

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

Tree Farm Licence 52

**held by
West Fraser Mills Ltd.**

Rationale for Allowable Annual Cut (AAC) Determination

Effective June 17, 2019

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Chief Forester**

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Objective of this document

This document provides an accounting of the factors I have considered and the rationale I have employed as chief forester of British Columbia (BC) in making my determination, under Section 8 of the *Forest Act* for Tree Farm Licence (TFL) 52. This document also identifies where new or better information is needed for incorporation in future determinations.

Acknowledgement

For preparation of the information I have considered in this determination, I thank West Fraser Mills Ltd. staff, and staff from BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRO) in the Quesnel Natural Resource District and the Forest Analysis and Inventory Branch (FAIB). I am also grateful to the First Nations and members of the public who have provided input.

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 *Forest Act* is reproduced in full as Appendix 1 of this document.

Description of the Tree Farm Licence

Since 1991 the licence for TFL 52 has been held by West Fraser Mills Ltd. (“the licensee”). The licence is administered from the Quesnel Natural Resource District office in Quesnel, which is within the jurisdiction of FLNRO’s Cariboo Region.

TFL 52 is comprised of two blocks: Block A is located to the east of Quesnel and Block B (formally TFL 5) is located northwest of Quesnel along the Fraser River. The blocks encompass an area of 261 468 hectares and have a timber harvesting land base (THLB) of 174 884 hectares. The land base of Block A is typified by rolling plateaus in the west, and the Cariboo Mountains in the east. The Block contains the headwaters of the Cottonwood, Bowron and Willow Rivers, which all flow directly into the Fraser River. Ease of access allows for year-round forest management and recreational activities. The land base of Block B is also typified by rolling plateaus but includes steep banks leading down to the Fraser River. A long history of forestry activity has established a well-developed road access infrastructure.

The TFL is primarily composed of stands of interior spruce, lodgepole pine, and Douglas-fir. Secondary stands are composed of subalpine fir, trembling aspen, and cottonwood; less frequently, stands of birch, western hemlock, and western redcedar can be found in localized areas. The two main biogeoclimatic (BEC) zones within the TFL are the sub-boreal spruce (SBS) zone and the Engelmann spruce-subalpine fir (ESSF) zone. The interior cedar-hemlock (ICH) zone is also found in a very small area near the eastern boundary of the TFL.

TFL 52 overlaps with the traditional territories of six First Nations: Lhtako Dene Nation, Xats’ull First Nation, Nazko First Nation, ?Esdilagh First Nation, T’exelc First Nation, and Lheidli T’enneh First Nation. The communities of Wells and Barkerville are located within the TFL and the communities of Bowron Lake and Cottonwood are in its vicinity. Bowron Lake Provincial Park and Troll Mountain Ski Resort are popular recreational areas adjacent to the TFL.

The TFL is located within the Cariboo-Chilcotin Land Use Plan (CCLUP) area and is managed in accordance with the associated legal order under Section 93.4 of the *Land Act*. This legal order, last amended in 2011, establishes land use objectives for key resource values including biodiversity, wildlife trees, old growth forest, critical habitat for fish, community areas of special concern, lakes, riparian areas, mature birch retention, grasslands, scenic areas, recreation trails, high value wetlands for moose, and grizzly bear. These objectives set by government must be addressed in all Forest Stewardship Plans that overlap the CCLUP area, including TFL 52. Guidance to implement objectives outlined in the CCLUP is provided under the Quesnel Sustainable Resource Management Plan and the regional Biodiversity Conservation

Strategy. The TFL is also managed under a Government Actions Regulation (GAR) Order for Mountain Caribou within the Quesnel Highlands Planning Unit and the Upper Fraser, Hart Ranges and Mount Robson Planning Units. Under the *Forest and Range Practices Act*, the GAR directs how the BC provincial government establishes land designations or stewardship measures for forest and range values.

As required under the Tree Farm Licence Management Plan Regulation of the *Forest Act*, the licensee has prepared Management Plan No. 5 (MP 5) for TFL 52. This includes three components: a) management plan: general description and history of the TFL, title and description of all publicly available planning documents, and a summary of the First Nations and public reviews, b) timber supply analysis of the short-term and long-term availability of timber available for harvesting, and c) information package and other supporting documentation.

History of the AAC

In January 1991, the portion we now consider Block A of TFL 52 was issued to the licensee with an AAC of 518 952 cubic metres under Management Plan No. 1. For the next 15 years the AAC remained relatively stable until 2006 when TFL 5 was consolidated with TFL 52 to become Block B.

Prior to consolidation the AAC for TFL 52 was 570 000 cubic metres (this did not include accounting for mountain pine beetle salvage) and the AAC for TFL 5 was 300 000 cubic metres (this included an uplift of 177 200 cubic metres per year for mountain pine beetle salvage). After consolidation, the AACs were summed to 870 000 cubic metres.

In 2009, further outbreak of the mountain pine beetle prompted an urgent timber supply review and the AAC for TFL 52 was increased to 1 000 000 cubic metres, which included a partition of 500 000 cubic metres specified for non-pine species.

In 2011, the area of the TFL was reduced by 31 732 hectares under the *Forestry Revitalization Act*. As a result, the AAC was reduced by the Allowable Annual Cut Administration Regulation under the *Forest Act* to 918 014 cubic metres with 459 007 cubic metres specified for non-pine species.

New AAC determination

Effective June 17, 2019, the new AAC for TFL 52 is 592 500 cubic metres, which is a 36 percent reduction from the AAC in effect prior to this determination. This new AAC includes one partition of 570 000 cubic metres specified for coniferous species. The 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.

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 related to inventory, growth and yield, and management. The factors used as inputs to timber supply analysis have differing levels of uncertainty associated with them, due in part to variation in physical, biological and social conditions.

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 issues that must be considered when making decisions such as AAC determinations. Such information does provide valuable insight into potential impacts of different uncertainties about or changes to resource information and management practices, and thus forms an important component of the information I must consider in AAC determinations. In determining this AAC, I have considered the technical information provided, including any known limitations.

Guiding principles for AAC determinations

Given the large number of periodic AAC determinations required for BC'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 aware of my obligation as a steward of the forests of British Columbia, of the mandate of the Ministry of Forests, Lands, Natural Resource Operations and Rural Development ("the Ministry") as set out in Section 4 of the *Ministry of Forests and Range Act*, and of my responsibilities under the *Forest Act*, *Forest and Range Practices Act* (FRPA), and *Forester's Act*.

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, Natural Resource Operations and Rural Development with respect to subsequent allocation of wood supply.

These guiding principles focus on: responding to uncertainties; incorporating information related to First Nations' rights, titles and interests; and considering information related to integrated decision making, cumulative effects, and climate change.

Information uncertainty

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

Two important ways of dealing with this uncertainty are:

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

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 consistent with legislative requirements and not substantiated by demonstrated performance.

It is not appropriate to speculate on timber supply impacts that may eventually result from land-use designations not yet finalized by government. Where specific protected areas, conservancies, or similar areas have been designated by legislation or by order in council, these areas are deducted from the 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 that helps meet resource management objectives such as biodiversity.

In some cases, even when government has made a formal land-use decision, it is not necessarily possible to fully analyse and immediately account for the consequent timber supply impacts in an AAC determination. Many government land-use decisions must be followed by detailed implementation decisions requiring, for instance, further detailed planning or legislated designations such as those provided for under the *Land Act*

and FRPA. In cases where government has been clear about the manner in which it intends land use decisions to be implemented, but the implementation details have yet to be 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 may be 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 precautionary response to uncertainty with respect to a single value.

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

First Nations

The BC government has committed to true, lasting reconciliation with Indigenous peoples, including fully adopting and implementing the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). Reconciliation and implementation of UNDRIP will likely require changes to policies, programs and legislation, which will take time and involve engagement with Indigenous peoples. While this work is undertaken, BC is committed to fulfilling its legal obligations to consult and accommodate Aboriginal Interests consistent with the Constitution, case law, and relevant agreements between First Nations and the government of BC.

Where First Nations and the Province are engaged in collaborative land and resource planning, the Province may make general commitments regarding stewardship and other aspects of resource management. Where such commitments have been made, I will consider them when determining AACs, within the scope of my statutory authority.

As is the case for land use and management planning in general, where land use zones or management objectives resulting from collaborative planning between First Nations and the Province have not been finalized, it is beyond the statutory authority of the chief forester to speculate on final outcomes. If the timber supply implications of final designations are substantial, application of the Allowable Annual Cut Administration Regulation to reduce a management unit AAC between Section 8 determinations, or a new AAC determination prior to the legislated deadline may be warranted.

Where the nature, scope and geographic extent of Aboriginal rights and title have not been established, the Crown has a constitutional obligation to consult with First Nations regarding their Aboriginal Interests in a manner proportional to the strength of those Interests and the degree to which they may be affected by the decision. The manner of consultation must also be consistent with commitments made in any agreements between First Nations and the Province. In this regard, full consideration will be given to:

- (i) the information provided to First Nations to explain the timber supply review process and analysis results;
- (ii) any information brought forward through consultation or engagement processes or generated during collaboration with First Nations with respect to Treaty rights or Aboriginal Interests, including how these rights or Interests may be impacted;

- (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; and,
- (iv) existing relevant agreements and policies between First Nations and the BC Government.

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 that could have implications for the AAC determination are addressed in the various sections of this rationale where it is within the statutory scope of the determination.

Established Aboriginal title lands (meaning declared by a court or defined under an agreement) 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 TSA or TFL with which they overlap. Prior to establishment of Aboriginal title, it is not appropriate for the chief forester to speculate on how potential establishment of Aboriginal title in an area, either by court declaration or by agreement, could affect timber supply, given uncertainties about the scope, nature and geographic extent of title. Until land has been established as Aboriginal title land, it remains as provincial land managed by the province, and will contribute to timber supply.

Integrated decision making and cumulative effects

One of the responsibilities of the Ministry 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 relevant available information on timber and non-timber resources in the management unit, including information on the interactions among those resources and the implication for timber supply.

With respect to cumulative effects, I must interpret related information according to my statutory authority. As emphasized above, the chief forester is authorized only to make decisions on allowable harvest levels, not to change or institute new management regimes for which other statutory decision makers have specific authority. However, cumulative effects information can highlight important issues and uncertainties in need of resolution through land use planning, which I can note and pass to those responsible for such planning. Information on cumulative effect can also support considerations related to Aboriginal Interests.

Climate change

One key area of uncertainty relates to climate change. There is substantial scientific agreement that climate is changing and that the changes will affect forest ecosystems. Forest management practices will need to be adapted to the changes, and can contribute to climate change mitigation by promoting carbon uptake and storage. Nevertheless, the potential rate, amount, and specific characteristics of climate change in different parts of the province are uncertain. This uncertainty means that it is not possible to confidently predict the specific, quantitative impacts on timber supply.

When determining AACs, I consider available information on climate trends, potential impacts to forest ecosystems and communities that depend on forests and related values, and potential management responses. As research provides more definitive information on climate change and its effects, I will incorporate the new information in future AAC determinations. Where forest practices are implemented to mitigate or adapt to the potential effects of climate change on forest resources, or where monitoring information indicates definite trends in forest growth and other dynamics, I will consider that information in my determinations.

I note, however, that even with better information on climate change, in many cases there will be a range of reasonable management responses. 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, which appear to be likely in some areas. Hypothetically, focused harvests in at-risk forests could forestall losses of timber and allow for planting of stands better adapted to future conditions. Conversely, lower harvest levels could provide buffers against uncertainty. The appropriate mix of timber supply management approaches is ultimately a social decision.

Deciding on the preferred management approach will involve consideration of established climate change strategies, and available adaptation and mitigation options together with social, economic, cultural, and environmental objectives. Analysis will be useful for exploring options and trade-offs. Any management decisions about the appropriate approach and associated practices will be incorporated into future AAC determinations. In general, the requirement for regular AAC reviews will allow for the incorporation of new information on climate change, on its effects on forests and timber supply, and on social decisions about appropriate responses as it emerges.

The role of the base case

In considering the factors required under Section 8 of the *Forest Act* to be addressed in AAC determinations, I am assisted by timber supply forecasts provided to me through the work of the Timber Supply Review (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 simulation model, a series of timber supply forecasts can be produced, reflecting different starting harvest levels, rates of decline or increase, and potential trade-offs between short- and long-term harvest levels.

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

Because the base case represents only one in a number of theoretical forecasts, and because it incorporates information about which there may be some uncertainty, the base case forecast for a TFL is not an AAC recommendation. Rather, it is one possible forecast of timber supply, whose validity—as with all the other forecasts provided—depends on the validity of the data and assumptions incorporated into the computer simulation 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 forecast are realistic and current, and the degree to which any adjustments to its predictions of timber supply must be made, if necessary, to more properly reflect the current 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 wherever change during periods of legislative or regulatory change, or during the implementation of new policies, procedures, guidelines or plans.

Thus, in reviewing the considerations that lead to the AAC determination, it is important to remember that the AAC determination itself is not simply a calculation. Even though the timber supply analysis I am provided is integral to those considerations, the AAC determination is a synthesis of judgment and analysis in which numerous risks and uncertainties are weighed. Depending upon the outcome of these considerations, the AAC determined may or may not, coincide with the base case. Judgments that in part may be based on uncertain information are essentially qualitative in nature and, as such, are subject to an

element of risk. Consequently, once an AAC has been determined, no additional precision or validation would be gained by attempting a computer analysis of the combined considerations.

Base case for TFL 52

The timber supply analysis for MP 5 was prepared for the licensee by Ecora and Engineering and Resource Group Ltd. using the forest estate modeling software Patchworks. I am familiar with Patchworks and I am comfortable that it is capable of providing reasonable projections of timber supply and a sound basis for AAC determinations.

The MP 5 timber supply analysis included assumptions based on the licensee's assessment of the best available information on current forest management and the land base available for timber harvesting for the TFL. These assumptions are discussed in the information package and in the timber supply analysis documentation, which form integral components of the management plan.

The base case forecast for MP 5 initiates at 570 000 cubic metres per year, which is a level sustained for the next 20 years. After 20 years, the harvest level increases to 660 000 cubic metres per year after which it climbs slowly for the next 130 years to the long-term level of 784 500 cubic metres per year. This long-term level is the maximum harvest level that can be sustained on the TFL given the assessed productive capacity of the THLB and management practices currently in place.

In contrast to the previous management plan (MP 4), the current base case is approximately 30 percent lower than the mid-term harvest level of the base case forecast completed in support of MP 4. This decrease is attributed to multiple factors including: TFL area removals under the *Forestry Revitalization Act*; Vegetation Resources Inventories (VRI) Phase II adjustments providing an improved estimate of mountain pine beetle losses; restrictions on the rate of disturbance for watersheds; and the inclusion of early patch size modelling for the entire planning horizon.

To assess the potential implications and risk to timber supply arising from uncertainty in data assumptions, the licensee conducted various sensitivity analysis as part of the overall timber supply analysis. These sensitivity analyses and associated alternative harvest projections have also assisted me in considering the factors leading to my determination.

As discussed throughout this rationale, and in consideration of the items described above, I am satisfied that the base case forecast presented in MP 5 provides an adequate basis from which I can assess the timber supply for TFL 52 in this determination.

I would like to acknowledge and thank the licensee for their thorough work investing in the Change Monitoring Inventory (CMI) ground sampling program to improve information sources from the previous timber supply review.

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 is a reasonable reflection of current legal requirements, demonstrated forest management and the best available information; and uncertainties about the factor have little influence on the timber supply projected in the base case, no discussion is included in this rationale. These factors are listed in Table 1.

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

Table 1. List of factors accepted as modelled

Forest Act section and description	Factors accepted as modelled
8(8)(a)(i) - the composition of the forest and its expected rate of growth on the area	<ul style="list-style-type: none"> • Forest inventory • Non-forest and non-productive forest • Existing and future roads, trails and landings • Physical operability • Terrain stability • Low productivity • Recreation sites • Riparian reserve and management zones • Critical fish habitat • Site productivity assignments • Natural stand yields • Fertilization • Genetic gain • Operational adjustment factors • Backlog and currently non-stocked areas
8(8)(a)(ii) - the expected time that it will take the forest to become re-established on the area following denudation	<ul style="list-style-type: none"> • Stand establishment
8(8)(a)(iii) - silviculture treatments to be applied to the area	<ul style="list-style-type: none"> • Silviculture systems
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	<ul style="list-style-type: none"> • Decay, waste and breakage for unmanaged stands • Timber utilization
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	<ul style="list-style-type: none"> • Landscape-level biodiversity • Stand-level biodiversity • Scenic areas and visual resources • Hydrology • Caribou habitat • Mule deer winter range • High-value wetlands for moose • Grizzly bear habitat • Species at risk • Patch size distribution • Harvest rules and priority
8(8)(a)(vi) - any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber	<ul style="list-style-type: none"> • Dead pine • Harvest performance • Unharvested volume carry forward • Climate change • Cumulative effects
8(8)(b) – the short and long term implications to British Columbia of alternative rates of timber harvesting from the area	<ul style="list-style-type: none"> • Alternative rates of harvest

<i>Forest Act section and description</i>	Factors accepted as modelled
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	<ul style="list-style-type: none"> • Economic and social objectives of the crown
8(8)(e) - abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area	<ul style="list-style-type: none"> • Non-recoverable losses

Forest Act Section 8 (8)

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

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

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

Land base contributing to timber harvesting

- general comments

The THLB is an estimate of the land where timber harvesting is considered both available and economically feasible, given the objectives for all relevant forest values, existing timber quality, market values and applicable technology. It is a strategic-level estimate developed specifically for the timber supply analysis and, as such, could include some areas that may never be harvested or could exclude some areas that may be harvested.

The total area of the TFL 52 is approximately 261 468 hectares. This area is 32 027 hectares smaller than reported in MP 4 largely because of land removed from the TFL under the *Forestry Revitalization Act* in September 2011. Of this total area, 174 884 hectares are deemed to be available as THLB after deductions are applied for factors noted in Table 1 above and in factors discussed below.

As part of the process used to define the THLB, a series of deductions was made from the Crown forest management land base to account for various land classes that do not contribute to the TFL timber supply (e.g., non-forest areas, uneconomic areas). These deductions account for biophysical, economic or ecological factors that reduce the forested area available for harvesting. In reviewing these deductions, I am aware that some areas may fall into more than one land class. For example, an area may be both uneconomic and in unstable terrain. To ensure accuracy in defining the THLB, care was taken to avoid double-counting areas with overlapping objectives. Hence, the deduction amount for a given factor stated in the analysis, or in this document does not necessarily reflect the total area within that land class, as some portion of it may have been deducted earlier under another land class. For this determination, I accept that the approach used to determine the THLB for the TFL 52 base case was appropriate.

- deciduous-leading stands

The licensee harvests a portion of the deciduous profile as part of their operations (aspen, birch, and very minor amounts of cottonwood) but does not utilize the volume in their sawmills. In the base case, the deciduous inventory was considered non-merchantable under current market and milling conditions and was therefore excluded from the THLB. An exception was made for deciduous-leading stands with a previous harvest history which were maintained in the THLB.

In the Quesnel area, sawmill residuals (sawdust and shavings, chips and bark) generated from processing primary wood products such as plywood and lumber are utilized to produce secondary products such as pulp, medium density fibreboard and pellets. The licensee notes that, at the time of this determination, the

Quesnel sawmill has reduced sawlog processing in response to a diminished coniferous log supply. This has resulted in a shortage of residuals to supply to secondary manufactures. The licensee suggests that deciduous volume could provide material to compensate for lost sawmill residuals.

When I met with the licensee on February 21, 2019, they requested I consider implementing a partition for the harvest of deciduous volume over the term of the AAC. They indicated that in 2017 and 2018 they began utilizing deciduous volume from TFL 52 to augment their coniferous pulp wood supply and that they intend on increasing the use of this volume in the future. I note that this deciduous volume was primarily aspen harvested from coniferous-leavings stands. To demonstrate the potential supply of deciduous logs from the TFL, the company provided me with additional analysis information on the deciduous volume that would have been harvested if it had not been excluded from the THLB. Over the first 10 years of the forecast the average annual deciduous harvest was 22 500 cubic metres per year. FAIB staff reviewed this information and advised that, although this level of deciduous harvest is above current performance in TFL 52, it is a reasonable increment to the base case coniferous volume. Staff also recommended implementing an AAC partition to ensure that if additional volume is granted, it is not taken from coniferous species.

I would like to caution that additional deciduous volume should not come at the cost of stand-level biodiversity and riparian protection. Specifically, this volume should not come from areas along S6 streams, as these trees shade and moderate water temperature for fish habitat. See the '*cumulative effects*' section for a more detailed discussion of these valued ecosystem components and how they are related to broader considerations of cumulative effects on the landscape across TFL 52.

I conclude that not accounting for the harvest of deciduous species in the base case indicates that the short-term timber supply in the base case is underestimated by 22 500 cubic metres per year. To ensure that the additional AAC volume of 22 500 cubic metres is from deciduous and not coniferous species, I am implementing an AAC partition to limit the harvest of coniferous species to a maximum of 570 000 cubic metres per year. I discuss these considerations further under '**Reasons for Decision**'.

- *cultural heritage resources*

A cultural heritage resource (CHR) is defined in the *Forest Act* as “an object, site or location of a traditional societal practice that is of historical, cultural or archeological significance to the province, community, or an aboriginal people”. CHRs include, but are not limited to, archaeological sites, structural features, heritage landscape features, important harvest areas and traditional use sites.

An Archaeological Overview Assessment (AOA) for the Quesnel Natural Resource District was completed in 1998 and revised in 2009. In MP 5 the licensee stated that they refer to the AOA during their operational planning and conduct Archaeological Impact Assessments (AIA) in areas identified as high potential based on the AOA. The licensee also conducts First Nations consultation during the cutting permit planning process on a site-specific level to identify potential areas of concern for operational planners.

Many identified archaeological sites within TFL 52 are found in areas that are already excluded from the THLB for other ecological or environmental reasons. When identified archaeological sites occur on or near a proposed cutblock, the licensee has protected them by establishing wildlife tree retention areas required to meet stand-level biodiversity objectives.

FAIB staff note that the base case did not account for areas within the TFL that will be excluded from harvesting in order to protect contemporary cultural heritage features, such as resource gathering sites and traditional use areas. For this reason, I conclude that the need to account for the protection of these features indicates that the short-term harvest level in the base case forecast is overestimated by a small, unquantified, amount. Further discussion regarding cultural heritage resources in this AAC decision is included under '**Reasons for Decision**'.

- *dead potential volume*

In April 2006 new log grades were implemented for BC's interior. Under the previous grade system, a log was scaled according to whether the tree it came from was alive or dead at the time of harvest, and logs from dead trees were not charged to the AAC. Under the grading system now in use, grades are based on the size and quality of logs at the time they are scaled, without regard to whether they were alive or dead when harvested. Dead trees that are potentially merchantable (dead potential volume) therefore should now be accounted for in timber supply determinations.

In the previous timber supply review, estimates for dead potential volume were not included in the VRI or modelled in the base case forecast. To account for this in the 2009 AAC determination, the chief forester adjusted the base case to reflect harvest billing system data (from 1995 to 2004) on scaled dead potential volume. To provide a more accurate estimation of this factor for the next timber supply review, the chief forester instructed the licensee to ensure that future inventory projections would include estimates of dead potential volume.

In 2011, the licensee adjusted the VRI volume estimates for TFL 52 using Phase II (ground plot data) measurements which recorded merchantable volume for living trees for all species and for dead pine. FAIB staff note that, since the adjustments did not account for dead volume of non-pine species the utilization of dead potential volume from non-pine trees represents a potential addition to the base case level.

A 2006 FAIB report titled, *Summary of dead potential volume estimates for management units within the Northern and Southern Interior Forest Regions* indicates that the dead potential volume in TFL 52 is about 3.9 percent of the total green volume for stands over 60 years of age. FAIB staff note that this estimate includes dead pine, which is included in the Phase II adjusted VRI, and that the non-pine dead potential volume in the TFL is likely much less than 3.9 percent of the green volume.

From the information described above, I conclude that not accounting for the harvest of non-pine dead potential volume in the analysis indicates that the short-term harvest level in the base case forecast is underestimated by a small unquantified amount. I have discussed this further under '**Reasons for Decision**'.

To more accurately quantify this pressure in the next timber supply review, I encourage the licensee and Quesnel district staff to improve the tracking and monitoring of dead potential volume of all species.

Expected rate of growth

- *managed stand yield estimates*

Existing managed stands were identified as productive stands established after 1979 on Block A and after 1949 on Block B. The defining years were based on a review of historic inventory information and silviculture records for the TFL. The oldest managed stands on Block B are approximately 65 years of age and are now becoming harvestable.

Managed stand yield tables were generated using BatchTIPSY version 4.3. Inputs for TIPSY were defined based on the licensee's current silviculture regimes. The yield tables did not account for any fertilization or regeneration delay as these were applied separately in the timber supply model. Stands were aggregated into analysis units based on species composition, site productivity, existing stand condition and future management regime.

FAIB staff identified two considerations that indicate that the managed stand yield estimates applied in the base case may be overestimated. These are the use of an older version of TIPSY to generate yield tables and the application of a locally derived operation adjustment factor 1 (OAF 1) to account for less than ideal tree distributions, small non-productive areas, endemic pests and disease, and random risks such as wind throw.

In 2000, the licensee developed localized OAF 1 values using Terrestrial Ecosystem Mapping (TEM). Areas classified as non-productive in the TEM were assumed to be an approximation of the less than ideal tree distributions and small non-productive areas components of OAF 1. This approach was accepted for use in the analyses supporting MP 3 and again in MP 4. No further validation of the underlying assumption has been completed to date. FAIB staff believe that it would be timely for the localization project to be revisited and any new sources of information that have become available since 2000 should be considered.

FAIB staff compared yield tables generated from TIPSYS 4.3 and 4.4 and found that the unweighted average yield estimates for all timber types within the TFL were consistently lower with version 4.4 than with version 4.3. The licensee was not able to provide a sensitivity analysis that examines the effect of using yield tables produced with TIPSYS 4.4 on timber supply. Therefore, staff advise me that there is uncertainty quantifying this overestimation.

To validate the assumptions regarding future stand growth and yield, the licensee implemented a Change Monitoring Inventory (CMI) program in 2001 to monitor post-harvest managed stands. The program established a network of permanent sample plots across the TFL. The second remeasurement of these plots was completed shortly after the managed stand yield tables were produced for the current analysis. The report, *Change Monitoring Inventory on Tree Farm Licence 52: Second Remeasurement Analysis* (April 11, 2014) summarizes a comparison made between the plot data and the yield tables. The results of this report indicate that managed stand yield estimates may be overestimated by six percent. To reduce this bias, the licensee applied adjustments to the managed stand yield estimates used in the base case by extending regeneration delay for the affected analysis units.

FAIB staff advise me that in combination these factors result in an overestimation of managed stand yield estimates by a small amount, less than one percent. I agree and conclude that uncertainty regarding managed stand yield estimates indicate that the short-term timber supply in the base case forecast is overestimated by less than one percent. I discuss this consideration further under ‘**Reasons for Decision**’.

As noted under ‘**Implementation**’, I expect the licensee to revisit the localization of OAF 1 estimates and to continue their CMI program in order to reduce uncertainty regarding managed stand yield estimates in time for the next timber supply review.

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

Expected time for the forest to become re-established following harvest

No factors considered under this section require additional comment.

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

Re-establishment and silvicultural treatments

- *silviculture systems*

In the base case forecast the licensee assumed all harvesting to utilize an even-aged silviculture system with varying levels of retention. The one exception was for caribou “modified harvest” areas where partial harvest silviculture systems were utilized as recommended by the CCLUP caribou strategy.

The licensee recently started testing the feasibility of applying commercial thinning for stand improvement in stands under 45 years of age. Commercial thinning is a silviculture treatment that ‘thins’ out an overstocked stand by removing trees that are large enough to be sold as products such as poles or fence posts. This practice is intended to improve the health and growth rate of the remaining crop trees.

The licensee currently tracks thinning in the inventory and has advised me that they plan to establish CMI plots in thinned stands to monitor stand growth and recovery following thinning. They also noted that commercial thinning provides a component of deciduous harvest that can be utilized for secondary manufactures. For example, during the licensee’s commercial thinning trials within TFL 52, birch and

aspen were harvested and sold to be used as pellets. See ‘*deciduous-leading stands*’ for a further discussion on harvesting deciduous species in TFL 52.

As commercial thinning is still in the trial stage it was not modelled in the base case. I am mindful that this method does have the potential to alter the AAC over time, however, more information is still needed to determine what the impact will be. At this time, I am satisfied that the assumptions applied in the base case regarding silviculture systems were appropriately modelled and reasonably reflect demonstrated forest management and the best available information.

To continue exploring the effect of commercial thinning on timber supply, as noted under ‘**Implementation**’, I request the licensee work jointly with FLNRO staff to improve the tracking and modelling of commercial thinning in young stands. I look forward to considering these results to inform the potential expansion of commercial thinning as a silviculture strategy in other management units across BC.

Section 8 (8) (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

- *minimum harvestable criteria*

Minimum harvestable criteria are assigned to a stand based on the time required for the trees to accumulate volume and grow to a harvestable condition. These criteria are used in the timber supply model to define when a stand becomes available for harvest.

In the base case, a minimum harvestable volume and a minimum harvestable age criteria were used in conjunction to determine when a stand achieved a harvestable condition. The minimum harvestable volume was 120 cubic metres per hectare and the minimum harvestable age was the age at which the stand volume achieved at least 95 percent of its culmination mean annual increment. This approach was intended to ensure the stands were not scheduled for harvest in the forecast before they were older than the age of near maximum annual volume growth and had achieved a volume required for commercial harvesting.

A sensitivity analysis was conducted to test the effect of increasing and decreasing minimum harvest ages by 10 percent. It found that decreasing the ages only modestly increased harvest levels; however, increasing the ages by 10 percent resulted in an immediate harvest shortfall of 25 percent. The sensitivity of the initial harvest level to the lengthening of the time it takes for stands to become harvestable is likely linked to the recent mountain pine beetle epidemic and subsequent salvage. The large reduction in pine growing stock has resulted in a highly constrained short-term timber as the remaining non-pine growing stock must be harvested at a lower level as second-growth stands mature and MPB affected stands regenerate.

I conclude that the minimum harvestable criteria modelled in the base case adequately reflect current practice. I also note that the ability of the licensee to sustain the harvest level indicate by the base case is dependent on their ability to harvest existing managed stands at the ages indicated by those criteria. I expect the licensee to carefully monitor harvest performance in existing managed stands to ensure that the volumes harvested are operationally feasible and are consistent the assumption of the base case forecast. If over the period of my determination demonstrated performance significantly departs from the base case assumption, I am prepared to re-examine this consideration in a new AAC determination.

Utilization standard and DWB allowance

- *Grade 4 credit*

Operationally, the AAC within a TFL 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 licensee to remove Grade 4 timber without having it counted against their licence’s cut control position if the timber goes to a primary facility (i.e., pulp/paper, bioenergy, etc.) other than a sawmill or veneer plant 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.

Currently, the licensee has not utilized Grade 4 credit from harvesting within the TFL, however, they have expressed interest to do so in the next cut control period. They believe that Grade 4 credits would incent increased utilization of fibre to augment conifer pulp log shortfalls (as further discussed under ‘*deciduous-leading stands*’) and would allow for economic harvesting of the TFL’s log quality profile.

I am aware that the excessive use of Section 17(6) provisions (non-cut control accountable crediting of Grade 4) could lead to an overharvest of a management unit’s AAC. I acknowledge that cut control credit for Grade 4 timber can be a useful tool to incentivize the collection of low-quality timber, which reduces waste left on site and supports secondary manufacturers such as pulp, chipping and pellet plants.

I encourage the licensee to prudently apply this tool by ensuring that its use does not result in a rate of harvest higher than the determined AAC, putting the sustainability of other ecosystem values and the mid-term timber supply at risk.

I am satisfied that the assumptions applied in the base case for Grade 4 credits reasonably reflect demonstrated forest management and the best available information. To ensure any future use of this credit does not negatively impact the mid-term timber supply or other ecosystem values, I expect Ministry staff to monitor the use of Grade 4 cut control credits and report any concerns to the chief forester.

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

- *landscape-level biodiversity*

The *Forest and Range Practices Act* (FRPA) defines biodiversity as “the biological diversity of plants, animals and other living organisms in all their forms and levels of organization, including the biological diversity of genes, species and ecosystems”. Landscape-level biodiversity is conserved by maintaining forests with a variety of patch sizes and seral stages across a variety of ecosystems and landscapes. Given other forest management objectives that provide for a diversity of forest stand conditions, old-forest retention is a key landscape-level biodiversity consideration and is a requirement under FRPA.

Landscape-level biodiversity objectives for old growth in TFL 52 are managed by retaining forest in Old Growth Management Areas (OGMA) which have been established under the 2010 Cariboo-Chilcotin Land Use Plan *Land Act* Section 93.4 Ministerial Order (LAO). The OGMA’s were located with consideration for their overlap with areas to be managed for other resource values, including mule deer winter range, riparian reserves, critical fish habitat and wildlife habitat areas. Forest licensees must ensure that strategies described in their Forest Stewardship Plans are consistent with objectives in the LAO.

Under the LAO there are two categories of OGMA’s: ‘Permanent OGMA’s’ were excluded from the THLB and ‘Transition OGMA’s’ were maintained in the THLB but are reserved from harvest until they expire in 2031. OGMA’s cover a productive area of 24 321 hectares and of this, 19 815 hectares (5 313 643 cubic metres) were specifically removed from the THLB.

Additional targets specified in the LAO for ‘mature plus old seral’ requirements to maintain landscape-level biodiversity were set by landscape unit, natural disturbance type and BEC zone. These targets were modelled as seral retention constraints in the base case.

I have reviewed the information regarding the modelling assumptions for landscape-level biodiversity in the base case. Based on my review, I conclude that the landscape-level biodiversity and OGMA information used in the analysis is consistent with current legal requirements. Therefore, I will make no adjustment to the base case on this account.

As discussed under ‘*cumulative effects*’ landscape-level biodiversity was highlighted as a valued ecosystem component. Maintaining targets for old and mature forest is important for biodiversity as well as species dependant on old and mature forest within TFL 52 (such as caribou, mule deer and American marten). As mentioned under ‘**Implementation**’, I would like to see the licensee, in collaboration with FLNRO staff, undertake effectiveness monitoring of CCLUP LAO objectives for landscape-level biodiversity. If targets are not being achieved, a strategy to better recruit and restore mature and old forest should be implemented.

- *caribou habitat*

Caribou habitat within the TFL falls under two separate GAR order planning units with different management requirements. The Quesnel Highlands Planning Unit GAR order specifies two categories of caribou habitat: ‘no harvest’ and ‘modified harvest’. Areas designated as ‘no harvest’ were excluded from the THLB and the ‘modified harvest’ areas were modelled with restrictions that allow for access to timber while maintaining caribou habitat. The Upper Fraser, Hart Ranges and Mount Robson Planning Units GAR order designates a caribou corridor unit which specifies restrictive practices that were modelled as constraints in the base case.

Within TFL 52, caribou ‘no-harvest’ areas cover approximately 20 954 hectares of the productive land base and of this, 18 175 hectares (3 195 008 cubic metres) were specifically removed from the THLB.

At the time of this determination, BC and Canada are developing a bilateral conservation agreement under Section 11 of the *Species at Risk Act* to support southern mountain caribou recovery. The agreement will contain overarching commitments, for the recovery of Southern Mountain Caribou in BC. The agreement commits to development of herd plans through collaborative processes with Indigenous peoples and stakeholders that will identify habitat in need of protection, restoration and recovery, seral targets, and/or harvesting / silviculture best management practices while attempting to minimize impacts to local communities / stakeholders. At the time of this determination no specific management measures incremental to those described above have been implemented in TFL 52.

I have reviewed the information regarding the modelling assumptions to account for caribou habitat and discussed them with FLNRO staff. I am satisfied that the legal requirements for managing the needs of caribou present in TFL 52 were appropriately reflected in the analysis and I make no adjustments in this regard. I am mindful of the upcoming conservation agreement, and I am prepared to re-determine the AAC if habitat protection areas are legally established and are found to have a substantial effect on the available timber supply in TFL 52.

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

Other information

- *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 including wildfires, floods, landslides, and occurrences of insects and disease. While the trends are generally consistent, the specific magnitude of these changes, and their spatial and temporal distribution, are uncertain.

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

- The climate in the Cariboo Region has changed over the past century and is expected to continue to change. Averaged across the region, over one degree of warming has occurred during the 20th century, with most since 1950. Projections suggest the region may warm, on average, an

additional 1.6 to 4.3 degrees by the end of this century, similar to moving from Quesnel to Merritt (2.3°C warmer). Precipitation is projected to increase modestly in all seasons but summer where it is predicted to decrease.

- Projections for the longer term – mid-century – project increased spring precipitation, reduced snowpack and earlier snow pack melt, affecting water supply to the trees and affecting streamflow.
- By the 2050's, climate envelopes for current Cariboo BEC zones are predicted to shift about 100 to 250 metres upward in elevation and up to 175 kilometres northward). The cold, dry SBPS and high elevation MS and ESSF will likely experience the highest stress: all are projected to lose over two-thirds of their current area by the 2050's. The IDF, BG and ICH climate envelopes are projected to lose little current area and to expand inland and upslope.
- In the Cariboo Region it is believed that fires will become more frequent and pests, such as Douglas-fir beetle, Spruce Beetle, and Western Balsam Bark Beetle may increase as changes in precipitation stresses and weakens stands that were established under previous climatic conditions.
- Changes in climatic conditions support range expansion of forest pests that are currently limited by climate. Fewer extreme cold events will occur to inhibit insect outbreaks. Cariboo ecosystems are already undergoing massive shifts due to loss of mature lodgepole pine to the mountain pine beetle. Douglas-fir will likely experience continued and increased mortality from the tussock moth, the Douglas-fir bark beetle and the Western spruce budworm.
- Hydrology in the region will be substantially influenced by warmer annual temperatures with increased evaporative demand, wetter winters with less snow and more rain, wetter springs and falls, and drier summers, combined with more frequent and severe extreme weather events. Altered flow patterns could disrupt seasonal habitat use by fish. As well, earlier thaws and changed peaks pose hazards to infrastructure.
- Uncertainty about climate projections leads to uncertainty about which trees may be best-suited to changing conditions, particularly in the coast/interior transition at the west of the region. Suitable trees at any given point in time may become maladapted by rotation age, creating additional uncertainty and complexity for management.

The following are examples of adaptation strategies presented in *Adapting natural resource management to climate change in the Cariboo Region* extension note that may help address the current and anticipated impacts to ecosystems:

- Retain sufficient riparian cover to maintain stream flow and improve shading (thus reducing the impact of warmer temperatures) and maintain bank stability to decrease the impact of potential increases in storms/flooding events.
- Maintain diversity in stand composition and age classes across watersheds to vary snow accumulation and loss and desynchronise run-off.
- Consider limiting the Equivalent Clearcut Area to 30 to 50 percent of the THLB.
- Promote ecosystem adaptation to climate change by spatially locating Old Growth Management Areas across elevation bands and include habitat for specialized species and communities at risk. Also consider maintaining adjacent old forest retention to facilitate natural migration of ecosystem components.
- Plant climatically-suited species and genetic stock especially on dry sites or sites facing drought, adjust stocking standards to reflect site capabilities, and establish operational trials to test survival and growth.

- Increase fire resilience at the landscape level by creating strategic fuel breaks, prescribing fire, and allowing ecologically appropriate fires in suitable locations to burn under appropriate conditions.
- Increase stand-scale species diversity (e.g., retain and plant a variety of species, including deciduous) and expand the breadth of “acceptable” species in young stands.

There is a large amount of uncertainty with the short- and long-term impacts from climate change but it is important to encourage dialogue to develop climate change mitigation and adaptation strategies through stakeholder engagement forums. It will be worthwhile to continue to consult and collaborate with federal and provincial government agencies, First Nations, universities, and forest licensees to better understand climate adaptation and mitigation challenges and opportunities in relation to forest management.

For the next timber supply review, I encourage the licensee to work with FLNRO’s Climate Change and Integrated Planning Branch to develop a climate adaptation strategy for TFL 52 that applies the information and strategies discussed in the above-mentioned regional report. As part of this strategy, I recommend the licensee investigate the application of Climate Based Seed Transfer (CBST) in the development of yield estimates for future managed stands. CBST promotes healthy, resilient and productive forests and ecosystems through the matching of seed sources (seedlots) to climatically suitable planning sites.

While projected climate change will likely affect forest productivity and growth, the dynamics of natural disturbances, forest pests and hydrological balances mean the magnitude, extent and timing of impacts are uncertain. It is likely that the best approach in the short term is to monitor for changes to enable timely adaptive responses and to undertake analysis to increase our understanding over time.

- *cumulative effects*

Cumulative effects are changes to social, economic and environment conditions caused by the combined impact of past, present and potential human activities or natural events. The Government of BC has supported the phased implementation of the Cumulative Effects Framework (CEF) that aims to provide relevant information and supporting policy to address these cumulative effects. The framework gives resource managers the procedures and tools to inform decisions that support sustainable management and the needs of many different users.

A provincial Cumulative Effects Team has been established and is focusing on implementing cumulative effects assessments within pilot areas across the province, building assessment procedures for values, and developing policies and procedures. As part of this process in 2015, the Cariboo-Chilcotin Region released *A Broad Scale Cumulative Impact Assessment Framework for the Cariboo-Chilcotin* which described an assessment methodology and standardized descriptions of risk factors for broad-scale assessments covering six valued ecosystem components (VEC). These VEC are: biodiversity, hydrology, marten, moose, mule deer and grizzly bear.

Regional cumulative effects assessments have been completed for most of the Cariboo-Chilcotin Region including the Quesnel Natural Resource District (which covers TFL 52). Results of these assessments have been distributed to forest resource managers to support management decisions at the strategic and operational level. As with the Quesnel TSA, the VEC of primary concern in TFL 52 are fish habitat, American marten and landscape-level biodiversity.

To date, there has not been a result or strategy approved in a Forest Stewardship Plan in the Quesnel Natural Resource District that incorporates cumulative effects. Changes in management as the implications of cumulative effects are more directly considered in strategic and operational plans will be incorporated in future AAC determinations.

I have reviewed and discussed with FLNRO staff the information regarding cumulative effects in TFL 52 and conclude that the base case reflects current management, the current status of the effects of past and present industrial activity on the land base, and the legal objectives established by government for various non-timber resources. A reduction in the AAC for TFL 52, as indicated in the base case will support

hydrological recovery, which the cumulative effects assessment indicates is a priority for watersheds in the TFL. The remaining unsalvaged dead pine in combination with some non-pine overstory and understory trees, can play a role in the management of cumulative effects on fish habitat, American marten and forest biodiversity.

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

- *accumulated volume carry-forward*

Unused AAC volume can accumulate from three sources, these are: unharvested AAC, uncommitted volume, and unused BCTS volume. Collectively these are referred to as accumulated volume. Guidance on the administration of accumulated volume for forest licences, tree farm licences and woodlot licences, in accordance with Section 75.8 of the *Forest Act*, is provided by the Ministry 2018 policy on the *Administration of Unharvested Volumes, Uncommitted Volumes and Unused BCTS Volumes*. This policy sets out a process to determine the accumulated volume that may be made available for issuance in new forest agreements.

When determining the AAC for a TFL, the chief forester must consider the amount of total unused volume as one of the factors (e.g., as a reduction to the standing inventory available to support the AAC) and the minister (or delegate) may, in accordance with Section 75.8, issue a new tenure based on any unused volume source or combination of sources that would be harvestable in the next AAC period. It is important to note that First Nations consultation is required for any subsequent tenure issued using accumulated volume carry-forward.

In 2017, the licensee's cut control period ended with 1 924 607 cubic metres of unharvested AAC available for disposition. This undercut was largely attributed to the partition limiting the amount of non-pine species harvest. The remaining AAC of pine volume was specified for the salvage of mountain pine beetle killed stands. As the salvage of dead pine stands neared completion the opportunities to utilize the remaining AAC were no longer available.

In a May 25, 2018 briefing note prepared for the FLNRO South Area Regional Manager, district staff recommend to not offer any licence opportunities for available undercut volume because the extra volume was intended for use in addressing mountain pine beetle mortality and is no longer required now that salvage is near complete.

After discussing this information with Ministry staff, I agree that it would not be appropriate to award the undercut to new licensees. Any accumulated volume from the previous AAC is now considered in the current AAC.

Alternative rates of harvest

No factors considered under this section require additional comment.

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

- *economic and social objectives of the Crown*

The Minister of Forests, Lands, Natural Resource Operations and Rural Development has expressed the economic and social objectives of the Crown for the province in a letter dated October 30, 2017.

In the letter dated October 30, 2017 (attached as Appendix 3), the Minister emphasizes the BC Government's commitment to building a strong, sustainable, innovative economy and creating well paid jobs in the province. The letter identifies Government's three objectives for the management of BC's forests and Crown lands that are relevant to AAC determinations. These are:

- modernizing land-use planning to effectively and sustainably manage BC's ecosystems, rivers, lakes, watersheds, forests and old growth forests;
- expanding investments in reforestation; and,
- collaborating to develop strategies to manage wildlife resources and habitat.

The October 30, 2017, letter also asks that I do the following when making an AAC determination:

- ensure that the Ministry's approved strategies for delivering its forestry objectives are integrated into the TSR process;
- ensure AAC determinations take into consideration relevant agreements between First Nations and the Government of BC, and court decisions that define Aboriginal title and rights; and in addition support Government's commitment to moving forward on reviewing policies, programs, and legislation to determine how to bring the principles of the United Nations Declaration on the Rights of Indigenous Peoples into action for AAC determinations;
- consider traditional knowledge and other input from BC First Nation communities and organizations as they pertain to the AAC determination;
- consider how AAC determinations can support Government's objective to focus on planning and sustainable resource management in a way that supports robust forest recovery and timely and effective responses to emerging threats from factors such as insect infestations and wildfire while promoting forest health and values;
- ensure the TSR process incorporates the best available information on climate change and the cumulative effects of multiple activities on the land base and explores management options that align with established climate change strategies, adaptation and mitigation practices;
- where the cumulative effects of timber harvesting and other land-based activities indicate a risk to natural resource values, ensure the TSR identifies those risks for consideration in land-use planning;
- consider the environmental, social and economic needs of local communities as expressed by the public during TSR processes, including strategies that contribute to community economic stability, and the jobs that the forest sector creates in communities, where these are consistent with the government's broader objectives; and,
- when faced with necessary reductions in AAC's, that those reductions be no larger than necessary to avoid significant longer-term impacts.

First Nations considerations

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

Aboriginal Interests or treaty rights may be connected to biophysical, spatial, social, cultural, spiritual or experiential values. The overall AAC can affect various resource values and therefore the ability of Aboriginal peoples to meaningfully exercise their Aboriginal rights. Information gained through consultation with potentially affected First Nations about Aboriginal rights claims has been taken into account in the development of this determination. Where the Province and First Nations have negotiated a treaty or have contractually agreed to a process for consultation, that process was followed.

TFL 52 overlaps with the traditional territories of the six following First Nations: Lhtako Dene Nation, Xats'ull First Nation, Nazko First Nation, ?Esdilagh First Nation, T'exelc First Nation, and Lheidli T'enneh First Nation. The Lhtako Dene Nation's traditional territory encompasses almost the entire TFL except for the northwest portion along the Fraser River; Xats'ull First Nation's traditional territory overlaps with approximately half the TFL in the southeast area of the licence; the traditional territories of Nazko First Nation and ?Esdilagh First Nation overlap with the northwestern portions of the TFL; Lheidli T'enneh's traditional territory overlaps with the northernmost areas of the TFL; and T'exelc First Nation's traditional territory overlaps minimally with the southeastern boundary of TFL 52.

Of these six Nations, five are members of broader First Nations Councils, Alliances, or Governments.

- The Lhtako Dene Nation and Nazko First Nation are members of the Southern Dākelh Nation Alliance (formed in April 2016). Lhtako Dene Nation is also a member of the Carrier Chilcotin Tribal Council (established in 1991).
- Xats'ull First Nation and T'exelc First Nation are members of the Northern Shuswap Tribal Council or Northern Secwepemc te Qelmuw (formed in 1971 as the Cariboo Tribal Council).
- ?Esdilagh First Nation is the northernmost member of the Tsilhqot'in National Government (established in 1989).

On January 11, 2019, a letter of understanding was signed between the Southern Dākelh Nation Alliance and Tsilhqot'in National Government acknowledging their long history as neighbours and committing to work together to resolve boundary issues as a priority at the nation-to-nation level.

All of the First Nations with territorial overlap with TFL 52 have Forest Consultation and Revenue Sharing Agreements, Forest Tenure Opportunity Agreements, or woodlot agreements. Many nations also had tenure opportunities related to the salvage of mountain pine beetle-impacted trees. These tenures are now ending.

- *information sharing and consultation process*

Consultation with First Nations on the AAC determination and management plan approval was undertaken by FLNRO and began in December 2016. This consultation was assisted by information sharing with First Nations that was done by the licensee. On August 21, 2017, the licensee distributed the draft information package material to all applicable First Nations. On August 25, 2017, FLNRO staff initiated consultation activities on the information package requesting input by November 24, 2017. A response was received from the Tsilhqot'in National Government questioning how the licensee plans to address the Federal Government's recent caribou habitat report. The licensee responded with the same information I have discussed under '*caribou habitat*'. No other comments or concerns were expressed at this time.

From September 21 to 25, 2018 (the date range is due to email, mail/courier, and hand delivery of the Draft Management Plan package to each First Nation), the licensee began information sharing on the draft management plan. On September 24, 2018, FLNRO staff requested input on the draft Management Plan within 60-days, and on November 8, at the half-way point of the consultation time frame, a reminder email was sent. Nazko First Nation and Lhtako Dene Nation responded and had no concerns following email correspondence and meetings with the licensee. No further responses were received from the T'exelc Indian Band, Lheidli T'enneh First Nation, Xats'ull First Nation, or the Tsilhqot'in National Government.

Following the chief forester's '*Guiding principles for AAC determinations*' and my review of the information sharing and consultation process, the Aboriginal Interests information available to Ministry

staff, and the potential impact my decision may have on these interests, I believe that the Ministry has engaged in consultation in accordance with current provincial guidance and applicable case law.

I believe that any adverse impacts upon the Aboriginal Interests of the relevant First Nations stemming from forest development activities that occur subsequent to the TFL AAC determination can be appropriately minimized or mitigated through existing legislation and regulation, planning processes, and meaningful engagement at the operational and strategic level.

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

Abnormal infestations and salvage programs

No factors considered under this section require additional comment.

Reasons for Decision

In reaching my AAC determination for TFL 52, I have considered all 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 52 were appropriately modelled and reasonably reflect current legal requirements, demonstrated forest management and the best available information. In this section, I have summarized my considerations related to other factors where uncertainty exists or I have identified a need for some adjustment with respect to the analysis inputs, which in turn affect the base case timber supply.

I note that the base case harvest forecast presented in MP 5 maintained an initial harvest level of 570 000 cubic metres per year for 20 years before increasing to 660 000 cubic metres per year. This harvest level was projected to remain for the next 130 years before gradually increasing to the long-term level of 784 500 cubic metres per year.

I am aware of two factors that indicate the base case may underestimate the available harvest:

- *Deciduous-leading stands* – stand yield information used in the base case did not account for the contribution of volume from deciduous-leading stands; this resulted in an underestimate in short-term timber supply of 22 500 cubic metres per year.
- *Dead potential volume* – stand yield information used in the base case did not account for the contribution of dead potential volume from non-pine species; this resulted in an unquantified underestimate in the short-term timber supply indicated in the base case.

I am also aware of two factors that indicate the base case may overestimate the available harvest:

- *Cultural heritage resources* – although the area needed to protect cultural heritage resources sites may overlap with areas reserved for other resource values, additional area may need to be reserved, resulting in a small unquantified overestimate in timber supply projected by the base case.
- *Managed stand yield estimates* – two considerations were identified that indicate that the managed stand yield estimates applied in the base case may be overestimated. These are the use of an older version of the TIPS Y yield model and the application of locally derived operational adjustment factor 1 (OAF 1). In combination these factors indicate a small overestimation of less than one percent.

From reviewing the over- and underestimations in the projected timber supply listed above, the combined result is a 22 500 cubic metres per year net underestimate in base case timber supply. Increasing the initial harvest level by this amount results in an initial harvest level of 592 500 cubic metres per year.

As discussed earlier in this document under ‘*deciduous-leading stands*’, in order to encourage licensee performance in deciduous-leading stands, I am implementing a partition of a maximum of 570 000 cubic metres per year for coniferous species.

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 for the TFL 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 is 592 500 cubic metres per year. In making this AAC determination, I specify, under Section 8(5)(a) of the *Forest Act*, a partition of 570 000 cubic metres of the total AAC attributable to coniferous species.

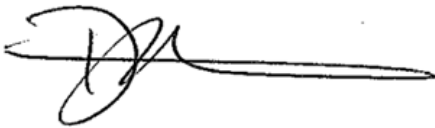
This determination is effective June 17, 2019, and will remain in effect until a new AAC is determined, which must take place within 10 years of the effective date of this determination.

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

Implementation

During the term of this AAC, I instruct the TFL holder to undertake the following activities:

- 1) *Operational adjustment factors*: revisit the localization of OAF 1 estimates and to continue their CMI program in order to reduce uncertainty regarding managed stand yield estimates in time for the next timber supply review.
- 2) *Silviculture systems*: work jointly with FLNRO district staff to improve the tracking and modelling of commercial thinning in young stands.
- 3) *Landscape-level biodiversity*: in collaboration with FLNRO staff, undertake effectiveness monitoring of CCLUP objectives.



Diane Nicholls, RPF
Chief Forester

June 17, 2019



Appendix 1: Section 8 of the *Forest Act*

Section 8 of the *Forest Act*, Revised Statutes of British Columbia 1996, c. 157, (current to May 15, 2019), 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* (current to May 15, 2019) reads as follows:

Purposes and functions of ministry

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

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

Appendix 3: Minister's letter of October 30, 2017



Reference: 230810

October 30, 2017

Diane Nicholls, Chief Forester and Assistant Deputy Minister
Ministry of Forests, Lands, Natural Resource Operations
and Rural Development
Victoria, British Columbia
V8W 2H1

Dear Diane

The British Columbia *Forest Act* conveys the responsibility to determine an Allowable Annual Cut (AAC) to the Chief Forester of the Province of BC for each timber supply area and tree farm licence in the province. It also specifies considerations that must be brought to bear during the course of such determinations including, among others, the economic and social objectives of the government.

This letter is intended to provide you with guidance regarding the objectives of the British Columbia (BC) government that require your consideration when determining an AAC.

Your office implements a rigorous Timber Supply Review Process to help ensure that each AAC you determine responds to a broad array of objectives and aligns with land use and management decisions established by provincial statutes and regulations. The objectives identified below are to be considered and as part of the review process to ensure that AAC determinations, and the timber harvest rates they enable, continue to support government goals.

This letter replaces two letters previously issued by the Minister of Forests and Range to the chief forester, dated July 4, 2006 and October 27, 2010. It is intended to be used in concert with direction provided by the Minister of Forests, Lands and Natural Resource Operations to the chief forester in a letter dated April 12, 2013, concerning objectives outlined in the Shared Decision Making Process pursuant to the Nanwakolas Reconciliation Protocol.

The BC government has committed to building a strong, sustainable, innovative economy and creating well paid jobs in the province. The health of the forest sector, and its ability to respond to an array of short and long term social, economic and environmental interests, is a key to delivering on this commitment. As such, Government has identified specific objectives for the management of BC's forests and Crown lands. Those relevant to AAC determinations include:

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Ministry of Forests, Lands,
Natural Resource Operations
and Rural Development

Office of the Minister

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Diane Nicholls, Chief Forester and Assistant Deputy Minister

- modernizing land-use planning to effectively and sustainably manage BC's ecosystems, rivers, lakes, watersheds, forests and old growth forests
- expanding investments in reforestation; and
- collaborating to develop strategies to manage wildlife resources and habitat

Strategies for delivering on these objectives will be developed in collaboration with the Ministry of Forests, Lands, Natural Resource Operations and Rural Development, relevant Natural Resource Ministries, indigenous partners and industry. Once approved by government, I ask that you ensure such strategies are integrated into the Timber Supply Review Process to support AAC determinations.

The BC government has committed to full and lasting reconciliation with Indigenous peoples. As chief forester, your responsibility includes continuing to ensure that AAC determinations take into consideration relevant agreements between First Nations and the Government of BC, court decisions that define Aboriginal title and rights as well as moving forward on reviewing policies, programs, and legislation to determine how to bring the principles of the United Nations Declaration on the Rights of Indigenous Peoples into action for AAC determinations. You also have a responsibility to continue to carefully consider traditional knowledge and other input from BC First Nation communities and organizations in the course of AAC determinations as they pertain to the AAC determination.

The *Forest Act* requires that the chief forester consider a range of forest health issues as part of AAC determinations, including the impacts of circumstances such as infestations, devastations and salvage programs. This is particularly relevant as BC's forest sector emerges from a period of significant, compounding challenges. The infestation of the Mountain Pine Beetle that peaked in the late 2000s has largely subsided but with continuing effects to the size and composition of the forest inventory. Currently, the north area is experiencing Spruce Beetle infestations which also pose impacts. Recently, the Province has experienced record levels of wildfires that have impacted timber supply, community stability and multiple forest values.

In response to these challenges, it is a government objective to focus on planning and sustainable resource management in a way that supports robust forest recovery and timely and effective responses to emerging threats. Please consider how your AAC determinations can support these objectives while promoting forest health and values. In some cases AAC determinations may encourage management practices that avert another infestation in the province's forests. In certain regions, they will need to reflect the reality of a lower timber supply. Some regions will require expanded investment in reforestation and/or an increased focus on timber utilization and recovery. In the wake of extensive natural disasters, the extent of damage in certain areas may also warrant re-determining AACs earlier than scheduled.

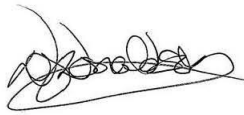
In order to ensure that AAC determinations align with government objectives to modernize land-use planning and sustainably manage B.C.'s ecosystems, rivers, lakes, watersheds, forests and old growth forests, the Timber Supply Review process should incorporate the best available information on climate change and the cumulative effects of multiple activities on the land base. Management options that align with established climate change strategies, adaptation and mitigation practices should be explored. Where the cumulative effects of timber harvesting and other land based activities indicate a risk to natural resource values, the process should identify those risks for consideration in land-use planning.

Diane Nicholls, Chief Forester and Assistant Deputy Minister

This government recognises that the forest sector is of critical importance to BC. The needs of rural communities and forest based industries are evolving in response to a number of the factors mentioned above. To support BC's forest-dependent communities, I ask that your AAC determinations consider the environmental, social and economic needs of local communities as expressed by the public during Timber Supply Review processes, including strategies that contribute to community economic stability, and the jobs that the forest sector creates in communities, where these are consistent with the government's broader objectives. I also ask that when faced with necessary reductions in AAC's, that those reductions be no larger than necessary to avoid significant longer term impacts.

Thank you Diane, for your continued service and considerable efforts in these regards.

Sincerely,

A handwritten signature in black ink, appearing to read "Doug Donaldson", with a horizontal line underneath.

Doug Donaldson
Minister

Appendix 4: Information sources used in the AAC determination

The information sources considered in determining this AAC for TFL 52 include the following:

- Legislation

- *Forest Act* and regulations, BC Government, current to May 15, 2019;
- *Ministry of Forests and Range Act*, BC Government, current to May 15, 2019;
- *Forest and Range Practices Act (FRPA)* and regulations and amendments, BC Government, current to May 15, 2019;
- *Forest Practices Code of British Columbia Act* and regulations and amendments, BC Government, current to May 15, 2019;
- *Land Act*, BC Government, current to May 15, 2019;
- *Environment and Land Use Act*, BC Government, current to May 15, 2019;
- *Park and Protected Areas Statutes Amendment Act*, 2019, BC Government, current to May 15, 2019;
- *Protected Areas of British Columbia Act*, BC Government, current to May 15, 2019;
- *Species at Risk Act*, Government of Canada (S.C 2002, c29) current to May 22, 2019;
- *Forestry Revitalization Act*, BC Government current to May 15, 2019;
- *Heritage Conservation Act*, BC Government current to May 15, 2019;
- *Interpretation Act*, BC Government current to May 15, 2019;
- *Wildlife Act*, BC Government, current to May 15, 2019.

- Licensee Plans and Timber Supply Documents

- Tree Farm Licence 52 Management Plan #5;
- TFL 52 Information Package, Ecora Engineering and Resource Group Ltd., January 2018;
- TFL 52 Rationale for AAC Determination, BC Ministry of Forests and Range, April 2009;
- TFL 52 Yield Tables Summary Report, West Fraser Mills Ltd., Therien Guillaume PhD, 2013;
- Procedures for Factoring Visual Resources into Timber Supply Analysis; BC Ministry of Forests, March 1998;
- Updated Procedures for Meeting Legal Obligations When Consulting First Nations – Interim; BC Government, May 7, 2010;
- Tree Farm Licence 52 Site Index Adjustment Compendium, Therien Guillaume PhD, December 2013.

- Land Use, Forest Practices and other Documents

- Caribou-Chilcotin Land Use Plan, BC Government, June 1998;
- Government Actions Regulation Orders applicable to TFL 52;
- Draft and established old growth management areas, BC Ministry of Forests, Lands and Natural Resource Operations, current to March 1, 2017;
- Order Establishing Provincial Non-Spatial Old Growth Objectives, BC Ministry of Sustainable Resource Management, June 30, 2004;
- Approved Ungulate Winter Ranges, BC Ministry of Environment, current to March 1, 2017;
- Approved Wildlife Habitat Areas, BC Ministry of Environment, current to March 1, 2017.

- First Nations

- Updated Procedures for Meeting Legal Obligations when Consulting First Nations, BC Government, May 7, 2010;
- Haida Nation v. British Columbia (Minister of Forests), [2004] 3 S.C.R. 511, 2004 SCC 73;
- Tsilhqot'in Nation v. British Columbia, 2014 SCC 44, [2014] 2 S.C.R.;
- R. v. Sparrow, [1990] 1 S.C.R. 1075;
- Bill C-34 – 2014 Tla'amin Final Agreement Act, Government of Canada 2014;
- Tla'amin Final Agreement Act and Tla'amin Final Agreement Interim Regulation, BC Government current to July 1, 2016;
- First Nations Consultation Report Draft Management.

In addition to the documents described above, the following general documents inform forest management decisions on the TFL:

- Miscellaneous Planning Documents

- Tree Farm Licence Management Plan Regulation (January 2013);
- *Forest and Range Practices Act* and the Forest Planning and Practices Regulation (January 2010);
- CCLUP Land Use Order (June 2011);
- GAR Order 'AMENDED – ORDER #U-5-001, U-5-002, U-5-003 Ungulate Winter Ranges Cariboo Chilcotin Land Use Plan, Shallow and Moderate Snowpack' (December 2004);
- GAR Order 'Wildlife Habitat Areas #5-088 to 5-117 – Mountain Caribou – Quesnel Highlands Planning Unit' (December 2009);
- Pellet Transects and Deer Management on TFL 52 (Keystone Wildlife, 2008);
- CCLUP Regional Conservation Biodiversity Strategy - Update Note #4 - An Approach for Patch Size Assessments in the Cariboo Forest Region (July 2001);
- CCLUP Regional Conservation Biodiversity Strategy - Update Note #12 – Stand-Level Retention for Biodiversity (December 2005);
- Integrated Land Management Plan For TFL 5 (Keystone Wildlife, 1995);
- Biodiversity Conservation Strategy Report;
- Biodiversity Strategy Report Appendices;
- Biodiversity Conservation Strategy Table 2 Landscape Unit Sizes.

- Update Notes

- Update Note #1: Key Assumptions & Recommendations For Use of the Inventory Adjustment Factor;
- Update Note #2: Amalgamation of Small NDT-BEC Units in Relation to Assessment of Seral Objectives and Old Growth Management Area Planning;
- Update Note #3: Definition of the Fir Group and Pine Group for Purposes of Seral Stage Assessments within NDT4;
- Update Note #4: An Approach for Patch Size Assessments;
- Update Note #5: An Integrated Mountain Pine-Biodiversity Conservation Management Strategy;
- Update Note #6: Procedures for Implementation of the Mountain Pine Beetle-Biodiversity Strategy to Address Current Attack During the Outbreak Phase;
- Update Note #7b: An Integrated Strategy for Management of Biodiversity and Bark Beetles in Douglas-fir and Spruce Stands;

- Update Note #8: Strategy for Management of Mature Seral Forest and Salvage of Mountain Pine Beetle-Killed Timber;
- Update Note #9: Strategy for Management of Mature Seral Forest and Salvage of Mountain Pine Beetle-Killed Timber Within TFLs;
- Update Note #10: Salvage Harvesting of Transition Old Growth Management Areas Heavily Attacked by Mountain Pine Beetle or Spruce Beetle;
- Update Note #11: New Options for Old Growth Management Pine Beetle or Spruce Beetle;
- Update Note #12: Stand-Level Retention for Biodiversity;
- Update Note #14: The Function and Management of Old Growth Management Areas in the Cariboo-Chilcotin;
- Update Note #15: M+O Seral Management in Wildfire Areas.