

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

**Kamloops  
Timber Supply Area**

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

**Effective May 5, 2016**

**(amended May 19, 2016, for clarification only)**

**Diane Nicholls, RPF  
Chief Forester**

**Table of Contents**

Objective of this document ..... 1

Acknowledgement ..... 1

Statutory framework ..... 1

Description of the Kamloops Timber Supply Area ..... 1

History of the AAC for the Kamloops TSA ..... 2

New AAC determination ..... 2

Information sources used in the AAC determination ..... 3

Role and limitations of the technical information used ..... 6

Guiding principles for AAC determinations ..... 6

The role of the base case ..... 9

Base case for the Kamloops TSA ..... 10

Consideration of Factors as Required by Section 8 of the *Forest Act* ..... 11

Section 8 (8) ..... 12

    Land base contributing to timber harvesting ..... 12

        - general comments ..... 12

        - future roads ..... 13

        - unstable terrain and environmentally sensitive areas ..... 13

        - deciduous stands ..... 14

        - old cedar and hemlock stands ..... 15

Existing forest inventory ..... 16

Expected rate of growth ..... 16

    - site productivity ..... 16

    - waste and log grade 4 ..... 18

Integrated resource management objectives ..... 20

    - stand-level biodiversity ..... 20

    - scenic resources and lakeshore management ..... 21

    - community and domestic watersheds ..... 22

    - ungulate winter range ..... 24

    - identified wildlife ..... 25

    - cutblock adjacency and maximum cutblock size ..... 25

    - mountain caribou ..... 26

    - cultural heritage resources ..... 27

Harvest performance ..... 28

First Nations consultation ..... 28

Climate change.....	30
Cumulative effects .....	30
Alternative harvest flows and harvest sequencing .....	33
- Minister’s letter.....	33
Local objectives .....	34
Mountain pine beetle.....	34
Other forest health and non-recoverable losses .....	35
Reasons for Decision .....	36
Determination .....	37
Implementation .....	38
Appendix 1: Section 8 of the <i>Forest Act</i> .....	40
Appendix 2: Section 4 of the <i>Ministry of Forests and Range Act</i> .....	43
Appendix 3: Minister’s letter of July 4, 2006.....	44
Appendix 4: Minister’s letter of October 27, 2010 .....	46

## **Objective of this document**

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

## **Acknowledgement**

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

## **Statutory framework**

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

## **Description of the Kamloops Timber Supply Area**

The Kamloops Timber Supply Area (TSA) is located in south-central British Columbia and covers approximately 2.77 million hectares of the Thompson Okanagan Region. It ranges from Logan Lake in the south to Wells Gray Provincial Park in the northwest, including the Blue River area, and is bounded by the Columbia Mountains to the east and the Cariboo Regional District to the west.

The topography of the Kamloops TSA is diverse, ranging from hot, dry grasslands in the valley bottoms in the south to wet rugged mountains in the north, and is bisected by the North Thompson River, which joins the South Thompson River at Kamloops.

Recent census data indicate a total population of 113,730 people residing in the TSA in 2013. The major population centres in the TSA are Kamloops, Clearwater, Logan Lake, Chase, Barriere, Cache Creek and Ashcroft. Smaller communities include Vavenby, Little Fort and Blue River and the First Nations communities that are listed below.

There are 34 First Nations communities whose traditional territories encompass areas within the Kamloops TSA reflecting a rich cultural history and active community and economic influence within the area.

The Kamloops Land and Resource Management Plan (KLRMP) was designated a higher-level plan on January 23, 1996. This plan and subsequent amendments provides legal land use direction to the Kamloops TSA. All major forest tenure holders are required to prepare legally binding Forest Stewardship Plans (FSP) that reference the 23 objectives of the KLRMP.

Diverse landscapes in the TSA provide a variety of wildlife habitats, including the grasslands, lakes and wetlands, forested slopes, and alpine areas. Grizzly bear, black bear, mule deer, moose, bighorn sheep and smaller furbearers, as well as many species of birds and amphibians, are common. The TSA includes portions of the range of three herds of mountain caribou. Twenty-nine species are considered identified wildlife species for which special management is required by provincial forest practices legislation. In the TSA, numerous rivers, lakes and streams support many species of fish

including rainbow trout, kokanee, steelhead, brook trout and white fish. Significant demands are also placed on water resources for ecological needs and to meet both domestic and agricultural needs.

Within the Kamloops TSA, pulp and paper, sawmill, veneer and plywood, and specialty (e.g. log homes, timber framing, post and rail) processing facilities operate. Together these facilities produce a diverse mix of forest products that are consumed worldwide.

## **History of the AAC for the Kamloops TSA**

In 1981, the AAC for the TSA was determined at 2 350 000 cubic metres.

On January 1, 1989, the AAC was increased by 62 280 cubic metres to 2 412 280 cubic metres, to account for a transfer of harvesting rights and land base from 100 Mile House TSA to the Kamloops TSA.

In 1994, the AAC was increased by 4400 cubic metres to 2 416 680 cubic metres, accounting for a transfer of land from TFL 35 to the Kamloops TSA for the Small Business Forest Enterprise Program (SBFEP).

In 1996, the AAC was determined at 2 679 180 cubic metres, including a partition of 200 000 cubic metres for old cedar and hemlock stands and a partition of 86 000 cubic metres for Pulpwood Agreement (PA) 16.

In 2003, the AAC was determined at 2 682 770 cubic metres, with a new partition of 20 000 cubic metres for deciduous stands outside the current boundary of PA 16, with 14 870 cubic metres specified as attributable to innovative practices and activities within the Adams Lake Innovative Forest Practices Agreement Area, and with all woodlot licence volumes issued since the 1996 determination (31 280 cubic metres) now excluded, as required by the *Forest Act*.

In 2004, the AAC was determined at 4 352 770 cubic metres, with partitions specifying harvest volumes attributable as follows: to the salvage of fire-damaged timber, 670 000 cubic metres; to the salvage of timber damaged by the mountain pine beetle (MPB), 1 000 000 cubic metres; to the harvest of old cedar- or hemlock-leading stands, 200 000 cubic metres; to PA 16, 86 000 cubic metres; to stands predominated by deciduous species, 20 000 cubic metres; and, to conventional harvesting in the TSA, 2 376 770 cubic metres.

In 2008 the AAC was determined to be 4.0 million cubic metres to continue addressing the salvage of timber damaged by MPB. Partitions were identified for 1 700 000 cubic metres to harvest in stands predominated by Douglas-fir, spruce or balsam (non-pine), 1 994 000 cubic metres to harvest pine with the possibility of an increase if under-harvesting in non-pine, 200 000 cubic metres in old cedar- or hemlock-leading stands, 86 000 metres for harvesting in PA 16 and 20 000 cubic metres for harvesting deciduous-leading stands.

The effective AAC at the time of this determination is 4 000 000 cubic metres.

## **New AAC determination**

Effective May 5, 2016 until May 4, 2021, the new AAC for the Kamloops TSA is 2 300 000 cubic metres, of which 200 000 cubic metres is attributable to cedar-leading and hemlock-leading stands older than 140 years. This AAC is about 42.5 percent lower than the effective AAC in place prior to this determination and about 12 percent lower than the pre-MPB uplift AAC set in 2003.

Effective May 5, 2021, the AAC is 2 100 000 cubic metres, of which 200 000 cubic metres is attributable to cedar-leading and hemlock-leading stands older than 140 years. This AAC is about 47.5 percent lower than the effective AAC in place prior to this determination and about 20 percent lower than the pre-MPB uplift AAC.

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

## Information sources used in the AAC determination

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

- British Columbia. 1995. Kamloops land and resource management plan. See [www.for.gov.bc.ca/tasb/SLRP/plan46.html](http://www.for.gov.bc.ca/tasb/SLRP/plan46.html)
- British Columbia. 2014. *Forest Act*. See Section 8 Allowable annual cut [www.bclaws.ca/civix/document/id/complete/statreg/96157\\_02](http://www.bclaws.ca/civix/document/id/complete/statreg/96157_02)
- British Columbia. 2014. *Forest and Range Practices Act*. See [www.bclaws.ca/civix/document/id/complete/statreg/02069\\_01](http://www.bclaws.ca/civix/document/id/complete/statreg/02069_01)
- British Columbia. 2014. Forest Planning and Practices Regulation. See [www.bclaws.ca/civix/document/id/complete/statreg/14\\_2004](http://www.bclaws.ca/civix/document/id/complete/statreg/14_2004)
- British Columbia. 2014. Government Actions Regulation. See [www.bclaws.ca/civix/document/id/complete/statreg/582\\_2004](http://www.bclaws.ca/civix/document/id/complete/statreg/582_2004)
- Buxton, K. and L. MacLauchlan. 2013. *Overview of Forest Health Conditions in the Southern British Columbia*. Ministry of Forests, Lands and Natural Resource Operations, Thompson Okanagan Region, Kamloops, BC.
- Buxton, K. and L. MacLauchlan. 2014. *Overview of Forest Health Conditions in the Southern British Columbia*. Ministry of Forests, Lands and Natural Resource Operations, Thompson Okanagan Region, Kamloops, BC.
- Dickenson, K. 2013. *Order to identify a resource feature adjacent to Mayson Lake and in the Opax Mt. – Isobel Lake area within the Kamloops Forest District aka Thompson Rivers District*. Thompson Okanagan Region, Ministry of Forests, Lands and Natural Resource Operations. See [www.for.gov.bc.ca/tasb/legsregs/frpa/frparegs/govact/orders/TRD\\_Order.pdf](http://www.for.gov.bc.ca/tasb/legsregs/frpa/frparegs/govact/orders/TRD_Order.pdf)
- Ecora Resource Group Ltd. 2015. *Type 4 Silviculture strategy in the Kamloops TSA: Modelling and analysis report*. Prepared for Paul Rehsler, FLNRO, Victoria BC.
- Chen, H. and A. Walton. 2015. *Monitoring harvest activity across 28 mountain pine beetle impacted management units*. Forest Analysis and Inventory Branch, Ministry of Forests, Lands and Natural Resource Operations, Victoria BC.
- J.S. Thrower & Associates Ltd. 2001. *Potential site index estimates for the major commercial tree species in the Adams Lake IFPA area: Final report*. 30 March 2001.
- Krakatsoulis, J. S. Paul, R. Osborne, C. Ortner and M. Anderson. 2005. Skeetchestn Indian Band: Research and development in riparian zone management.

- MacLauchlan, L. 2013. Southern Interior Area Forest Health Program Pest Management Plan 2013-2017. Ministry of Forests, Lands and Natural Resource Operations, Thompson Okanagan Region, Kamloops, BC.
- MacLauchlan, L. 2016. *Quantification of Dryocoetes confuses-caused mortality in subalpine fir forests of southern British Columbia*. Forest Ecology and Management 359(2016): 210-220.
- Ministry of Environment. Terrain stability mapping. See [www.env.gov.bc.ca/terrain/terrain\\_files/types.html#terrainstability](http://www.env.gov.bc.ca/terrain/terrain_files/types.html#terrainstability)
- Ministry of Environment. Identified Wildlife Management Strategy. See [www.env.gov.bc.ca/wld/frpa/iwms/index.html](http://www.env.gov.bc.ca/wld/frpa/iwms/index.html)
- Ministry of Environment. BC Species and Ecosystems Explorer. See <http://a100.gov.bc.ca/pub/eswp/>
- Ministry of Environment. Mountain Caribou Recovery. See [www.env.gov.bc.ca/wld/speciesconservation/mc/index.html](http://www.env.gov.bc.ca/wld/speciesconservation/mc/index.html)
- Ministry of Environment. Ungulate winter ranges. See [www.env.gov.bc.ca/wld/frpa/uwr/](http://www.env.gov.bc.ca/wld/frpa/uwr/)
- Ministry of Forests. 1995. *Biodiversity guidebook*. See [www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/biodiv/biotoc.htm](http://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/biodiv/biotoc.htm)
- Ministry of Forests. 2009. Variable density yield projection. Volume 1 – VDYP7 Overview Version 2.0. Forest Analysis and Inventory Branch, Victoria, BC.
- Ministry of Forests, Lands and Natural Resource Operations. Provincial-level projection of the current mountain pine beetle outbreak. See [www.for.gov.bc.ca/hre/bcmapb/year12.htm](http://www.for.gov.bc.ca/hre/bcmapb/year12.htm)
- Ministry of Forests, Lands and Natural Resource Operations. Harvest Billing System (HBS). See [www.for.gov.bc.ca/hva/hbs/](http://www.for.gov.bc.ca/hva/hbs/)
- Ministry of Forests, Lands and Natural Resource Operations. Wildlife Management Areas. See [www.env.gov.bc.ca/fw/habitat/conservation-lands/wma/](http://www.env.gov.bc.ca/fw/habitat/conservation-lands/wma/)
- Ministry of Forests, Lands and Natural Resource Operations. Archaeology in British Columbia. See [www.for.gov.bc.ca/archaeology/index.htm](http://www.for.gov.bc.ca/archaeology/index.htm)
- Ministry of Forests and Range. 2009. *TIPSY and VDYP7 volume comparison*. Draft. March 31, 2009, Forest Analysis and Inventory Branch, Victoria, BC.
- Ministry of Forests and Range. 2009. *Monitoring harvest activity across 29 mountain pine beetle impacted management units*. Forest Analysis and Inventory Branch. 12/17/2009.
- Ministry of Forests, Lands and Natural Resource Operations. 2011. *Monitoring harvest activity across 28 mountain pine beetle impacted management units*. Forest Analysis and Inventory Branch. July 25, 2011.
- Ministry of Forests, Lands and Natural Resource Operations. 2012. *Beyond the Beetle: A Mid-term Timber Supply Action Plan*.
- Ministry of Forests, Lands and Natural Resource Operations. 2013. Ministerial Order under the *Land Act* – Land Use Objectives Regulation. Old Growth Management Objectives for the Kamloops Land and Resource Management Plan Area. See [ftp://ftp.geobc.gov.bc.ca/publish/Regional/Kamloops/KLRMP/Legal\\_OGMA/KLRMP\\_Old\\_Growth\\_Management\\_Objectives\\_Legal\\_Order\\_March\\_5\\_2013.pdf](ftp://ftp.geobc.gov.bc.ca/publish/Regional/Kamloops/KLRMP/Legal_OGMA/KLRMP_Old_Growth_Management_Objectives_Legal_Order_March_5_2013.pdf)

- Ministry of Forests, Lands and Natural Resource Operations. 2013. *Best practices for calculating non-recoverable losses*. Forest Health Unit. Resource Practices Branch. Victoria, BC.
- Ministry of Forests, Lands and Natural Resource Operations. 2015. *Monitoring harvest activity across 28 mountain pine beetle impacted management units*. Forest Analysis and Inventory Branch. June 15, 2015.
- Ministry of Forests, Lands and Natural Resource Operations. 2015. *Kamloops Timber Supply Area Timber Supply Review Data Package update*. September 2015. Victoria, BC.
- Ministry of Forests, Lands and Natural Resource Operations. 2015. *Kamloops Timber Supply Area Timber Supply Analysis Discussion Paper*. September 2015. Victoria, BC.
- Ministry of Forests and Range. 2005. *Provincial Logging Residue and Waste Measurement Procedures*. Manual. Revenue Branch, Ministry of Forests and Range, Victoria, BC and amendments to October 2013.
- Ministry of Forests and Range. 2006. *Summary of dead potential volume estimates for management units within the Northern and Southern Interior Forest Regions*. Forest Analysis and Inventory Branch, Victoria, BC.
- Ministry of Forests and Range. 2007. *Timber supply review for the Kamloops timber supply area*. Public Discussion Paper. October 2007. Victoria, BC.
- Mitchell, K.J., M. Stone, S.E. Grout, M. Di Lucca, G.D. Nigh, J.W. Goudie, J.N. Stone, A.F. Nussbaum, A. Yanchuk, S. Stearns Smith. R. Brockley. 2000. TIPSY version 3.0. Ministry of Forests, Research Branch, Victoria, BC.
- Skeetchestn Indian Band. Undated. *Through the eyes of Sk'lep: A vision of ecosystem stewardship in the Deadman watershed*.
- Snetsinger, J. 2008. *Kamloops Timber Supply Area Rationale for Allowable Annual Cut (AAC) determination*. Effective June 1, 2008. Ministry of Forests and Range, Victoria, BC.
- Special Committee of the BC Legislature on Timber Supply. August 2012. *Growing Fibre, Growing Value*.
- Statistics Canada. 2011. [www.statcan.gc.ca](http://www.statcan.gc.ca)
- Stearns Smith, S., G. Neinaber, M. Cruickshank, A. Nussbaum. 2004. *Demonstrating Growth and Yield Adjustments (TIPSY OAFs) for Armillaria root disease in a timber supply analysis*. Forestry Canada, Pacific Forestry Centre, Victoria, BC. 9 p.
- Sunderman, R. 2014. Kamloops TSA Socio-economic baseline. Prepared for BC Ministry of Forests, Lands and Natural Resource Operations. June 6, 2014. Kamloops, BC.
- Timberline Natural Resource Group. 2009. *Site index adjustment of the Kamloops Timber Supply Area Final Report*. Prepared for Marino Bordin, Adams Lake Lumber Ltd. & Zoran Boskovic, BC Timber Sales on behalf of the Kamloops TSA Licensees. March 2009. Victoria, BC.
- Timberline Natural Resource Group. 2008. *Site index adjustment of the Kamloops Timber Supply Area*. 31 March, 2008.
- Timberline Natural Resource Group. 2007. *Timber supply analysis information package*. Kamloops TSA Timber Supply Review 4. Reference: 7061913 July 2007. Kelowna, BC.
- Woods, A. and K.D. Coates. 2013. *Are biotic disturbance agents challenging basic tenets of growth and yield and sustainable forest management?* Forestry 86(5): 543-554.



## **Role and limitations of the technical information used**

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

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

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

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

## **Guiding principles for AAC determinations**

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

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

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

### **Integrated decision making**

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

### Information uncertainty

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

Two important ways of dealing with this uncertainty are:

(i) managing risks by evaluating the significance of specific uncertainties associated with the current information and assessing the various potential current and future, social, economic and environmental risks associated with a range of possible AACs; and

(ii) re-determining AACs frequently, in cases where projections of short-term timber supply are not stable, to ensure they incorporate current information and knowledge.

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

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

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

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

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

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

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

#### Climate change

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

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

I note, however, that even with better information on climate change there will be a range of reasonable management responses. Considerations of how to respond in anticipation of uncertain, potential future impacts and risks differ from those related to responding to known or ongoing processes such as the recent mountain pine beetle (MPB) infestation. For example, it is not clear if either increases or decreases to current harvest levels would be appropriate in addressing potential future increases in natural disturbance due to climate change. Conversely, the present forest conditions resulting from the MPB infestation provide a clearer circumstance to which to respond.

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

#### First Nations

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

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

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

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

### **The role of the base case**

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

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

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

Because it represents only one in a number of theoretical forecasts, and because it incorporates information about which there may be some uncertainty, the base case is not an AAC recommendation. Rather, it is one possible forecast of timber supply, whose validity - as with all the other forecasts provided - depends on the validity of the data and assumptions incorporated into the computer model used to generate it.

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

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

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

### **Base case for the Kamloops TSA**

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

- maintain the best possible (given the other harvest flow objectives) mid-term harvest levels;
- maximize the long-term harvest levels and achieve a stable growing stock; and
- set an initial harvest level that reflects current harvest performance, tenure obligations and the 2014 harvest level expectations projected in the 2008 base case.

The timber supply forecasts, including the base case, were prepared for this determination using FAIB's timber supply model Forest Service Spatial Analysis Model (FSSAM). The data and assumptions used in the base case are intended to reflect current legal requirements, the best available information, demonstrated forest management practices and current conditions in the Kamloops TSA as documented in the September 2015 data package.

In the base case, an initial harvest level of 2.5 million cubic metres per year could be maintained for one decade before declining over the next three decades to a mid-term level of 1.78 million cubic metres per year. After an additional seven decades, the harvest level is projected to increase to 2.0 million cubic metres per year. It increases again in 2214 to the long-term harvest level of 2.1 million cubic metres per year.

The base case initial harvest level is 35.5 percent lower than the AAC set in 2008. As the AAC was significantly increased in 2004 in response to the fires of 2003 and the most recent mountain pine beetle infestation, the base case initial harvest level is only 6.8 percent lower than the 2003 AAC of 2 682 770 cubic metres. Further, the initial harvest level is only 12 percent lower than the 2.84 million cubic metres per year average annual harvest level in the Kamloops TSA during the post-peak infestation period between 2008 and 2014.

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

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

I have reviewed the information for all of the factors required to be considered under Section 8 of the *Forest Act*. Where I have concluded that the modelling of a factor in the base case is a reasonable reflection of current legal requirements, demonstrated forest management and the best available information, and uncertainties about the factor have little influence on the timber supply projected in the base case, no discussion is included in this rationale. These factors are listed in Table 1.

Table 1. List of accepted factors

<b><i>Forest Act</i> section and description</b>	<b>Factors accepted as modelled</b>
8(8)(a)(i) Composition of the forest and its expected rate of growth	<ul style="list-style-type: none"> <li>• Non-provincial Crown Lands</li> <li>• Area based tenures</li> <li>• Timber Licences</li> <li>• Non-forest and non-productive</li> <li>• Parks and miscellaneous reserves</li> <li>• Economic and physical operability</li> <li>• Unmerchantable Forest Types – Low Sites</li> <li>• Unmerchantable Forest Types – Balsam and Spruce</li> <li>• Recreation and Heritage Trails</li> <li>• Research Installations and Permanent Sample Plots</li> <li>• Volume Estimates for Existing Stands</li> <li>• Volume Estimates for Managed Stands</li> <li>• Genetic Gains</li> <li>• Minimum Harvest Ages and Minimum Harvest Volumes</li> </ul>
8(8)(a)(ii) Expected time that it will take the forest to become re-established following denudation	<ul style="list-style-type: none"> <li>• Impediments to Prompt Regeneration</li> </ul>
8(8)(a)(iii) Silvicultural treatments to be applied	<ul style="list-style-type: none"> <li>• Incremental Silviculture</li> <li>• Regeneration Inputs</li> </ul>
8(8)(a)(iv) Standard of timber utilization and allowance for decay, waste, and breakage	<ul style="list-style-type: none"> <li>• Utilization standards and decay, waste, and breakage</li> </ul>
8(8)(a)(v) Constraints on the amount of timber produced by use of the area for purposes other than timber production	<ul style="list-style-type: none"> <li>• Land and Resource Management Plan</li> <li>• Landscape Level Biodiversity</li> <li>• Community Wildfire Interface</li> </ul>
8(8)(a)(vi) Any other information	<ul style="list-style-type: none"> <li>• AAC Utilization</li> </ul>
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"> <li>• Partitions</li> </ul>

8(8)(d) Economic and social objectives of the government	<ul style="list-style-type: none"> <li>• Economic and Social Objectives of the Crown</li> <li>• Socio-economic information</li> <li>• Public Review</li> </ul>
8(8)(e) Abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area	

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

## Section 8 (8)

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

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

### Land base contributing to timber harvesting

#### *- general comments*

The total area of the Kamloops TSA is about 2.7 million hectares. Not all of this area contributes to the timber harvesting land base (THLB).

The THLB is a coarse estimate of the area available for timber production, at a single point in time, after areas reserved from harvesting for economic, cultural or ecological factors have been excluded. Because the THLB is an estimate derived for the purpose of timber supply modelling, the inclusion or exclusion of an area in the THLB does not necessarily correlate to how it will be managed and whether or not it will be harvested.

For the Kamloops TSA, the THLB used in the base case is 931 000 hectares, which is about eight percent smaller than the last timber supply review. The decrease is due primarily to changes in management objectives (e.g., mountain caribou requirements), updated information (e.g., a new vegetation resource inventory) and changes in modelling assumptions.

Input received from Tolko noted the significant current and proposed constraints on the THLB, including visual quality objectives, adjacency, mule deer winter range, temperature sensitive streams, fisheries sensitive watersheds and range grazing leases. In its input, Tolko noted that the impacts could not wait for a future timber supply review to be addressed and requested the establishment of working groups to assess the collective impacts on timber supply of all constraints applied to the land base and ensure GAR Order tests are met. Similar input received from Interfor noted that a significant amount of area was excluded from the THLB to provide for single, non-overlapping non-timber values. In order to reduce the amount of area excluded from the THLB, while still maintaining non-timber values, it recommended that the ministry undertake a review with the intention of further combining constraints.

In its input, the District of Clearwater recommended “every opportunity be taken to increase the timber harvesting land base and at a minimum maintained at the current level; and [t]hat careful review of the Parks and Miscellaneous Reserve, old growth management areas and Mountain Cariboo habitat be done relative to their impact on the timber harvesting land base.”

District staff note that during the development of the 2013 *Land Act* order to legally establish spatial old growth management areas (OGMAs), areas of non-THLB were considered for selection first. Where both resource values could be maintained, several hundred hectares of OGMAs were relocated so as to overlap with mountain caribou no-harvest zones established under the 2008 GAR order.

Throughout my considerations I have been mindful of the socioeconomic implications of a decreasing timber supply in mountain pine beetle impacted areas and the importance of minimising unnecessary restrictions on timber harvesting. However, I am also aware that government is responsible for the stewardship of a wide range of values that include, but are not limited to, timber supply. This is a difficult balance to achieve and I commend the work undertaken at the time the OGMAs were established to minimise the potential timber supply impacts by locating them in areas unsuited for and/or already excluded from timber harvesting, while ensuring that all of the attributes required for OGMAs and mountain caribou habitat requirements were being met.

I recommend that interested parties, including licensees and communities, work with FLNRO on an ongoing basis to ensure that the establishment of new management objectives consider the requirements for the full suite of forest values, including opportunities to reduce any negative impacts on timber supply by overlapping areas in which timber harvesting is either constrained or excluded, where appropriate. This work could include an assessment of whether opportunities exist to further overlap the existing constraints without compromising the conservation of the values for which they were established.

*- future roads*

The loss of productive forest associated with future road development was not accounted for in the base case. In the previous timber supply review, accounting for future roads resulted in THLB reductions of 6.2 percent and 6.9 percent in those areas of the Kamloops TSA encompassed by the Headwaters and Kamloops Forest Districts, respectively. THLB reductions of a similar magnitude result in an up to a six percent over-estimation of the mid- to long-term timber supply demonstrated in the base case. Having considered this information, I accept that the timber supply projected in the base case has been overestimated in the mid- to long-term by up to six percent, and I will account for this as discussed in ‘**Reasons for Decision**’.

*- unstable terrain and environmentally sensitive areas*

Timber harvesting may be limited due to concerns for slope stability (i.e., landslides). In the past, mapping for environmentally sensitive area (ESA) for soils provided an assessment of slope stability. However, ESA mapping has been replaced by terrain stability mapping (TSM), which is used to ensure that all unstable areas are identified and subjected to a field assessment prior to any forestry development. Areas classified in TSM as class ‘U’ (unstable) or class ‘V’ (very unstable) terrain, are generally unsuitable for harvest.

TSM information was used to identify areas of unstable slopes for exclusion from the THLB. TSM is not available for all of the Kamloops TSA; where it was not available, the older ESA mapping was used. To reflect that operationally some land classified as unstable or potentially unstable may be harvestable, 80 percent of the areas classified as unstable and 20 percent of areas classified as



potentially unstable were excluded from the THLB in the base case. One hundred percent of the area classified as ESA1 for soils was excluded from the THLB.

District staff note that harvest records for the areas classified through the TSM as unstable and potentially unstable do not support the same harvest assumptions as in the base case. A comparison to the overall operational harvest levels suggest that 92 and 93 percent of unstable classes V and U, respectively, could be excluded from the timber harvesting land base, as compared to the 80 percent assumed in the base case. For the potentially unstable classes IV and P, harvest records suggest 59 and 67 percent of these areas, respectively, could be excluded, rather than the 20 percent assumed in the base case. For the areas classified as soil ESAs, about two percent had been harvested.

A sensitivity analysis was completed to assess the timber supply implications of adjusting the assumptions to be consistent with what is observed in current practice. Excluding the additional area of THLB, totalling 22 000 hectares, results in a 4.8 percent decrease in the mid-term harvest level.

Staff indicate that over time, it is expected that increased levels of harvesting will occur within areas with unstable and potentially unstable classifications due to limited timber availability.

Having considered the information regarding terrain stability and sensitive soils and discussed performance with district staff, I accept that the pattern of harvest in these areas represents a lower level of harvest than was assumed in the base case. At the time of this determination, nothing suggests that the current harvest patterns will change, although district staff note that limited timber availability over time may lead to increased levels of harvest. I expect that the timber supply implications demonstrated in the sensitivity analysis represent the upper limit of the impact and note that operational change over time that includes more harvest of these areas can be reflected in a future timber supply review. I encourage licensees to work to improve harvest performance in these areas where appropriate to do so.

For this determination, I will take into account that mid-term timber supply has been overestimated by up to 4.8 percent, and will discuss this further under '**Reasons for Decision**'.

*- deciduous stands*

In the Kamloops TSA, broadleaved deciduous (i.e., birch and poplar) timber of sawlog size occurs most widely as an incidental species in mixed stands, or as a leading species in early seral coniferous stands. In 2003, in response to an emerging demand for deciduous sawlogs, the chief forester established a 20 000 cubic metre per year partition for deciduous-leading stands. This partition was continued in the 2008 AAC determination.

District staff indicate the demand for deciduous sawlogs in the TSA is currently limited. In the base case, deciduous-leading stands – stands in which 50 percent or more of the stand species composition is birch or poplar - were excluded from the THLB but were assumed to contribute to non-timber values within the CFLB. Within mixed, coniferous-leading stands, the deciduous component was excluded from the stand yield tables.

District staff indicate that these assumptions are consistent with current practices, where licensees do not harvest in deciduous stands, and deciduous volume in coniferous-leading stands is left as wildlife trees or to meet biodiversity objectives.

A 10 year non-replaceable forest licence (NRFL) was issued in 2007 for the full amount of the deciduous partition. This licence will expire on November 30, 2017, unless extended. To date, only nine percent or 18 000 cubic metres of the total licence volume of 200 000 cubic metres has been harvested. In addition to the NRFL, two forestry licenses to cut, specifically for birch, were issued at

the request of a local deciduous sawlog processing facility. The total volume harvested under this license was about 1050 cubic metres.

From reviewing the information, I conclude that the exclusion of deciduous-leading stand volume and deciduous volume in mixed coniferous stands in the base case reflects the generally low demand for deciduous sawlogs in the Kamloops TSA, and I will make no adjustments on this account. Further, I will not continue a deciduous-leading stand partition in the new AAC, as referenced in ‘**Reasons for Decision**’.

I note that discontinuation of the deciduous partition does not prevent the district from issuing licenses to harvest deciduous sawlogs.

*- old cedar and hemlock stands*

The land base of the Kamloops TSA includes old cedar-leading and hemlock-leading stands that present unique challenges for harvest due to their limited merchantability. In the 1996 timber supply analysis, the stands were excluded from the THLB; however, it was recognized that the stands represented an opportunity for increased timber supply. To encourage harvest in the stands and in consideration of the productive sites they occupy, the chief forester in 1996 established a partition in the AAC of 200 000 cubic metres for cedar- and hemlock-leading stands greater than 140 years of age. This partition has been maintained in subsequent decisions. Of the 200 000 cubic metres partition, 184 000 cubic metres are apportioned to non-replaceable forest licenses (NRFLs) and the remainder apportioned to BC Timber Sales. Of the 184 000 cubic metres per year available for NRFLs, about 160 000 cubic metres per year has been issued in licensees. Currently, replaceable forest licences do not permit harvest in these stands.

In the 2015 base case, this partition was not explicitly modelled; i.e., there was no requirement for the model to harvest a minimum (or maximum) volume from the partitioned stand types. In the absence of a requirement, old cedar- and hemlock-leading stands contribute about 177 000 cubic metres per year to the base case harvest level in the first decade, 495 000 cubic metres per year in the second decade and 172 000 cubic metres per year in the third decade. In an alternative forecast, it was shown that a harvest of 200 000 cubic metres per year can be maintained for the first four decades of the forecast period.

Harvest performance in the old cedar- and hemlock-leading stand partition for the eight-year period from 2008 to 2015 averaged about 25 000 cubic metres per year, or about 12 percent of the total partition apportioned to NRFLs. Prior to the 2008 AAC determination, in the period 1999 to 2006, harvest performance averaged about 85 percent of the partitioned volume. District staff indicate that the low level of harvest is in part due to a delay between the expiry of previous NRFLs and the issuance of new NRFLs. Staff note that most of the harvest to date has been directed at old cedar-leading stands, with less focus on old hemlock-leading stands (which comprise about two-thirds of the partitioned stands).

Several licensees, including Gilbert Smith Forest Products, Simpco, ALIB and Integrated Fibre, as well as several First Nations have identified an interest in the old cedar- and hemlock-leading stand profile.

I have considered the information regarding the old cedar- and hemlock-leading stands. In terms of past performance, I note that harvest performance was good from 1999 to 2006. I accept that the low levels of harvest over the past eight-year period is in part attributable to the administrative time delay in issuing the relevant licences. Further, during this time licensees have been almost entirely focused on the salvage of MPB-damaged timber and correspondingly the mill profile has focused on pine, and the demand for hemlock and cedar has been low.

Given that these stands occupy sites of reasonable site productivity, from a stewardship perspective it makes sense to continue to encourage harvest, to the extent possible, so that more productive regenerating stands can be established.

I am aware that achieving the base case harvest forecast is dependent on contribution from these stands, and given the mid-term timber supply decline, it will be important to maintain harvest in these stand types to the extent possible. The alternative forecast mentioned above demonstrates that 200 000 cubic metres per year could be harvested for the next four decades from these stands.

In consideration of the information, I conclude it is appropriate to continue the partition to old hemlock- and cedar-leading stands, and I will discuss this further under '**Reasons for Decision**'. I also request that the performance in the partition continue to be monitored over the term of this determination.

### Existing forest inventory

A new vegetation resources inventory (VRI) of the Kamloops TSA was completed in March 2014. A ground sampling (VRI phase 2) audit of the inventory indicated that the ratios between the ground samples and photo-interpreted polygons for age, height, basal area, volume and site index were all within 10 percent of the target ratio of 1.0. This result indicates that the photo-interpretation results correlated well with the ground sampling information.

Prior to use in the base case and other timber supply forecasts, the inventory was updated for depletion and projected for growth starting on January 1, 2014.

I accept the forest inventory as the best available information for this determination.

### Expected rate of growth

#### *- site productivity*

Site productivity information is a key input for projecting the growth of managed forests and has implications in timber supply reviews not only for stand volume estimates but also for the modelling of resource management objectives (e.g., time to reach green-up height). Site index is a measure of site productivity based on tree height and age. Provincially, many studies have demonstrated that site indices for older and younger stands in the forest cover inventory underestimated the potential productivity of sites.

For strategic analysis needs, FLNRO has developed a provincial site productivity map layer that consists primarily of estimates of site productivity based on findings from the long-term research project entitled, *Site Index by Biogeoclimatic (BEC) Site Series (SIBEC)*. These site indices are typically derived for site series through site series mapping and the collection of field-based samples. However, in areas where the site series mapping is insufficient, a biophysical model is used to generate site productivity estimates.

In the base case, the provincial site productivity data layer estimates of site index were used to derive managed stand volume tables as well as height to age relationships for modelled management constraints. For the Kamloops TSA the provincial site productivity layer estimates are based on a biophysical model approach.

In 2009, major licensees completed a site index adjustment (SIA) project to obtain potential site index estimates for managed stands of spruce, lodgepole pine and Douglas-fir in the Kamloops TSA. Stands in the Engelmann-Spruce/Sub-alpine Fir zone, very dry biogeoclimatic subzones, at elevations greater than 1700 metres and those identified as selection harvest stands in the second timber supply review for the TSA were excluded from the study. For this study, preliminary site indices based on a biophysical model were adjusted using ground-based information collected from 35, 33 and 30 sample clusters in the lodgepole pine, spruce and Douglas-fir strata, respectively. The statistical adjustment of the preliminary site indices for all three species was within the 95 percent sampling error target of plus or minus 1.5 metres.

FAIB staff compared the site indices from this SIA project, Young Stand Monitoring, and Stand Density Management surveys against the site index information in the provincial site productivity layer. The results suggest that the site indices for young existing lodgepole pine and Douglas-fir stands may be underestimated in the provincial site productivity layer by five percent and 12 percent, respectively. A similar comparison for sub-alpine fir and white spruce stands showed no statistically significant difference.

Sensitivity analyses were completed that showed the base case assumptions for site productivity result in higher available timber supply than if the forest inventory site indices had been used, but lower than if SIA values were used. Utilizing the existing forest inventory site indices and regeneration assumptions from the previous timber supply review demonstrated at least 20 percent lower harvest levels than the base case. The results of the licensee SIA project were not available spatially; however, applying the reported SIA results by biogeoclimatic variant and leading species identified an 18 percent increase in the long-term harvest levels and a seven percent increase in the mid-term levels compared to the base case.

FAIB staff note that the use of the provincial site productivity map layer in this analysis is a significant reason for the projected base case initial harvest level to be relatively similar to that in the 2008 base case, in spite of a 7.7 percent decrease in the size of the THLB.

During the public review process, comments were received from the District of Clearwater and Interfor.

The District of Clearwater recommended that prior to the next timber supply review, actual field information be obtained to identify the site productivity projections.

Interfor requested feedback as to why the results of the SIA project, which found that the potential site index estimates for the Kamloops TSA were significantly higher for several species, were not used in the base case - at least for the portion of the THLB to which the study applied. It also suggested that the ministry clarify where information gaps exist and implement a plan to address these gaps prior to the next timber supply review.

FAIB staff indicate that the collection of field information and appropriate site series mapping for the SIBEC project is an ongoing process and improved information will be available for subsequent AAC determinations. For this timber supply review, ministry staff wished to present both the provincial site productivity information and the information from the SIA project. Staff chose to use the provincial site productivity layer in the base case because the provincial site productivity layer provided a complete and consistent coverage of the entire TSA, whereas the spatial information for the SIA project was not available for use in the analysis, and as well the sampling population did not cover the entire TSA.

I have considered the information regarding site productivity for the stands in the Kamloops TSA. Although the provincial site productivity layer used in the base case was based on a biophysical model and not the complete SIBEC protocol, I find these estimates to provide a reasonable indication of site productivity for the entire TSA. However, I am also mindful that the licensee's SIA results as indicated by the FAIB staff comparison of the ground samples and in the sensitivity analysis results suggest that site productivity is likely underestimated in the base case. If further information indicated it would be appropriate to extrapolate the information to the entire TSA, then mid- and long-term timber supply could be seven and 18 percent higher, respectively, than demonstrated in the base case.

Based on my review of the available site productivity information, I accept that the information used in the base case was adequate for this determination and I will make no adjustments to the base case on this account.

With regard to the SIA work completed, I note that the study results were not used in the base case due to the limited area of TSA sampled during the study. In recognition of the significant influence that site productivity estimates have on timber supply projections, and the substantial licensee and government investment already made to collect site productivity data, I strongly encourage ministry staff and licensees as indicated in the **Implementation** section of this document to continue this work. If new site productivity estimates are developed by either expanding the SIA project to cover a broader area or using some other methodology that meets government standards, it is my expectation that the new estimates will be used in the base case for the subsequent AAC determinations.

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

No factors considered under this section require additional comment.

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

No factors considered under this section require additional comment.

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

*- waste and log grade 4*

AACs reflect the merchantable volume understood to be available using the best information derived through on existing growth and yield tools.

Operationally, the harvest level within a TSA is monitored through various tenure decisions and billing of harvest to those tenures. However, there are two specific exceptions for which volume included within the AAC decision is not accounted: volumes attributed to Grade 4 credits under the Cut Control Regulation, and waste volume for dry grade 4 as per the *Provincial Logging Residue and Waste Management Procedure Manual* (Waste Manual).

Grade 4 cut control credit is a tool that was developed to provide an incentive for the harvest of low quality logs and higher levels of fibre utilization. Under the grade 4 credit, volume delivered to a non-sawlog facility is not charged to a licensee's allowable annual cut allocation and therefore is not counted under TSA AAC.

District staff conducted a review of harvest records that indicates that since 2008, approximately one million cubic metres of volume or 150 000 cubic metres per year has been harvested under the grade 4 cut control regulation and delivered to either non-sawlog or canting facilities.

As well, dry grade 4 that is left on the harvest block is not considered waste as per current Waste Manual direction. This applies to scale-based cutting authorities where a residue and waste survey captures volume not brought to scale. This volume as such is not charged to a licensee's allowable annual cut.

District staff note that the results of a 2012 pilot study that looked at residue and waste assessments found that due to the leaving of dry grade 4 onsite, about two to three percent less stand volume is identified. Further, the study found about one percent less stand volume is identified due to improper waste assessment. Overall this small pilot study indicated that scaled volumes attributed to the AAC would be three to four percent greater if these quantities of dry grade 4 and unaccounted waste left on the block were included.

District staff are concerned about the level of volume considered grade 4 credit and waste that is not billed against the allowable annual cut of current tenures. Staff recognize that MPB-impacted stands provided a significant source of grade 4 volume and the harvest in these stands is declining. However, increased harvest in spruce and balsam stands that are impacted by pests suggest similar concerns will continue.

The *Forest Act* and the Cut Control Regulation currently provide for the Minister to set a maximum limit on the volume that can be attributed as grade 4, in management units where there are concerns about sustainability as a result of the volumes attributed to the credit. This tool, which has not been used in the Kamloops TSA, could be used to provide control on the grade 4 credit issue, relative to the AAC set under Section 8, if coordinated with other decisions around apportionment and disposition.

Input from the Skeetchestn Indian Band expressed concern about the lack of accounting in the base case for the volumes harvested and attributed to the grade 4 cut control credit. In their input, they provided data that 15 percent of the original volume on one of their licenses was attributable to grade wood, and if that value was extrapolated proportionally across the TSA, it would represent over 400 000 cubic metres of volume annually. Cook's Ferry and Siska Indian Bands expressed concern that the use of grade 4 credits has a significant impact on their economic interests.

I have considered the information presented about grade 4 volume, including the input received, and discussed the matter with district and FAIB staff. I am concerned about the potential implications to the long-term sustainability of the TSA's timber supply if the AAC set under Section 8 is exceeded due to the above issues, in particular if any of the grade 4 volume represents green (live) stems rather than dead wood. I am aware that harvest records over the past eight years indicate that 150 000 cubic metres per year of volume attributed as grade 4 was transported to non-sawlog or cant facilities and a further three to four percent of harvested volume is left on site, and none of this volume is currently attributable to the AAC.

In consideration of the information presented, and of the information provided under Mountain Pine Beetle below, I will account in this determination for a reduction in the base case short-term harvest forecast of 150-000 cubic metres, the amount expected to be attributable to grade 4 credits from the volume harvested from dead pine that was included in the base case harvest forecast for the first decade. I will discuss this further under '**Reasons for Decision**'.

As discussed under ‘**Implementation**’, I request that district staff continue to monitor the volumes attributed to grade 4 credit, and should the volume be of concern, I recommend that staff utilize the existing policy instruments to request that the Minister implement a maximum volume limit.

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

Integrated resource management objectives

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

*- stand-level biodiversity*

In the base case, wildlife tree retention in the form of wildlife tree patches and dispersed retention was modelled by applying a percentage reduction of 1.9 percent to stand yields at the time of harvest in the model. The percentage reduction was determined based on information on stand-level retention provided by licensees for the previous timber supply review.

District staff, in collaboration with Resource Practices Branch staff, reviewed stand-level biodiversity sampling data available from Forest and Range Evaluation Program (FREP) and current submissions in the ministry’s silviculture data base (RESULTS). The FREP data was based on a ground assessment of 72 cutblocks harvested after 2003, to assess wildlife tree retention. The FREP review indicated that since 2003, 7.1 percent of the timber harvesting land base is being reserved operationally for stand-level biodiversity. Correlating this land base percentage value to a yield curve reduction as applied in the base case would suggest a 5.9 percent reduction to stand yields to account for stand-level biodiversity reserves.

An analysis of RESULTS data identified that 8.6 percent of the gross area is retained for wildlife tree retention and a further four percent for biodiversity purposes. This analysis, that looked at submissions after April 2012, screened out records that may have inappropriately identified dispersed retention.

District staff note that past practices during salvage of MPB-impacted stands may have resulted in higher levels of in-block retention, in conjunction with the relaxation of adjacency constraints. As a result, in-block retention levels may decrease over time as harvest operations move from pine stands to non-pine stands.

I have considered the information presented regarding the base case assumptions for stand-level biodiversity and the results of the subsequent data analysis. I accept that the FREP and RESULTS data provides reasonable information regarding operational practices, and therefore I conclude that higher levels of retention for stand-level biodiversity have been occurring operationally than assumed in the base case. As a result, it is appropriate in this determination to account for the increased level of retention through an additional four percent timber supply reduction beyond what was assumed in the base case that affects the entire forecast period. I will discuss my considerations of this further under ‘**Reasons for Decision**’.

As mentioned under ‘**Implementation**’, I request that the operational levels of in-block retention be monitored over the term of this determination, so that any noted changes can be assessed and incorporated, as appropriate, in the next timber supply review.

*- scenic resources and lakeshore management*

Visual management in the Kamloops TSA is guided by the Kamloops Land and Resource Management Plan (KLRMP) Higher Level Plan Order (HLP), district manager established objectives, and the Forest Planning and Practices Regulation (FPPR). Visual Quality Objectives (VQOs) were established by the district manager for the southern portion of the TSA that was formerly the Kamloops Forest District. For the northern portion of the TSA that was formerly the Clearwater Forest District, VQOs are managed in accordance with Section 9.2.2 of the FPPR. For areas where no VQO is identified, a minimum VQO of modification is assumed to apply to the Crown forested land base operationally, an interpretation of the KLRMP HLP.

In the base case, VQOs were modelled through specifying a maximum percentage of forest land within each visual polygon that could be below a given visually effective green-up height at any one time. Planimetric percent alteration ranges for each VQO were modified according to the Visual Absorption Capability (VAC) rating for each visual polygon found in the visual inventory. VAC ratings were used to divide percent alteration ranges into thirds and the mid-point of each third was used as a target to model each combination of VQO and VAC. Area-weighted VEG heights were determined for each visual unit based on slope, and ranged from 3 to 8.5 metres depending on site conditions. Areas outside the scenic area did not have a constraint applied in the base case.

Lakeshore management zones were modelled using VQO’s consistent with their classifications from the district’s Lakes Local Resource Use Plans.

Staff indicate that areas of the Crown forested land base where no VQOs are available total about one million hectares. In the base case, these areas were subject to the IRM zone forest cover constraint in the model, and not modelled to the similar characteristics of a modification VQO, given the lack of specifically defined scenic units. Staff are not certain the extent to which the application of a modification VQO would further constrain these areas.

District staff note that the harvest over the past 20 years, in particular the MPB-salvage activity, has focused on gentler slopes. Future harvest will likely occur in steeper sloped areas with generally higher visual sensitivities and lower VAC ratings.

District staff note that the VQO inventory was completed such that large VQO polygons cover entire hillsides. The terrain in VQO polygons is often highly variable, and staff believe there is an opportunity through developing newer mapping to further refine the VQO polygons, which would better represent actual visual sensitivity.

Analysis completed to assess the sensitivity of timber supply showed harvest levels are affected by changing assumptions for maximum alteration values. Staff note that the sensitivity analysis results suggest that harvest choices in the visual land base that favour less sensitive and lower slope stands will, over time, constrain mid-term harvest levels.

Input from the Cook’s Ferry and Siska Indian Bands noted that the bands have not been consulted on the definition of VQOs and they have not been able to determine the impact on their aboriginal title and rights.



Input from Interfor questioned the base case assumptions for the northern portion of the TSA, noting that operations in the northern portion of the TSA will likely be governed by the least restrictive VQO in the range of allowed VQOs within each visual polygon. Staff confirm that the base case assumed less sensitive visual objectives in these areas.

I have considered the information regarding visual quality in the Kamloops TSA. I accept that there may be timber supply implications as a result of the application of slightly different assumptions in the base case for the areas outside of scenic areas in accordance with direction under the Kamloops LRMP; however, at this time, it is uncertain whether this discrepancy between what was modelled and what guides current practice increases or decreases timber supply.

I am aware that analysis suggests that the continued focus on the harvest of lower slopes, and less visually sensitive areas will, over time, restrict harvest in other stands in scenic areas to a greater extent than reflected in the modelling, and I caution licensees in this regard. I request that licensees and FLNRO staff work together to study and better define the visually sensitive land base over the term of this determination, as discussed further under '**Implementation**'.

*- community and domestic watersheds*

There are 15 designated community watersheds, totalling 67 821 hectares, within the Kamloops TSA. Management objectives for community watersheds are established under Section 8.2 of the Forest Planning and Practices Regulation.

In the base case, a similar approach to the previous timber supply review was used to reflect requirements in these watersheds. Management was modelled through the application of a maximum disturbance constraint wherein no more than 25.2 percent of the Crown managed forest land base (gross area of the watershed) was permitted to be covered in stands less than 6.6 metres in height. FAIB staff note that the application of this constraint in the modelling to the community watershed areas was initially constraining to timber supply for about one third of the community watersheds.

District staff state that the modelling approach does not reflect the professional guidance approach used in operational practice, and that the development of new modelling approaches have been suggested. Further, District staff and some licensees had stated concerns that the current practice is all watersheds should be identified (i.e., based on hydrological assessments) and considered within the timber supply review practice. Staff note that there are some additional watersheds that are not officially designated but managed for watershed values as they are servicing communities.

Input received from Tolko noted that it currently operates in watersheds with higher ECA's than modelled, based on watershed-specific recommendations from hydrologists. Tolko recommends incorporating watershed-specific modelling for ECA's as well as data from licensee hydrologist reports into the analysis.

Having considered the information and uncertainties associated with community watersheds it is unclear to me whether or not current practices are more or less constraining than modelled in the base case. However, in the absence of better information at this time, I accept the assumptions used in the base case.

As indicated in '**Implementation**', in order to reduce the uncertainty associated with this factor, I encourage ministry staff and licensees to undertake a review of current operational practices and requirements for all watersheds including community watersheds in the Kamloops TSA and ensure that future timber supply reviews appropriately capture such management.

- riparian

The protection of riparian reserves is governed by the Forest Planning and Practice Regulation (FPPR), which defines classification of streams, wetlands and lakes and provides a minimum riparian reserve zone and riparian management zone, totalling a riparian management area. The dataset for streams used for the previous timber supply review was combined with data layers for lakes and wetlands from the BC Geographic Warehouse (BCGW). A riparian buffer layer consistent with the FPPR and Forest Stewardship Plans was created and overlaid on the Crown Managed Forest Land Base to determine the amount of area to exclude aspatially from the THLB to account for riparian values.

District staff note that the Skeetchestn Indian Band has done some work to identify stewardship practices for wildlife corridors and other needs that would result in increased riparian reserve areas in their traditional territory. These increased reserves would be beyond what is required under legislation. In its input, the Skeetchestn Indian Band stated that they would like their Cultural Resource Management Zone (CRMZ) policy to be considered in the timber supply review process.

This CRMZ policy has been adopted by some licensees within the TSA and involves increasing retention around streams and wetlands. It was not modelled in the base case as it isn't being applied consistently throughout the TSA.

Staff used the limited knowledge of the additional reserves to evaluate the potential impacts to timber supply. Applying an additional 50 metre (25 metres per side) buffer with 50 percent basal area retention to all stream classes, wetlands and lakes across the entire TSA would result in an estimated additional THLB impact of 55 000 hectares, and a 4.2 percent decrease in timber supply.

BCTS input noted that there are pending GAR orders for fisheries sensitive watersheds and temperature sensitive watersheds, and questioned how the timber supply impacts of these GAR orders would be determined once the orders are put into effect. I note that the cycle of the timber supply review process is intended to capture and reflect updates such as new data and new requirements over time.

Ministry staff evaluated watershed-level risk to fish habitat. About one-quarter of all watersheds in the north and two-thirds in the south were considered to be in a high risk fish stream risk class. Included in this assessment was an assessment of riparian hazards (i.e., clearing of near-stream areas). This will be discussed further under cumulative effects.

I have considered the information regarding the assumptions in the base case to account for riparian areas. I accept that the base case assumptions do reflect the legal requirements for the protection of riparian features and riparian habitat and are the best information available for this determination. However, I acknowledge that the available stream classification data is outdated and therefore encourage district staff to assess available inventories and other real data, such as data from FREP, licensees, or other government sources, so as to update the available stream and other riparian information for the TSA to the extent possible. I also encourage the district and Skeetchestn to work together on a shared approach to riparian management. I include this request under **'Implementation'**.

*- ungulate winter range*

Critical Deer Winter Range and Critical Moose Winter Range are the two General Resource Management Zones related to ungulate winter ranges that are identified in the Kamloops LRMP.

Higher level plan objectives under the KLRMP for deer include management measures to maintain or enhance forage production and habitat requirements such as dispersing harvesting, maintaining at least 25 percent of the forested area in thermal cover, and linking thermal cover units with travel corridors. Policy direction in the KLRMP interprets these objectives to include recommendations to practice uneven-aged management and restrict clearcuts to less than five hectares in size. There are also higher level plan objectives for critical moose winter range areas focused on maintaining thermal and visual cover and enhancing browse production.

In the base case, requirements for deer winter range were modelled through the application of a minimum of 25 percent of the forested land base allowed to be covered in stands less than 20 metres in height, and a maximum of 20 percent allowed to be covered in stands less than three metres in height within a planning cell. Requirements for critical moose winter range were assumed to be met operationally with no timber supply implications, and were not explicitly modelled.

Two additional areas in the TSA, the Skull Wildlife Habitat for critical deer winter range and the Skwilatin Wildlife Habitat for critical moose winter range, are identified as “Special Resource Management – Habitat/Wildlife Management Areas”. Management of the Skwilatin area is not anticipated to have any timber supply impacts and was not modelled in the base case. The Skull area covers 4148 hectares of THLB and was also not explicitly modelled in the base case. A sensitivity analysis that included this area in the area managed for deer winter range, with corresponding requirements described above, showed an impact to mid-term timber supply of 0.03 percent.

Staff note that a pending GAR order is expected to result in changes to the area managed for mule deer as well as the required management regime. Specifically, the order identifies a larger area of winter range, and specifies retention of snow interception cover in Douglas-fir leading stands of specific age classes and crown closure of 15 or 40 percent depending on the snow pack zone.

Input from the Skeetchestn Indian Band expressed concern about reduced habitat connectivity as a result of relaxed adjacency requirements during MPB salvage and the impact on moose and other wildlife species. They question the assumption that needs for moose can be met operationally without timber supply implications.

District staff note that a Moose Watershed Stewardship Pilot, led by a working group with representation from the provincial government, Secwepemc First Nation and forest licensees is working collaboratively to develop a coordinated plan to ensure stewardship of moose and watershed values in the pilot area. The results of the pilot are expected to inform management needs for moose in the Kamloops TSA.

For this timber supply review, FLNRO staff have presented me with a cumulative effects resource value assessment for moose. This is discussed further in the below section on cumulative effects.

I have considered the information and assumption used to account for ungulate winter range and habitat and conclude that with the exception of the Skull Wildlife Habitat Area the base case appropriately accounts for these requirements. I accept that not excluding the Skull area from the THLB results in a 0.03 percent over-estimation of the base case mid-term timber supply. However, in the context of a strategic level timber supply analysis an over-estimation of this magnitude is negligible and I will not adjust the base case on this account.

I applaud the work progressing under the Moose Watershed Pilot Project, and note that any results that suggest implications for timber supply can be reflected in the next timber supply review for the Kamloops TSA.

*- identified wildlife*

In the base case, all identified wildlife habitat areas were excluded in the derivation of the THLB, for a total of 412 hectares specifically on this account.

Operationally, general wildlife measures vary by identified wildlife species from little operational impact to complete exclusion of the THLB area.

Input received from BCTS noted that over the past three years, it has increased reserve areas to address integrated resource management concerns, noting that larger amounts of area than strictly required is set aside to meet breeding and nesting needs for bird species such as goshawk, herons and sandhill cranes, which may not be red- or blue-listed species but have cultural significance. As well, greater amounts of area are set aside to meet fisher and marten habitat needs than guidelines require.

For this timber supply review, FLNRO staff have presented me with a cumulative effects resource value assessment for marten. This is discussed further in the below section on cumulative effects.

I have considered the input from BCTS regarding reserve areas, and acknowledge their comments. I suggest that BCTS monitor its practices operationally and ensure that it is considering co-locating reserve areas, if appropriate, to meet the needs it has noted. I also note that if it is appropriate to set aside additional areas to look after habitat needs for identified wildlife species, these reserves should be put forward for designation through the appropriate means.

For this determination, I am satisfied with the accounting provided for identified wildlife in the base case, which resulted in the complete exclusion of these areas from the THLB, and I make no adjustments in this regard.

*- cutblock adjacency and maximum cutblock size*

Requirements for the harvest of areas adjacent to other cutblocks are identified within the FPPR, including maximum cutblock sizes. However, during the mountain pine beetle infestation, exemptions to cutblock adjacency requirements were permitted in infested areas.

In the base case, adjacency requirements were assumed to be met by other, more constraining requirements in the RMZ areas. In the non-RMZ area, a maximum disturbance constraint was applied where no more than 33 percent of the THLB was permitted to be covered in stands less than three metres in height. An average area weighted age for each landscape unit was calculated based on height to age requirements for each analysis unit.

As well, in the base case, a block distribution was attempted where 20 percent of cutblocks were 250 to 80 hectares, 40 percent were 80 to 40 hectares and 40 percent were less than 40 hectares in size.

Having reviewed the information presented regarding cutblock adjacency and maximum cutblock size, I am satisfied that the base case assumptions reasonably reflect operational requirements. As mentioned under ‘**Implementation**’, I request that licensees ensure that practices return to the intent of adjacency constraints as the salvage of MPB-impacted timber is completed. In this regard, it may be appropriate to consider NDT-related patch size distribution analysis to better understand the application of alternative block sizes.

- range and grazing leases

The Kamloops TSA has an extensive cattle ranching industry for which the majority of summer range for livestock is in forested areas. The TSA has 147 tenures under the *Range Act* across the district and 114 grazing tenures under the *Land Act* in the TSA that cover 69 604 hectares or 30 995 hectares of timber harvesting land base.

Harvesting or forestry activities that take place in areas covered by grazing leases must focus on production of forage, and harvesting or silviculture prescriptions may promote a more suitable forage base while still contributing to timber production. Staff note that the majority of grazing leases, which are located in the northern portion of the ponderosa pine BEC zone, often require special management, that may include the use of a partial cut or uneven-aged silviculture system. In the base case, these areas were modelled with a clearcut silviculture system.

Historically, forest licensees have not harvested timber in grazing lease areas. A district policy developed in 2015 allows forest licensees to have priority rights to the harvesting of timber in these areas.

In the base case, no explicit modelling was done to reflect practices in areas managed for range values. A sensitivity analysis in which grazing lease areas were excluded from the THLB showed less than a 0.5 percent impact to timber supply. Stands within the grazing lease areas tend to have lower volumes and lower site productivity than average, and the areas are constrained for multiple other non-timber objectives.

Input received from Tolko noted that grazing lease areas are typically areas of additional constraint on the THLB for the TSA. To encourage harvesting, they requested that FLNRO establish working groups to examine these issues including the impacts of such constraints on the THLB.

Having considered the information regarding grazing tenures and grazing leases in the Kamloops TSA, I accept that current practice has been reasonably modelled in the base case and I make no adjustments on this account. However, in light of the expected ongoing need to ensure cooperative management of values in these areas, I note that it is my expectation that forest licensees, range tenure holders and grazing lease holders will work with the district staff to ensure practices in areas of overlapping range and timber values support enhancement of those values for both forest and range licensees, as described under '**Implementation**'.

- *mountain caribou*

Three Government Action Regulation (GAR) orders related to mountain caribou are in place in the Kamloops TSA. These orders describe three separate planning units with different management regimes applicable to each.

U-3-004, the Wells Gray Thompson Planning Unit, contains three management zones: a no-harvest zone; a modified harvest zone that requires harvest to consider retention of suitable habitat attributes and a minimum non-spatially delineated area of 9757 hectares - comprised of 1800 hectares of THLB and 7957 hectares of non-THLB - to be retained in suitable condition; and, a corridor in which 33 percent of the habitat must be in suitable condition at all times. U-3-005, the Revelstoke Shuswap Planning Unit is strictly no-harvest. U-8-004, the Revelstoke Shuswap and South Monashee Planning Unit is one management zone with two objectives: silviculture treatments that do not result in pure spruce stands, and no harvest permitted in sub-alpine parkland ecosystems.

In the 2008 determination, the chief forester requested that there be a full accounting for all areas deleted from the land base in association with the mountain caribou recovery strategy.

In the base case, the assumptions to account for mountain caribou habitat varied depending on the set management regime. The no-harvest zones in U-3-004 and U-3-005 were entirely excluded from the timber harvesting land base. For the modified harvest zone in U-3-004, 8102 hectares of area were identified spatially to meet the 9757 hectare non-spatial target of suitable habitat, and excluded in the derivation of the timber harvesting land base.

To reflect management requirements for the corridor area within U-3-004, a cover constraint was to be applied as a minimum amount of 33 percent of the area to be covered in stands greater than 140 years of age at any one time. However, an error in the modelled resulted in the exclusion of this area, totalling 5539 hectares, from the THLB rather than the application of an expected a minimum 33 percent retention constraint.

The area of U-8-004 subject to no harvest in the sub-alpine parkland ecosystems does not fall within the Kamloops TSA and therefore was not modelled. The silviculture treatment requirements of that planning unit were assessed and not expected to impact timber supply and were also not explicitly modelled.

I have considered the information presented regarding the management requirements for mountain caribou and how these requirements were modelled in the base case, and discussed this information with staff. I accept that the majority of the base case assumptions appropriately reflect expected management and I make no adjustments in this regard. I will account in this determination for a small underestimation in timber supply as projected by the base case as a result of the exclusion of 5539 hectares of corridor zone, and I discuss this further under '**Reasons for Decision**'.

*- cultural heritage resources*

There are 2714 registered sites covering approximately 3442 hectares that have been recorded within the government's Remote Access to Archaeological Data (RAAD) database. These sites were excluded in the derivation of the THLB in the base case.

Operationally, Forest Stewardship Plans (FSPs) contain objectives to conserve or, as necessary, protect cultural heritage resources that are the focus of a traditional use by an aboriginal people and of continuing importance to that people. A number of culturally sensitive areas have been identified in the Kamloops TSA; none have been legally established, and are generally managed for at the operational level.

BCTS provided input that stated much of its operating area overlaps with sensitive areas for First Nations and many cultural and archaeological values are present and made known through First Nations traditional use studies. BCTS notes that there are impacts to the THLB as a result of conserving or protecting these areas that are not accounted for in the base case.

Several First Nations provided input on cultural heritage resources. The Skeetchestn Indian Band noted in its input that a minimum 25-metre reserve should be applied around all water bodies to account for cultural heritage resources. I note that my consideration of this is provided above under riparian. The Cook's Ferry and Siska Indian Bands noted that the identification and management of culturally sensitive areas is of critical importance to the bands and other First Nations. The Secwepemc First Nation provided input that noted Secwepemc communities are interested in understanding how cultural heritage resources are considered in the TSR process.

District staff indicate that they are developing a process for managing cultural heritage resources at an operational level. Although this process is still evolving, some First Nations and forest licensees are implementing the process as a means of managing cultural heritage resources.

I have considered the information regarding cultural heritage resources and discussed this factor with district staff. I am satisfied that processes and practices at the operational level are providing for appropriate consideration of these values. Although the information available upon which the base case assumptions were formulated did not provide for an explicit accounting for all of these values, I am aware that many assumptions applied in the analysis, such as for riparian values, do also provide some accounting for expected timber supply impacts of managing for cultural heritage resources. I note that in the absence of explicit registration of sites operationally, it is difficult to provide for direct accounting in timber supply analysis. I encourage BCTS and FLNRO staff to continue to work with First Nations and refine processes for incorporating management of these values into timber supply analyses.

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

#### Harvest performance

The effective AAC in the Kamloops TSA has been 4 000 000 cubic metres, of which 3 800 000 cubic metres is outside the 200 000 cubic metre partition for old hemlock and cedar-leading stands. District staff indicate that harvest performance outside of the partitioned volume between 2008 and 2014 has averaged 71.3 percent of the AAC.

I am aware that this correlates to an average of 2 820 000 cubic metres annually, and will discuss my considerations of this further under '**Reasons for Decision**'.

#### First Nations consultation

There are 34 First Nations and seven national/tribal organizations whose territories encompass areas within the Kamloops TSA. Nine First Nations are actively involved in the forestry sector and have obtained area- or volume-based tenures within the Kamloops TSA. There are 23 bands who have, or are negotiating, Forestry Consultation and Revenue Sharing Agreements (FCRSA) with FLNRO.

Five First Nations bands are signatories to the Secwepemc Reconciliation Framework Agreement (RFA). These bands are Tk'emlups te Secwepemc, Skeetchestn Indian Band, Splots'in First Nation, Adams Lake Indian Band and Shuswap Indian Band (whose territory does not overlap the Kamloops TSA).

There are five bands who have signed the Nlaka'pamux Nation Tribal Council (NNTC) Land and Resource Decision Making Pilot Project Agreement. Two of these bands - Lytton First Nation and Oregon Jack Creek Indian Band - have traditional territories within the Kamloops TSA.

First Nations consultation was undertaken as per the Haida consultation spectrum and consistent with FCRSA consultation requirements. Consultation was undertaken at a deeper level with bands that have stronger interests within the TSA, specifically the Secwepemc RFA signatory bands who had additional engagement through a series of meetings, including discussions about the TSR process.

In December 2013, an initial letter was sent to First Nations advising them that a new timber supply review was going to be initiated and that this process would culminate with the chief forester determining a new AAC for the Kamloops TSA.

Following this letter, in January 2014, district staff met with representatives from the Secwepemc RFA to discuss the timber supply review process in general. District staff also met with representatives from the Lillooet Tribal Council, Nicola Tribal Association, Boston Bar First Nation, Simpcw First Nations, Lower Nicola Indian Band and the Bonaparte Indian Band in March 2014. Subsequently, Chief Forester Dave Peterson met with representatives of the Tk'emlups te Secwepemc and Splots'in First Nation.

In September 2015, a discussion paper describing the results of the timber supply analysis was sent to all First Nations, except those whose territories overlap the Wells Gray Park. Subsequently, ministry staff attended the Secwepemc RFA Natural Resource Technical Committee meeting to discuss the timber supply analysis discussion paper. First Nations were contacted again on October 26, 2015 and November 18, 2015 and invited to provide additional information, comments and/or recommendations for my consideration prior to my AAC determination.

As indicated in the discussion paper, consultation was scheduled to end on November 24, 2015; however, during the formal consultation period as well as after it ended, I received requests from a number of First Nations for deeper consultation and to postpone my AAC determination.

First Nations were advised that although I was not willing to prolong this timber supply review process, I was willing to consider any new information provided to me before I completed my determination.

Subsequently, I had opportunities to hear the concerns and recommendations provided by First Nations, both in person and by phone. In making this AAC determination, I have considered both this direct communication, as well as the written submissions provided by First Nations.

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

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

With respect to the adequacy of land use objectives listed above: Cook's Ferry and Siska Indian Bands expressed their concern about the legal protection of old growth management areas (OGMA) in both the Merritt and Kamloops TSAs, as these areas were originally located to help accommodate First Nations interests. As indicated in my *Rationale for the Allowable Annual Cut Determination for the Merritt TSA* (March 2016) forest licensees in the Merritt TSA can harvest OGMA's provided equivalent replacement areas are established. However, this is not the case in the Kamloops TSA where OGMA's have been spatially established by an order issued under the Land Use Objectives Order Regulation in April 2013.



Where the information, concerns or recommendations I received are within my authority as chief forester, I have considered them in my AAC determination. Where the information, concerns or recommendations are outside of my authority, I have endeavoured to share the information, concerns or recommendations with the appropriate decision makers (e.g., I informed regional tenures staff of the requests I received for enhanced participation in the apportionment and disposition of the AAC following this determination).

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

I have reviewed the information regarding the consultation undertaken with First Nations and discussed it in detail with district, regional and branch staff. I am satisfied that the consultation was conducted appropriately and that reasonable efforts were made by district staff to engage and inform First Nations in the timber supply review process, collect information regarding their interests and understand how these may be affected by the AAC determination.

If new information regarding First Nations' aboriginal interests becomes available that significantly varies from the information that was available for this determination, I am prepared to revisit this determination sooner than the 10 years required by legislation.

### Climate change

Climate change is predicted to impact forest ecosystems in a number of ways, including general increases in temperature, changes in precipitation patterns and increased frequency and severity of disturbances.

The draft Thompson-Okanagan Regional Climate Action Plan includes a set of actions aimed to assist the adaptation of the management of values associated with water, fish, wildlife, forested ecosystems, grasslands, natural disaster management and public safety and infrastructure. Climate changes projected to the year 2050 include predictions for changes in temperature, precipitation, snowfall, snowpack, frost-free days and growing-degree days as well as extreme weather events.

I have considered the work done to predict changes in climate across the TSA. Projected climate changes are likely to affect forest productivity, growth, natural disturbances, forest pests and hydrological balances; however, the magnitude and extent of the impacts are not yet certain. I am aware that to the extent some of these impacts are already observed, such as through recent disturbances from wildfires or increased damage from pests, they are reflected in timber supply analysis. I request that FLNRO staff continue to monitor changes and where possible, collect information to inform decisions. Any additional information and corresponding analysis that helps us to better understand how forest management decisions can be adapted to mitigate impacts can be incorporated into future timber supply reviews.

### Cumulative effects

In its 2007 decision on *William*, the BC Supreme Court ruled that decision makers should consider credible information on wildlife values associated with First Nations rights and needs (e.g., hunting, trapping, fishing and trading), and the potential implications of the decision on wildlife and

First Nations' needs. The Government of BC has supported implementation of the Cumulative Effects Framework (CEF) that aims to provide relevant information and supporting policy for decision making needs. The TSR process leveraged the CEF wildlife value assessments to support this requirement and focused on fish habitat, moose, landscape-level forest biodiversity and marten.

The current condition, trend from 2003 and potential future effects on the four resource values were assessed. The reference points for interpreting value conditions were based on government expectations found in guidance, best management practices or policy. Information presented included both direct (e.g., amount of timber harvest) and indirect (e.g., spatial pattern of harvest) effects that may result from the harvesting at the base case level. Results were interpreted independently for the north and south portions of the TSA.

The results suggest a wide range of conditions and trends. For moose, both the positive effects of future harvesting (e.g., creation of forage) and indirect negative effects of harvesting the future allocated cut (e.g., more roads and access, thermal cover around wetlands) that combine with moose population pressures (e.g., predation by wolves) were noted. For moose, results indicate that while populations have declined in the north portion of the TSA due to predation, populations are stable in the south portion of the TSA. Currently, high risks on the Bonaparte Plateau are being addressed through government-to-government policy discussions with First Nations. The future harvest levels in the base case are not expected to directly increase risk to moose populations; rather, the spatial pattern of future timber harvest (i.e., for thermal cover) and roads to access future timber (i.e., that increase population risks) are more important to address. Both are the subject of ongoing monitoring and policy review.

For forest biodiversity, although the current condition of the value was determined to meet the KLRMP objectives, the overall risk to biodiversity was assessed as moderate and requiring attention in future practices to ensure stability. In the past decade, risk declined in the north of the TSA due to implementation of the mountain caribou recovery strategy, whereas risk increased in the south following MPB salvage. The needs of pine marten, are assumed to be met through forest biodiversity objectives. Sufficient habitat to maintain marten populations exists in the north of the TSA, but modifications to management practices are required to maintain habitat in the south. The amount and pattern of harvesting in Natural Disturbance Type 3 (NDT3) areas in the south of the TSA, which has isolated old- and mature-patches of forest within marten home ranges, was noted as having a significant effect in the past decade.

For fish habitat, assessments were applied at the watershed scale. Results from the north portion of the TSA indicated that the dominant hazards were associated with water quality: indicative of the potential for sedimentation from high road densities. However, there has been some improvement in hydrological recovery in the north TSA watersheds over the last decade. Impacts from future harvest were less pervasive because the majority of near term available timber (i.e., first decade) is located in the south portion of the TSA.

In the southern portion of the TSA, riparian hazard was the dominant hazard, associated with harvesting of near-stream areas, followed by an increase in stream flow hazard. Although some increases in risk were detected in the north, the increases in risk in the south watersheds were significant in the past decade. Future harvest at base case level was assessed as having both indirect effects, from potential increases to riparian and water quality hazards, and direct effects from the amount of timber harvest. The direct effects were due to the majority of the TSA's available volume being in the south and in the upper portions of watersheds that are more hydrologically sensitive.

These assessments also summarized ongoing resource management actions/mitigations to address many of the issues identified. These take the form of regulation reviews (e.g., *Water Sustainability Act* development), policy refinement (e.g., Moose wetland\thermal cover needs, watershed assessment

guidance), setting objectives (e.g., Fisheries Sensitive Watershed Designation, Bonaparte Moose-Riparian Pilot Project), and further monitoring that is underway for fish habitat, moose and landscape-level biodiversity and marten.

I have considered the information presented regarding the CEF assessment work completed in the Kamloops TSA and discussed it with FLNRO staff. I commend the work undertaken to date to better understand the cumulative effects of all activities as well as natural events on the land base and support continued work at the regional level. I am aware that forest management and harvesting practices in the Kamloops TSA undertaken by licensees have adhered to current legislative requirements and the results of the CEF assessment work are not reflective of lack of compliance in this regard. In addition, licensees currently manage for hydrological recovery in watersheds. Notwithstanding, however, the results strongly indicate a need for changed behaviour in watersheds.

I am aware that the resource values assessed are of particular importance to First Nations. As such, I request that FLNRO staff and licensees continue to work with First Nations on planned actions for management of these resource values.

With respect to fish habitat values, I note that the increase harvesting to salvage MPB timber and relaxation of green-up constraints may have contributed to the disruption in hydrological recovery for many watersheds in the TSA. Recent research suggests that hydrological recovery takes longer than previously understood from older IWAP recovery curves and this information should inform future management. I encourage the use of watershed hydrological assessments to inform planning of harvest activities, and further request that FLNRO staff to develop and provide clear expectations to licensees for the development of watershed assessments to guide both the amount and spatial location of harvest and road development and management activities. It is imperative that hydrological recovery time is again prioritized in forest management activities in these areas impacted by MPB.

I have considered the information regarding moose habitat, and I accept that actions may be needed in the southern portion of the TSA, such as changes in practices to manage thermal cover, in order to stabilize and increase moose populations. I request that the FLNRO regional staff notify me if government establishes new objectives for moose that have timber supply implications over the term of this determination.

With respect to forest biodiversity, although the more specific KLRMP Higher Level Plan objectives (conserve the diversity and abundance of native species and their habitats) are being met, I am aware that the current amounts of old, mature or early seral forest in many landscape units in the TSA are inconsistent with the broader (non-legal) KLRMPL direction. This inconsistency stems from differences between current seral distribution and recommended seral targets for some landscape units based on Biodiversity Emphasis Options defined in the KLRMP. In the last 20 years since KLRMP, management for mountain caribou recovery and MPB salvage have shifted the focus of forest harvesting on the land base. As such, I request that FLNRO staff revisit multi-landscape unit direction in the TSA to provide guidance to operational implementation of future allocated harvest. I am aware that pine marten currently has no legal designation and its management is included with and assumed to be met by landscape-level biodiversity requirements. I request that regional staff work to establish guidelines for the management of pine marten habitat in NDT 3 areas, and consider developing specific objectives if landscape-level biodiversity objectives are unlikely to sustain pine marten populations. From discussions with FLNRO staff, I am aware that habitat for this species is enhanced by coarse woody debris retention on harvested stands and I encourage consideration of stand attributes to inform both this work and *Forests for Tomorrow* stand rehabilitation efforts.

I will discuss my consideration of this factor in combination with other factors under ‘**Reasons for Decision**’.

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

Alternative harvest flows and harvest sequencing

A range of alternative harvest forecasts were developed with different initial harvest levels and correspondingly different mid-term levels. In general, a higher initial harvest level than the base case resulted in lower mid-term levels, while dropping the initial harvest level lower below two million cubic metres did not result in a correspondingly greater mid-term level. The base case harvest forecast represented the best option, in that it reflected objectives to maintain the best possible mid-term harvest level, a maximum long-term harvest level that supports a constant growing stock, and an initial harvest level that considered current tenure obligations and harvest level expectations from the 2008 AAC determination.

District staff expressed concern that the selection of stands reflected in the base case would not be realized in the first decade. The base case assumed an oldest stand first harvest rule. Staff indicate that a harvest rule that results in the selection of highest volume stands first is more likely to be reflective of operational practices. A sensitivity analysis completed to assess the timber supply implications of using this harvest rule rather than that modelled in the base case showed a 5.3 percent impact to the mid-term harvest level.

Having reviewed the information regarding the assumptions around harvest sequencing and discussed this information with staff, I accept that a harvest rule that selects highest volume stands first is more reflective of current and expected operational practice. As a result, I take into account a five percent reduction in mid-term timber supply on this account, and I will discuss this further under ‘**Reasons for Decision**’.

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

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

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

*- Minister's letter*

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

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

The Minister also emphasizes the mountain pine beetle outbreak in the interior of British Columbia. He indicates that of particular relevance to AAC determinations are the objectives of encouraging long-term economic sustainability for communities affected by the epidemic; recovering the greatest value from dead timber before it burns or decays, while respecting other forest values; and conserving the long-term forest values identified in land-use plans. As well, the Minister requested that the

chief forester consider the local social and economic objectives expressed by the public, and information received from First Nations.

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

With respect to the 2006 letter, I note that in the base case as well as in the alternative harvest projections prepared for this determination that a primary objective has been to attain a stable, long-term harvest level where the growing stock is also stable. I am satisfied that the base case has incorporated the best available information regarding the impacts of the mountain pine beetle epidemic on stands in the Kamloops TSA. As discussed elsewhere in this document, the mountain pine beetle epidemic in the Kamloops TSA has ended, and much of the salvage of damaged pine stands has been completed.

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

### Local objectives

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

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

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

#### Mountain pine beetle

The mountain pine beetle infestation began in the year 2000 in the Kamloops TSA and increased rapidly, peaking in 2006. The infestation has since declined, with few areas of infestation recorded since 2010. Recent estimates made using the BCMPv11 model indicate that approximately 48 percent of the mature pine volume on the timber harvesting land base was killed during the infestation.

Salvage operations in the Kamloops TSA began in 2006, with non-replaceable forest licences issued to target harvesting in impacted stands, using specific stand selection criteria including the severity of impact and the percentage of pine in stands.

To inform shelf life assumptions for the base case, district staff conducted a survey of licensees. The information regarding observed shelf life for dead pine suggested 12 to 15 years is reasonable if the trees remain standing.

In the base case, the inventory estimates for standing dead pine volume were based on 2010/2011 photography, and assumed to be about 8.5 million cubic metres. It was assumed that the volume in dead pine was available for harvest for the first 10 years of the harvest forecast (until 2024), after which the volume in the dead stands no longer contributed to timber supply. A total of 450 000 cubic metres per year was harvested from dead pine stands in the base case in the first decade.

Staff note that the pine at the start of the base case harvest forecast could have been dead for between 5 and 10 years, and as a result, a portion of the dead pine volume would be assumed to have a 20-year shelf life. This is in excess of what is expected to be realized operationally.

Input was received from licensees regarding the assumptions for pine salvage. West Fraser Mills noted that the declining quality of wood in dead pine stands, with correspondingly higher levels of windthrow, breakage and less favourable market conditions, suggest that the pine is reaching the end of its shelf life. West Fraser notes it has recently shifted focus to stands comprised of 50 percent or less dead pine, and expresses the opinion that this focus on mixed live and dead stands is not inconsistent with the base case assumptions. Interfor expressed a number of commitments to continued harvest in pine stands as well as a commitment to increased focus on steeper slope harvest.

In its input, BCTS notes that a number of factors – reduced demand, market conditions, declining fibre quality – suggest that the base case assumptions for the first decade overestimate the volume that will be harvested in dead pine operationally.

Having considered the information regarding the accounting for MPB in the base case, I am aware that just over half the remaining volume of standing dead pine is assumed to be harvested in the base case, in the first decade of the forecast period. The remaining volume is assumed lost, and in my estimation any uncertainty regarding overestimation of shelf life in the base case is accounted for through the assumed lost volume.

As mentioned above under waste and log grade 4, I will account in this determination for a reduction in the base case short-term harvest forecast of 150 000 cubic metres, the amount expected to be attributable to grade 4 credits from the volume harvested from dead pine that was included in the base case harvest forecast for the first decade. I will discuss this further under '**Reasons for Decision**'.

#### Other forest health and non-recoverable losses

Estimated average annual unsalvaged volume losses in stands due to catastrophic events such as insect epidemics (non-MPB, which was modelled separately), fires, wind damage or other agents were incorporated into the base case. The unsalvaged losses account for volume that is not expected to be recovered. To account for the majority of these factors, a total of 100 000 cubic metres per year was assumed lost and deducted from the harvest forecast in the base case across all time horizons. Losses resulting from armillaria root disease in Douglas-fir stands in the Interior Cedar Hemlock (ICH) biogeoclimatic zone were modelled within the growth and yield model, TIPSY, at a moderate level of infection.

District staff reviewed estimates for annual non-recoverable losses in the TSA, which include losses resulting from Douglas-fir beetle, spruce beetle, balsam bark beetle and two year cycle budworm, wildfire, tussock moth and spruce budworm. This review suggested annual losses are 116 000 cubic metres rather than the initial estimate of 100 000 cubic metres used in the base case.

Having reviewed the information presented regarding non-recoverable losses and discussed the information with district staff, I accept that it is appropriate to take into account that the losses have been underestimated in the base case projection. On this account, timber supply has been overestimated by 16 000 cubic metres per year across all time horizons.

I will discuss my considerations of this further in my '**Reasons for Decision**'.

## **Reasons for Decision**

In reaching my AAC determination for the Kamloops TSA, I have made the considerations documented above, all of which are integral to my reasons for my decision, and from which I have reasoned as follows.

The base case harvest forecast prepared for the Kamloops TSA suggests that an initial harvest level of 2.5 million cubic metres could be maintained for one decade before declining over three decades to a mid-term level of 1.78 million cubic metres. This mid-term level lasts for seven decades before increasing in the tenth decade to 2.0 million cubic metres and then in the twentieth decade to 2.1 million cubic metres.

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

Factors identified as indicative of a potential over-estimation in the timber supply to a degree that can be quantified with accuracy are as follows:

- **Future roads** – future road development was not accounted for in the base case, and as a result timber supply has been overestimated in the mid- to long-term by up to six percent;
- **Unstable terrain and environmentally sensitive areas** – as a result of less harvest in areas of unstable or potentially unstable terrain than was assumed in the base case, mid-term harvest levels have been overestimated by up 4.8 percent;
- **Waste and log grade 4** – to account for the timber supply implications of the harvest of grade 4 volume outside of the AAC, timber supply has been overestimated by 150 000 cubic metres or six percent in the short term. This is the amount expected to be attributable to grade 4 credits from the volume harvested from dead pine that was included in the base case harvest forecast for the first decade;
- **Stand-level biodiversity** – as a result of higher levels of retention operationally for stand-level biodiversity than assumed in the base case, timber supply has been overestimated by four percent across the entire forecast period;
- **Harvest sequencing** – as I accept that a harvest rule that selects highest volume stands first is more reflective of current and expected operational practice, I account for a five percent reduction in mid-term timber supply on this account;
- **Non-recoverable losses** – as a result of additional volume losses from non-mountain pine beetle forest health factors in the Kamloops TSA, timber supply has been overestimated by 16 000 cubic metres per year across all time horizons.

Factors identified as indicative of a potential underestimation in the timber supply to a degree that can be quantified with accuracy are as follows:

- **Mountain caribou** – as a result of the modelling in the base case of 5539 hectares of corridor zone as an exclusion rather than subject to a forest cover constraint, timber supply has been underestimated by 0.6 percent across all time horizons.

In reviewing the implications for the timber supply resulting from the above factors taken in combination, I note that the information suggests that timber supply has been overestimated by up to 10 percent in the short term and 20 percent in the mid- to long-term. Applying a 10 percent reduction to the base case initial harvest level results in a level of 2 250 000 cubic metres.

In addition to these factors, I am aware of the results of the cumulative effects assessment that indicates there is a need to ensure hydrological recovery for watersheds in the TSA, through the application of management practices designed to support this. Although it is not within my authority in determining AACs to change forest management requirements, I am aware that a reduction in the AAC could help support hydrological recovery.

Based on the considerations described throughout this document, I have decided to establish a two-tiered AAC for the Kamloops TSA. Effective immediately and for the next five years, the new AAC will be 2.3 million cubic metres, after which it will decrease to 2.1 million cubic metres. The new AAC for both five-year periods includes a 200 000 cubic metres partition attributable to cedar- and hemlock-leading stands older than 140 years.

## **Determination**

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

- Establishing an AAC of 2 300 000 cubic metres for the next five year period, of which 200 000 cubic metres is attributable to cedar-leading and hemlock-leading stands older than 140 years. This AAC is about 42.5 percent lower than the effective AAC in place prior to this determination and about 14 percent lower than the pre-MPB uplift AAC set in 2003.
- Establishing an AAC for the next five year period effective May 5, 2021, of 2 100 000 cubic metres, of which 200 000 cubic metres is attributable to cedar-leading and hemlock-leading stands older than 140 years. This AAC is about 47.5 percent lower than the effective AAC in place prior to this determination and about 22 percent lower than the pre-MPB uplift AAC.

This determination is effective May 5, 2016, and will remain in effect until a new AAC is determined, which must take place within 10 years of the effective date of this determination.

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

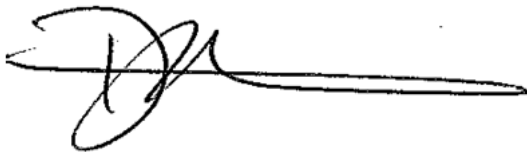


## Implementation

In the period following this decision and leading to the subsequent determination, I encourage FLNRO staff, licensees and other major project proponents to undertake or support the tasks and studies noted below, the particular benefits of which are described in appropriate sections of this rationale document. I recognize that the ability of all parties to undertake or support these projects is dependent on provincial priorities and available resources, including funding. However, these projects are important to help reduce the risk and uncertainty associated with key factors that affect the timber supply in the Kamloops TSA.

- **Old cedar- and hemlock-leading stands** – I request that performance in the partition to old cedar- and hemlock-leading stands be monitored over the term of this determination;
- **Site productivity** – I request that FLNRO and licensee staff continue their work together to ensure a consistent and reliable site productivity layer for the TSA;
- **Silvicultural systems** – as dry-belt fir stands occupy 19 percent of the timber harvesting land base, I request that licensees work with district staff to ensure that the silvicultural systems applied support appropriate reforestation regimes and emulate the natural stand structure in these areas, as well as meet the requirements for other objectives such as range and ungulate winter range;
- **Plantations post-free growing** – I request that prior to the next timber supply review, staff work to ensure that information about the health and productivity of regenerating stands that becomes available through the Young Stand Monitoring project and the *Forests for Tomorrow* initiative is used to reduce the uncertainty around losses in regenerating stands; as well, I expect licensees to monitor regenerating stands to ensure unintended species conversion does not occur;
- **Grade 4** – I request that staff monitor the volumes attributed to the grade 4 cut control credit and if such volume becomes a sustainability concern for the timber supply, request a maximum volume limit be implemented by the Minister;
- **Scenic resources** – I request that licensees and FLNRO staff work together to study and better define the visually sensitive land base, including an assessment of areas suitable for recruitment over time to meet objectives;
- **Community watersheds** - I encourage district staff and licensees to undertake a review of current operational practices and requirements for watersheds in the Kamloops TSA;
- **Riparian** – I encourage district staff to use all available data sources, including data from licensees and FREP, to update the stream inventory prior to the next timber supply review. As well, I also encourage the district and Skeetchestn to work together on a shared approach to riparian management;
- **Cutblock adjacency and maximum cutblock size** – I request that licensees ensure operational practices are consistent with the intention of cutblock adjacency and size limitations now that the MPB salvage is essentially complete;
- **Range and grazing leases** – I expect that forest licensees, range tenure holders and grazing lease holders work with district staff to ensure practices are appropriate and enhance values for all parties;

- **Cultural heritage resources** - I encourage BCTS and FLNRO staff to continue to work with First Nations and refine processes for incorporating management of these values into timber supply analyses;
- **Cumulative effects - fish habitat** - I encourage the use of site specific hydrological assessments to inform planning of harvest activities, and further request that district staff to develop and provide clear expectations to licensees for the development of watershed assessments to guide both the amount and spatial location of harvest and road development and management activities.
- **Cumulative effects – moose** - I request that the FLNRO regional staff notify me if government establishes new objectives for moose that have timber supply implications over the term of this determination.
- **Cumulative effects – forest biodiversity** - with respect to forest biodiversity, I am aware that the results of the assessment suggest that the current amounts of old, mature or early seral forest in many landscape units in the TSA are inconsistent with KLRMP direction. As such, I request that district staff revisit multi-landscape unit direction in the TSA to provide guidance to operational implementation of future allocated harvest.
- **Cumulative effects – pine marten** - I am aware that pine marten currently has no legal designation and its management is included with and assumed to be met by landscape-level biodiversity requirements. I request that regional staff work to establish guidelines for the management of pine marten habitat in NDT 3 areas, and consider developing specific objectives if landscape-level biodiversity objectives are unlikely to sustain pine marten populations.



Diane Nicholls, RPF  
Chief Forester



May 5, 2016

## Appendix 1: Section 8 of the *Forest Act*

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

### Allowable annual cut

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

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

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

(b) each tree farm licence area.

(2) If the minister

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

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

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

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

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

(3) If

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

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

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

(3.1) If, in respect of the allowable annual cut for a timber supply area or tree farm licence area, the chief forester considers that the allowable annual cut that was determined under

subsection (1) is not likely to be changed significantly with a new determination, then, despite subsections (1) to (3), the chief forester

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

(b) must give written reasons for the postponement.

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

(a) by written order may rescind the order made under subsection (3.1) and set an earlier date for the next determination under subsection (1), and

(b) must give written reasons for setting the earlier date.

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

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

(a) different types of timber or terrain in different parts of Crown land within a timber supply area or tree farm licence area;

(a.1) different areas of Crown land within a timber supply area or tree farm licence area;

(b) different types of timber or terrain in different parts of private land within a tree farm licence area.

(c) [Repealed 1999-10-1.]

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

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

(a) each community forest agreement area in accordance with the community forest agreement for that area, and

(b) each first nations woodland licence area in accordance with the first nations woodland licence for that area.

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

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

- (i) the composition of the forest and its expected rate of growth on the area,
- (ii) the expected time that it will take the forest to become re-established on the area following denudation,
- (iii) silviculture treatments to be applied to the area,
- (iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area,
- (v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production, and
- (vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber,

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

(c) [Repealed 2003-31-2.]

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

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

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

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

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

(b) each tree farm licence area

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

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

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

Section 4 of the *Ministry of Forests and Range Act* reads as follows:

### **Purposes and functions of ministry**

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

(a) encourage maximum productivity of the forest and range resources in British Columbia;

(b) manage, protect and conserve the forest and range resources of the government, having regard to the immediate and long term economic and social benefits they may confer on British Columbia;

(c) plan the use of the forest and range resources of the government, so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated, in consultation and cooperation with other ministries and agencies of the government and with the private sector;

(d) encourage a vigorous, efficient and world competitive

(i) timber processing industry, and

(ii) ranching sector

in British Columbia;

(e) assert the financial interest of the government in its forest and range resources in a systematic and equitable manner.

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



JUL 04 2006

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

Dear Jim:

**Re: Economic and Social Objectives of the Crown**

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

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

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

Page 1 of 2

Minister of  
Forests and Range  
and Minister Responsible  
for Housing

Office of the  
Minister

Mailing Address:  
PO Box 9049 Stn Prov Govt  
Victoria BC V8W 9E2  
Telephone: 250 387-6240  
Facsimile: 250 387-1040

Location:  
Parliament Buildings  
Victoria BC V8V 1X4  
e-mail: FOR.Minister@gov.bc.ca

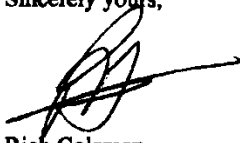
Jim Snetsinger

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

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

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

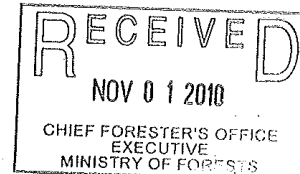
Sincerely yours,

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

Rich Coleman  
Minister



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



File: 280-30/MPB  
Ref: 126097

OCT 27 2010

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

Dear Mr. Snetsinger:

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

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

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

Page 1 of 2

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

Mailing Address:  
P.O. BOX 9049 Stn Prov Govt  
Victoria, BC V8W 1X4

Tel: (250) 387-6240  
Fax: (250) 387-1040  
Website:  
[gov.bc.ca/forlmbwww.gov.bc.ca](http://gov.bc.ca/forlmbwww.gov.bc.ca)

Jim Snetsinger, Chief Forester

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

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

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

Sincerely,



Pat Bell  
Minister

pc: Dana Hayden, Deputy Minister