I am aware the many forest health concerns within TFL 18 have introduced a level of uncertainty in the estimation of stand volumes which in turn introduces uncertainty in the timber supply available to harvest. While I make no account of an over- or underestimation of timber supply on account of this uncertainty, I have issued an instruction in '**Implementation**' for the TFL Holder to improve the inventory and estimations of stand volume to better inform the next AAC determination.

I am also aware there is a level of uncertainty in our understanding of how climate change will affect the long-term timber supply on the TFL. While I make no account of an over- or underestimation of timber supply on account of this uncertainty, I have considered the uncertainty posed by climate change in making my decision.

As noted under the 'TFL Holder AAC recommendation', the TFL Holder has recommended a first decade harvest of 201 000 cubic metres per year in order to address the emerging forest health problems such as the spruce bark beetle, western balsam bark beetle and two-year cycle budworm. This elevated first decade harvest would enable more damaged timber to be salvaged before it deteriorates and becomes uneconomic to harvest. Although I am supportive of the desire to enhance economic recovery of dead and dying timber, I do not wish to elevate the first decade harvest to a level that would reduce the mid-term harvest to an amount lower than the mid-term level of a projection where no uplift is applied. FAIB staff advised me that an increase of 7000 cubic metres per year to the base case level could be maintained for one decade without causing the mid-term to fall below the desired level. Therefore, in addition the adjustments noted above, I will adjust the first decade harvest level by 7000 cubic metres per year.

These considerations in summation suggest that the current operating practices in the TFL may sustain economically viable harvesting operations over the next 10 years at level of 156 000 cubic metres per year. However, given the need to maximize the harvest of current dead volume within the TFL as well as volume anticipated to be killed or damaged during the current outbreak of spruce bark beetle and western balsam bark beetle, I have decided to establish a two-level AAC. For the first five years following this determination the AAC will be 175 000 cubic metres, thereafter and until a new AAC is determined, the AAC will decrease to 137 000 cubic metres. I note that this two-level AAC will allow the same total volume to be harvested over the 10-year determination period as a one-level AAC of 156 000 cubic metres over the same period.

My expectation is that the TFL Holder will focus on harvesting stands with a high component of dead and infested trees, while ensuring this harvest focus does not result in unnecessary reductions to the mid- and long-term timber supply, throughout the duration

of this AAC determination. I also expect the TFL Holder will harvest at least 11 000 cubic metres per year of low volume stands.

My determination includes requests that FLNRO staff and the TFL Holder monitor the evolving forest health concerns, the economics of harvesting dead trees, harvest performance in low volume stands and the impacts of salvage harvesting on other resource values and, if warranted, recommend the initiation of a new timber supply review earlier than the 10 years required by legislation.

Determination

I have considered and reviewed all the factors as documented above, including the risks and uncertainties of the information provided. It is my determination that a timber harvest level that accommodates objectives for all forest resources during the next 10 years and that reflects current management practices as well as the socio economic objectives of the Crown can be best achieved by setting the AAC for the entire TFL 18 as follows:

- from July 13, 2017, to July 12, 2022, the AAC will be 175 000 cubic metres;
- after July 12, 2022, until the next determination, the AAC will be 137 000 cubic metres.

This determination is effective on July 13, 2017, and will remain in effect until a new AAC is determined, which must take place within 10 years after the date of this determination.

If additional significant new information is made available to me, or major changes occur in the management assumptions upon which I have predicated this decision, then a new timber supply review can be initiated leading to a determination sooner than in the 10 years allowed by legislation.

Implementation

In the period following this determination and leading to the subsequent determination, I encourage FLNRO staff and the holder of TFL 18 ('TFL Holder') to undertake the tasks and investigations noted below that I have also mentioned in the 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 TFL 18. My expectation is that the following projects will be carried prior to the next TSR:

a) the TFL Holder to improve stand volume estimates in the forest inventory, particularly volume estimates for balsam stands, for the next timber supply review;

b) the TFL Holder to report annually the volume harvested from balsam leading stands and for district staff to report this performance to the chief forester;

c) the TFL Holder to monitor the volume growth of managed stands through the term of this AAC determination;

d) the TFL Holder to report annually the volume harvested from low-volume stands and for the district staff to report this performance to the chief forester;

e) the TFL Holder to ensure section 9.2 FPPR visual quality objectives and KLRMP HLP scenic objectives are achieved, and for FLNRO district staff to monitor the achievement of scenic objectives and to report this achievement to the chief forester;

f) FLNRO staff and the TFL Holder to monitor the implementation and effectiveness of LMZs and LVMZs, and report this information to the chief forester prior to the next AAC determination;

g) FLNRO staff to continue collecting information, conducting analyses and monitoring changes with respect to climate change, so that appropriate forest management adaptations occur within TFL 18;

h) the TFL Holder to report annually the dead volume harvested and for district staff to report this performance to the chief forester;

i) FLNRO staff to monitor and inform the chief forester of any volume, including Grade 4 credit, that is harvested and not charged against the AAC;

j) the TFL Holder to continue monitoring the forest health conditions, including the spruce bark beetle, western balsam bark beetle and two-year cycle budworm within TFL 18.

Diane Nicholls, RPF

Chief Forester

July 13, 2017

Appendix 1: Section 8 of the *Forest Act*

Section 8 of the *Forest Act*, Revised Statutes of British Columbia 1996, c. 157, (consolidated to August 17, 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 tree farm licence areas, community forest agreement areas and 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 regional manager or district manager must determine an allowable annual cut for each woodlot licence area, according to the licence.

(7) The regional manager or the regional manager's designate must determine an allowable annual cut for each community forest agreement area, in accordance with

(a) the community forest agreement, and

(b) any directions of the chief forester.

(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* (consolidated to August 17, 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 sector

in 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

BRITISH COLUMBIA

JUL 0 4 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.

Minister of Forests and Range and Minister Responsible for Housing

Office of the Minister

Mailing Address:
PO Box 9049 Stn Prov Govt
Victoria BC V8W 9E2
Telephone: 250 387-6240
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e-mail: FOR.Minister@gov.bc.ca

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,

Rich Coleman
Minister

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

BRITISH COLUMBIA
The Best Place on Earth

File: 280-30/MPB
Ref: 126097

OCT 2 7 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

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

Appendix 5: Minister's letter of April 12, 2013

Ref: 196701

April 12, 2013

Dave Peterson
Chief Forester and Assistant Deputy Minister
Ministry of Forests, Lands & Natural Resource Operations
Tenures, Competitiveness and Innovation Division
PO Box 9352 Stn Prov Govt
Victoria, British Columbia
V8W 9M1

Dear Dave Peterson:

The *Forest Act* gives you the responsibility and authority to make allowable annual cut determinations.

Section 8 of the *Forest Act* requires you to consider the government's social and economic objectives, as expressed by the Minister, as well as the other items listed in section 8.

As provided for in Section 1.1 of the Shared Decision Making Process agreed to as part of Schedule B, Appendix 2 (the Forestry Schedule) of the Nanwakolas Reconciliation Protocol, this letter provides government's social and economic objectives for signatory First Nations. In addition to government's social and economic objectives provided in other letters, please consider these objectives when making determinations of Allowable Annual Cut within the traditional territories of Nanwakolas First Nations:

- To share in economic development initiatives within the Traditional Territories of the Nanwakolas First Nations that facilitate, over time, the individual members of the Nanwakolas First Nations obtaining a quality of life that is equal to or better than the national Canadian average;
- To become full partners with the Province (i.e. to the fullest or maximum extent possible) in the forest sector within the Nanwakolas Traditional Territories including, but not limited to, opportunities for shared decision-making, forest tenures and revenue sharing;
- To develop significant involvement with the forest industry operating within their Traditional Territories, through the development of measures that will facilitate new relationships with industry;

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- To significantly increase employment opportunities in the forest industry, over time, for Nanwakolas First Nations members, within their Traditional Territories; and

- To consider the value of forest resource development in the Traditional Territories of Nanwakolas First Nations when developing appropriate strategies for full Nanwakolas First Nations participation in the management and operation of the forest resource sector in the Traditional Territories.

Sincerely,

Steve Thomson
Minister