BRITISH COLUMBIA
MINISTRY OF FORESTS AND RANGE

Williams Lake Timber Supply Area

Rationale for Allowable Annual Cut (AAC) Determination

Effective April 18, 2007

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Objective of this Document

This document is intended to provide an accounting of the factors I have considered and the rationale I have employed as chief forester of British Columbia (B.C.) in making my determination, under Section 8 of the *Forest Act*, of the allowable annual cut (AAC) for the Williams Lake timber supply area (TSA). This document also identifies where new or better information is needed for incorporation in future determinations.

Description of the Williams Lake Timber Supply Area

The Williams Lake TSA comprises approximately 4.9 million hectares and is one of fifteen TSAs lying within the Southern Interior Forest Region of B.C.

The TSA is bounded by the Quesnel TSA to the north, Wells Gray Park and Mitchell-Niagara Park to the east, the 100 Mile House and Lillooet TSAs to the south, and Tweedsmuir Provincial Park, Kingcome TSA and Sunshine Coast TSA to the west. The TSA is administered from the BC Forest Service (BCFS) Central Caribou Forest District office in Williams Lake in the east and the BCFS Chilcotin Forest District office in Alexis Creek in the west.

The Williams Lake TSA includes three general landscape types. The Chilcotin Plateau, west of the Fraser River, is characterized by a drier climate with extensive lodgepole pine forests and some Douglas-fir, and is bounded on the west by the Coast Mountains. The central portion of the TSA, both east and west of the Fraser River, has mixed species forests, primary leading in Douglas-fir and lodgepole pine, interspersed with open range lands. To the east of the Fraser River, the rolling plateau gently increases in elevation to meet the Cariboo Mountains and Quesnel Highlands where forest of spruce, pine, western red cedar, western hemlock and sub-alpine fir predominate.

The dominant tree species in the TSA are lodgepole pine, about 63 percent of the total volume within the timber harvesting land base (THLB), and Douglas-fir, about 15 percent of the total volume. Several other tree species occur including spruce, subalpine fir (balsam), western redcedar and western hemlock. Various deciduous (hardwood) species are also present on the land base.

The forests of the Williams Lake TSA are very diverse and provide a wide range of resources including timber, forage, non-timber forest products, fish and wildlife habitat, water, and recreation and tourism opportunities. Residents and tourists enjoy outdoor recreation activities such as cross-country skiing, snowmobiling, mountain biking, hiking, camping, fishing and hunting.

Ten First Nations have communities within the Williams Lake TSA. Four are Secwepemc (Shuswap) – Xats'ull (Soda Creek), Xatl'tem/Stwecem'c (Dog Creek/Canoe Creek), Esketemc First Nation (Alkali Lake) and T'exelc (Williams Lake). Five are Tsilhqot'in (Chilcotin) – Tl'esqox (Toosey), T'letinqox (Anaham), Yunesit'in (Stone), Xeni Gwet'in (Nemiah Valley) and Tsi Del Del (Alexis Creek). One is a southern Carrier community – Ulkatcho.

Twelve First Nations assert traditional territories in the Williams Lake TSA but do not reside within the TSA. Three are Secwepemc (Shuswap) – Tsq'escen (Canim Lake), High Bar, and Whispering Pines/Clinton. One is Tsilhqot'in (Chilcotin) – 'Esdilagh (Alexandria). Four are southern Carrier – Lheidli T'enneh, Lhtako (Red Bluff), Nazko, and

Lhoosk'uz Dene (Kluskus Band). One is Stl'atl'imx (Lillooet) – Ts'kw'aylaxw (Pavilion). Two are Coast Salish – Homalco and Nuxalk, and one is Kwakiutl – Da'naxda'xw/Awaetlala.

A 2006 community profile showed that the population of the South Cariboo region has remained stable at approximately 25,000 from 1996 to 2004. The largest community is Williams Lake, with a population of approximately 11,900. Smaller communities include Alexis Creek, Horsefly, Likely, Anahim Lake, Tatla Lake, Riske Creek, Big Creek, Nimpo Lake, 150 Mile House, Big Lake and McLeese Lake.

Critical issue: Epidemic mountain pine beetle infestation

Mountain pine beetle (MPB) epidemics are natural events that affect lodgepole pine forests, however, the current infestation has reached an unprecedented level in B.C.'s history. Provincial annual aerial survey data shows the MPB affected about 9.2 million hectares in 2006, up from 8.7 million hectares in 2005. Of the total area affected in 2005, 23 percent sustained severe or very severe mortality (i.e., at least 30 percent of the stand volume), 24 percent moderate mortality (i.e., 11 to 30 percent of stand volume) and 53 percent light or trace mortality (i.e., 10 percent or less stand mortality). The estimated volume of trees infested by the mountain pine beetle now affects about 582 million cubic metres of timber, up from 411 million cubic metres in 2005. Mortality projections suggest that the epidemic could last at least 10 more years and has the potential to kill more than 80 percent of the merchantable pine in the province's Interior.

Lodgepole pine represents approximately 63 percent of the total volume within the timber harvesting land base in the Williams Lake TSA. The majority of this pine volume is considered mature (over 80 years old) and is particularly susceptible to the MPB epidemic. In 1999 and 2000, the aerial forest health survey indicated 8000 hectares of MPB red attack infestation in the TSA, by 2006, this had expanded to approximately 2 170 000 hectares of forest. The volume of pine killed on the timber harvesting land base by MPB is projected to be about 100 million cubic metres in the next 20 years.

MPB-killed pine stands have a limited time during which one can economically recover lumber from harvested logs, i.e., the "shelf-life" of attacked stands. For this reason, this urgent review of the timber supply and AAC in the Williams Lake TSA has been conducted.

Expedited process for an urgent AAC determination to address the infestation

While the MPB has impacted a significant portion of the TSA, and the beetle damage intensifies, intervention may help to mitigate economic and environmental impacts.

The Williams Lake TSA Forest Health Strategy includes the following recommendations: guiding harvest of the existing AAC and potential increases to high priority (at least 70 percent pine component) MPB-killed or infested stands; conserving the long-term forest values identified in the Cariboo-Chilcotin Land Use Plan; recognizing landscape and stand-level biodiversity values, and developing retention strategies to maintain or enhance those values in a manner consistent with the chief forester's December 2005 "Guidance on Landscape and Stand-level Structural Retention in Large-Scale Mountain Pine Beetle Salvage Operation"; and minimizing impacts to the non-pine component of the timber supply area, except to treat other forest health factors associated with that component.

A significant portion of the current AAC is dedicated to harvesting infested or susceptible stands in support of the TSA strategy. Even so, current harvest levels are considered by District staff to be insufficient to address the epidemic, and that an increase of the harvest of currently infested and susceptible stands would improve their economic recovery and provide for their prompt reforestation. In contemplation of the need to provide remedies for these and similar situations, the *Forest Act* (section 8(8)(e)) requires the chief forester, in determining AACs, to consider *abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.*

Having reviewed the information about the current epidemic, I became further satisfied that an updated AAC determination, with particular weight given to considerations under section 8(8)(e) of the *Forest Act*, could be crucial assistance in remedying some of the serious problems related to the MPB infestation.

As such, an expedited review process was undertaken that included a timber supply analysis and a public discussion paper (PDP) prepared and released for public and First Nations comment in July 2006. On this basis, I have proceeded to make an AAC determination in as timely a manner as possible, giving consideration to all the land use, forest growth, forest management, social and economic and other factors required by the statute to be considered. This rationale describes my considerations and reasoning on which my determination is based.

History of the AAC

The Williams Lake TSA was established in 1981 with an allowable annual cut of 2 500 000 cubic metres. In 1985, the chief forester set the AAC at 3 750 000 cubic metres; a partition was created to address mountain pine beetle. In 1989, the AAC was set at 4 092 510 cubic metres; another partition was created to address the western supply block while the MPB partition was decreased. In 1992, the AAC was set at 3 975 000 cubic metres; a new deciduous partition was created and the MPB partition was further reduced. In 1996, the AAC was set at 3 807 000 cubic metres; a problem forest type partition was created, the deciduous partition was deleted and the western supply block partition was decreased. In 2003, the current AAC was set by the chief forester at 3 768 400 cubic metres; the base AAC was decreased and the western supply block partition was increased.

As of March 31, 2006, the current AAC is apportioned as follows:

Apportionment	Cubic metres per year	Percentage
Replaceable forest licences	2 006 680	53.3
Non-replaceable forest licenses	1 020 000	27.1
Pulpwood Agreement timber sale license	107 000	2.8
BC Timber Sales	569 720	15.1
Forest Service Reserve	65 000	1.7
Total AAC	**3 768 400**	**100.0**

New AAC determination

Effective April 18, 2007, in order to support a forest management strategy in response to the MPB epidemic, the new AAC for the Williams Lake TSA will be 5 770 000 cubic metres. This represents a 2 001 600 cubic metre (53 percent) increase from the previous AAC. My determination is predicated on directing the entire AAC at stands with at least

70 percent pine that are located west of the Fraser River. In order to reduce the risk to mid-term timber supply a significant proportion of the harvest should focus on low volume, low value stands. My expectations regarding the deployment of the entire AAC are discussed further under "Implementation".

This AAC determination will remain in effect until a new AAC is established, which must take place within five years of the present decision unless the next determination is postponed under Section 8(3.1).

Information sources used in the AAC determination

Information considered in determining the AAC for the Williams Lake TSA include:

- Public review comments (on the TSR Public Discussion Paper). Submitted July to September, 2006 (see Appendix 4 for a list of those providing submissions).
- Abundance of Secondary Structure in Lodgepole Pine Stands Affected by Mountain Pine Beetle. Second draft. 2006. Coates, K.D., DeLong, C., Burton, P.J., and Sachs, D.L. Bulkley Valley Centre for Natural Resource Research and Management.
- *Letter on log grade changes.* 2006. Bob Friesen. Ministry of Forests and Range, Tenures and Revenue Division.
- *Memorandum on log grade changes.* 2006. Doug Konkin. Ministry of Forests and Range, Deputy Minister.
- Methodology for Determining the Adjustment Factor to Reconcile Historical Cut Control Practices with the New Log Grades. 2006. BC Forest Service.
- *Urgent timber supply review for the Williams Lake timber supply area: Public Discussion Paper*. July 2006. BC Ministry of Forests and Range.
- *Williams Lake Timber Supply Area Rationale for Allowable Annual Cut (AAC) Determination.* 2003. Ministry of Forests.
- *Williams Lake Timber Supply Area Analysis Report.* 2001. Ministry of Forests.
- *Declaration of the Cariboo-Chilcotin Land-Use Plan as a Higher Level Plan: Filing and Notice.* 1996. BC Ministry of Forests.
- *Cariboo-Chilcotin Land Use Plan: 90-Day Implementation Plan, Final Report*, 1995, Province of B.C.
- *Anahim Round Table Sustainable Resource Management Plan.* March 2001. Integrated Land Management Bureau.
- *Chilcotin Sustainable Resource Management Plan Update*. Anticipated 2007. Integrated Land Management Bureau.
- *Horsefly Sustainable Resource Management Plan Update*. October 2005. Integrated Land Management Bureau.
- *South Chilcotin Sustainable Resource Management Plan Update*. September 1999. Integrated Land Management Bureau.
- *Williams Lake Sustainable Resource Management Plan Update*. October 2005. Integrated Land Management Bureau.

- *CCLUP Biodiversity Conservation Strategy*. 1996. Biodiversity Conservation Strategy Committee.
- *Update Note#5: An Integrated Mountain Pine-Biodiversity Conservation Management Strategy*. 2002. Biodiversity Conservation Strategy Committee.
- *Update Note #6: Procedures for Implementation of the Mountain Pine Beetle-Biodiversity Strategy to Address Current Attack During the Outbreak Phase*. 2004. Biodiversity Conservation Strategy Committee.
- *Update Note #7: Integration of the Biodiversity Strategy with a Douglas-fir Beetle Suppression Strategy-Interim Direction*. 2005. Biodiversity Conservation Strategy Committee.
- *Update Note #8: Strategy for Management of Mature Seral Forest and Salvage of Mountain Pine Beetle-Killed Timber*. 2004. Biodiversity Conservation Strategy Committee.
- *Update Note #9: Strategy for Management of Mature Seral Forest and Salvage of Mountain Pine Beetle-Killed Timber Within TFLs in the Cariboo*. 2004. Biodiversity Conservation Strategy Committee.
- *Update Note #10: Salvage Harvesting of Transition Old Growth Management Areas Heavily Attacked by Mountain Pine Beetle or Spruce Beetle*. 2005. Biodiversity Conservation Strategy Committee.
- *Update Note #13: Integration of the Biodiversity Strategy with a Spruce Bark Beetle Suppression Strategy – Interim Direction.* 2005. Biodiversity Conservation Strategy Committee.
- *Management Strategy for Mule Deer Winter Ranges in the Cariboo-Chilcotin. Part 1a: Management Plan for Shallow and Moderate Snowpack Zones*. 2002. CCLUP Mule Deer Strategy Committee.
- *Management Strategy for Mule Deer Winter Ranges in the Cariboo-Chilcotin. Part 1b: Management Plan for Transition and Deep Snowpack Zones*. 2006. Ministry of Forests and Range, Forest Science Program.
- *Structural Definitions for Management of Mule Deer Winter Range in the Interior Douglas-fir Zone*. 2000. Ministry of Forests, Cariboo Forest Region Research Section, Extension Note 25A18.
- *Timber Supply Analysis: Mountain Pine Beetle Impact on Interior Timber Supply Areas.* 2002. Timberline Forest Inventory Consultants Ltd., prepared for the Council of Forest Industries.
- *Background Information for Implementing Species At Risk Objectives under the Cariboo-Chilcotin Land-use Plan, in the Chilcotin Forest District.* 2005. Integrated Land Management Bureau.
- *Background Information for Implementing Species At Risk Objectives under the Cariboo-Chilcotin Land-use Plan, in the Central Cariboo Forest District.* 2005. Integrated Land Management Bureau.
- *Biodiversity Guidebook*. 1995. Ministry of Forests.

- Provincial-Level Projection of the Current Mountain Pine Beetle Outbreak: Update of the infestation projection based on the 2005 Provincial Aerial Overview of Forest Health and revisions to "the Model" (BCMPB v3). 2006. Eng, M., Fall, A., Hughes, J., Shore, T., Riel, B., Walton, A., and Hall, P.
- 2005 Overview of Forest Health in the Southern Interior Forest Region. 2005. Maclauchlan, L., Rankin, L., and Buxton, K.
- *Guidance on Landscape- and Stand-Level Structural Retention in Large-Scale Mountain Pine Beetle Salvage Operations.* 2005. Ministry of Forests and Range, Chief Forester.
- *Williams Lake Timber Supply Area Forest Health Strategy 2005-2006*. Ministry of Forests and Range, Central Cariboo and Chilcotin Forest Districts.
- *Southern Interior Timber Demand Supply Analysis*. Ministry of Forests and Range, Economics and Trade Branch. 2007.
- *Forest Stewardship in the Context of Large-scale Salvage Operations: An Interpretation Paper*. 2004. Ministry of Forests, Forest Science Program.
- *Hydrologic sensitivity of watersheds to MPB infestation in the B.C. Interior*. Summary of hydrologic consequences of the Mountain Pine Beetle infestation and salvage operations. Winkler, R., and D. Maloney, P. Teti, and J. Rex. Ministry of Forests and Range website.
- *Recommended operational procedures to address hydrological concerns.* 2004. Ministry of Forests and Range.
- *Chief Forester's response to MPB and potential 2007 flooding*. Letter from Chief Forester Jim Snetsinger dated March 16, 2007. Ministry of Forests and Range.
- Technical review and evaluation of current operating conditions through comprehensive discussions with staff of the BC Forest Service (BCFS) staff including the AAC determination meeting held in Williams Lake on *October 11-12, 2006*.

Role and limitations of the technical information used

Section 8 of the *Forest Act* requires the chief forester to consider biophysical, social and economic information in AAC determinations. Most of the technical information used in determinations is in the form of a timber supply analysis and its inputs of inventory and growth and yield data. These 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.

However, the analytical techniques used to assess timber supply are necessarily simplifications of the real world. There is uncertainty about many of the factors used as inputs into timber supply analysis due in part to variations in physical, biological and social conditions. While ongoing science-based improvements in the understanding of ecological dynamics will help reduce some of these uncertainties, technical information and analytical methods alone cannot incorporate all the social, cultural and economic factors relevant to forest management decisions nor do they necessarily provide complete answers or solutions to the forest management problems addressed in AAC determinations. However, they do provide valuable insight into potential outcomes of different resource-use assumptions and

actions—important components of the information that must be considered in AAC determinations.

In determining the AAC for the Williams Lake TSA I have considered and discussed known limitations of the technical information provided, and I am satisfied that the information provides a suitable basis for my determination.

Statutory framework

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

Guiding principles for AAC determinations

Rapid changes in social values and in the understanding and management of complex forest ecosystems mean there is always uncertainty in the information used in AAC determinations. In making the large number of periodic determinations required for British Columbia's many forest management units, administrative fairness requires a reasonable degree of consistency of approach in incorporating these changes and uncertainties. To make my approach in these matters explicit, I have set out the following body of guiding principles. In any specific circumstance where I may consider it necessary to deviate from these principles, I will explain my reasoning in detail.

Two important ways of dealing with uncertainty are:

(i) minimizing risk, in respect of which in making AAC determinations I consider particular uncertainties associated with the information before me and attempt to assess and address the various potential current and future, social, economic and environmental risks associated with a range of possible AACs; and

(ii) redetermining AACs frequently, in cases where projections of short-term timber supply are not stable, to ensure they incorporate current information and knowledge—a principle that has been recognized in the legislated requirement to redetermine these AACs every five years. This principle is central to many of the guiding principles that follow.

In considering the various factors that Section 8 of the *Forest Act* requires the chief forester to take into account in determining AACs I attempt to reflect, as closely as possible, operability and forest management factors that are a reasonable extrapolation from current practices. It is not appropriate to base my decision on unsupported speculation with respect to factors that could work to *increase* the timber supply—such as optimistic assumptions about harvesting in unconventional areas, or using unconventional technology, that are not substantiated by demonstrated performance—or with respect to factors that could work to *reduce* the timber supply, such as integrated resource management objectives beyond those articulated in current planning guidelines or the *Forest and Range Practices Act* (FRPA).

In many areas the timber supply implications of some legislative provisions, such as those for landscape-level biodiversity, remain uncertain, particularly when considered in combination with other factors. In each AAC determination I take this uncertainty into account to the extent possible in context of the best available information.

As British Columbia progresses toward the completion of strategic land-use plans, in some cases the eventual timber supply impacts associated with land-use decisions resulting from various regional and sub-regional planning processes remain subject to some uncertainty before formal approval by government. It is my practice not to speculate on timber supply impacts that may eventually result from land-use decisions not yet finalized by government.

In some cases, even when government has made a formal land-use decision, it is not necessarily possible to fully analyze 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, the establishment of resource management zones and resource management objectives and strategies for those zones. Until such implementation decisions are made it would be impossible to fully assess the overall impacts of the land-use decision. In such cases the legislated requirement for frequent AAC reviews will ensure that future determinations address ongoing plan-implementation decisions. Wherever specific protected areas have been designated by legislation or by order-in-council, these areas are deducted from the timber harvesting land base 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.

The Williams Lake TSA lies within the area covered by the Cariboo-Chilcotin Land Use Plan (CCLUP). Forest development is required to be consistent with aspects of the plan as they represent government objectives under both the *Forest Practices Code* and now the FRPA. These land use decisions have clarified many aspects of land and resource management and I refer to this where applicable in various components of this document.

Where appropriate, I will consider information on 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.

Some have suggested that, given the large uncertainties present with respect to much of the data in AAC determinations, any adjustments in AAC should wait until better data are available. I agree that some data are not complete, but this will always be true where information is constantly evolving and management issues are changing. Moreover, in the past, waiting for improved data created the extensive delays that resulted in the urgency to redetermine many outdated AACs. In any case, the data and models available today are superior to those available in the past, and will undoubtedly provide for more reliable determinations.

Others have suggested that, in view of data uncertainties, I should immediately reduce some AACs in the interest of caution. However, any AAC determination I make must be the result of applying my judgement to the available information, taking any uncertainties into account. Given the large impacts that AAC determinations can have on communities, no responsible AAC determination can be made solely on the basis of a response to uncertainty. Nevertheless, in making my determination, I may need to make allowances for risks that arise because of uncertainty.

With respect to First Nations' issues, I am aware of the Crown's legal obligations resulting from decisions in recent years made by the Supreme Court of Canada. I am aware of the Crown's legal obligation to consult with First Nations regarding asserted rights and title in a manner proportional to the strength of their claimed interests and the degree to which the

decision may impact these interests. In this regard, I will consider any information brought forward respecting First Nations' aboriginal interests, including operational plans that describe forest practices to address First Nations' interests. As I am able, within the scope of my authority under Section 8 of the *Forest Act,* I address those interests. When aboriginal interests are raised that are outside of my jurisdiction, I will endeavour to forward these interests for consideration to other decision-makers.

The AAC that I determine should not be construed as limiting the Crown's obligations under the Court's decisions in any way, and in this respect it should be noted that my determination does not prescribe a particular plan of harvesting activity within the Williams Lake TSA. It is also independent of any decisions by the Minister of Forests and Range with respect to subsequent allocation of wood supply.

Overall, in making AAC determinations, I am mindful of my obligation as steward of the forest land of British Columbia, of the mandate of the Ministry of Forests and Range as set out in Section 4 of the *Ministry of Forests and Range Act,* and of my responsibilities under the Code and under the *Forest and Range Practices Act.*

The role of scenarios

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

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

From a range of possible forecasts, one is normally chosen in which an attempt is made to avoid both excessive changes from decade to decade and significant timber supply reductions in the future, while ensuring the long-term productivity of forestlands. 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.

For this Williams Lake TSA timber supply analysis, no base case is presented as management practices are rapidly evolving in response to the MPB epidemic. Instead, three potential scenarios representing different assumptions about harvesting practices, shelf-life, etc. were explored in the analysis. In making this determination, I have considered these scenarios along with many other sources of information.

Scenarios for the Williams Lake TSA

Traditionally, several timber supply forecasts would be provided for the Williams Lake TSA, including a base case, spanning the next 250 years. This approach assumes a good understanding of the forest and how it will respond to harvesting. It would offer reasonable estimates of future timber supply based on careful observation of the past. This understanding of the forest has been severely challenged by the current MPB epidemic that is historically unprecedented in scope and severity.

There are many uncertainties regarding the MPB epidemic. It is unknown whether the current epidemic will consume all the mature lodgepole pine in the TSA and what proportion and age of younger stands will be impacted. Originally it was thought that the beetles attacked only mature lodgepole pine stands, however, they have been observed in stands as young as 20 years of age. It is also hard to predict how fast surviving trees will grow, how susceptible they will be to windthrow, how long it will take regeneration to become established under an overstorey of dead trees, and how long dead trees will retain commercial value.

Given these and other large uncertainties, a different approach to assessing timber supply was used in the timber supply analysis to support a timely, yet considered, AAC decision for the Williams Lake TSA. The timber supply analysis employed a spatial timber supply computer simulation model, developed, by the Forest Analysis and Inventory Branch using the Spatially Explicit Landscape Event Simulator (SELES), a high-level language created by Fall and Fall in 1996. Using the model, the projected spread of the MPB, shelf-life and harvesting were tracked at the stand level on an annual basis. The first 20 years were modelled in greater detail than in previous timber supply analyses for the Williams Lake TSA.

Exploration of mid-term timber supply was more general and analysis was limited to those non-pine stands with at least 65 cubic metres of volume today. It is acknowledged that mid-term timber supply will also be supported by stands less than 60 years of age that have already been planted or naturally regenerated. The current timber supply analysis also modelled three different harvesting scenarios, namely the 'maximum green volume' strategy, the 'maximum salvage' strategy, and the 'minimize non-recoverable losses' strategy. These strategies will be described and discussed in more detail later in this document.

Long-term (50 years or more into the future) timber supply was not considered in the analysis because it is unlikely to impact decisions about the harvest level directed at MPB-impacted pine stands over the next five years. This simplified the analysis by removing the need to speculate on the establishment and growth of regeneration under varying amounts of residual overstorey in MPB-affected stands.

Further, as mentioned previously, no base case was presented in the analysis. Instead, a number of possible harvest scenarios were explored which I discuss further under *mountain pine beetle epidemic*. In summary, these scenarios demonstrate that:

- over the next 20 years, the MPB is projected to kill almost 100 million cubic metres on the timber harvesting land base (about 26 years of harvest at the current AAC);
- almost all of the pine damage is projected to occur in stands with at least 70 percent pine content;
- most of the pine damage is projected to occur in stands located west of the Fraser River;
- harvesting will be unable to salvage all of the pine that is projected to die;
- the length of an uplift and how effective it is at salvaging and/or reducing the damage caused by the mountain pine beetle will be determined by how stands are scheduled for harvest;
- protecting mid-term harvest levels requires not salvaging some dead pine to retain live trees of other species;

- harvesting stands that contain less than 70 percent pine for the next fifteen years will reduce the mid-term timber supply; and
- within 20 years, harvest opportunities within the TSA are likely to decrease significantly.

From my review of the timber supply analysis, including detailed discussions with BCFS specialists, I accept the scenarios as providing a suitable basis of reference for use in this determination. All of the scenarios, and other information as noted below, have been helpful in the considerations and reasoning leading to my determination, which are documented as follows.

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

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

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

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

Composition of the forest

- *defining the timber harvesting land base*

The total area within the Williams Lake TSA is 4.9 million hectares with 3.1 million hectares classified as productive crown forest land. In the analysis, a series of deductions was made to the productive forest land base to account for those areas that are not available for timber harvesting including environmentally sensitive areas, steep slopes, low productivity, caribou no-harvest areas, lakes buffers, riparian reserves and wildlife tree patches.

For the analysis, a spatial approximation of the timber harvesting land base was used based on the comparative indices project (CIP 2) dataset. The dataset was created in 2003 by the former Ministry of Sustainable Resource Management (MSRM), Business Solutions Branch and refined for this analysis by incorporating new information such as wildlife habitat areas (WHAs), old growth management areas (OGMAs), woodlots, community forests and other no harvest areas.

The result of the refinement was a THLB representation totalling 1.86 million hectares or about 87 percent of the published TSR 2 figure; specifics about the individual factors considered are reviewed below. Having reviewed the methodology and assumptions, I am satisfied that the timber harvesting land base derived is appropriate for use in this determination.

- *woodlot licences and community forests*

There are currently 52 existing woodlots and two existing community forest agreements (CFAs) within the Williams Lake TSA. For the purposes of this AAC determination, the area allocated to woodlots and community forests was excluded from the crown forested land base.

I am aware that there is continued interest in establishing additional woodlots and CFAs across the TSA; however, no additional areas have yet been allocated nor volume apportioned. Having reviewed the information, I am satisfied that the existing woodlot licenses and community forests were appropriately modelled in the analysis.

- *old growth management areas*

Old growth management areas (OGMAs), have been spatially located through the development of Sustainable Resource Management Plans (SRMPs). The OGMAs are intended to augment existing reserves (e.g., riparian reserve zones) to achieve the old forest retention targets of the regional biodiversity conservation strategy. Currently, there are three designations for OGMAs: "permanent", "rotating" or "transition". Permanent OGMAs were the first OGMAs to be designated; harvesting is not permitted within their boundaries. For rotating OGMAs harvesting under specific conditions is permitted, and provides for replacement of OGMAs with less susceptible forest types. Transition OGMAs are intended to capture forests in certain landscape unit and biogeoclimatic zone combinations that were deficient in permanent OGMAs.

The current OGMAs, totalling 271 087 hectares (about 9 percent of the total productive crown forest land), have been accounted for in this analysis through their explicit removal from the timber harvesting land base; the flexibility for harvest of rotational OGMAs was not modelled in the analysis. Should harvesting occur in mature pine-dominated stands within rotating OGMAs, equivalent OGMA replacement areas of less susceptible forest types are expected to be identified.

I have reviewed the assumptions used in the analysis and am satisfied that the representation of OGMAs is reasonably consistent with the objectives under the CCLUP. However, I recognize in my "Reasons for Decision" that any harvesting in rotational OGMAs in the short term could represent a small corresponding downward pressure (up to one percent) on mid-term timber supply if replacement areas are associated with stands that are currently expected to contribute to timber supply in the mid-term.

- *critical fish habitat and other riparian concerns*

Critical fish habitat has been identified as an objective in the CCLUP and has been spatially located by specialists in the development of Sustainable Resource Management Plans (SRMPs). While some critical fish habitat is addressed in the timber supply analysis through deductions for riparian areas and OGMAs, the remaining habitat was not been explicitly modelled. The total habitat area is approximately 50 000 hectares, with about 7700 hectares situated within the THLB (or 0.4 percent of the THLB).

I note that the majority of critical fish habitat occurs within non-pine stands, which, due to harvesting priority for pine, was not identified for harvest in this analysis. Because areas associated with critical fish habitat should not be considered as available for harvest, the mid-term timber supply projected in the model may be overestimated by up to 0.4 percent. I have discussed this further in my "Reasons for Decision".

Composition of the forest

- *species and age class distribution*

The dominant tree species within the THLB are lodgepole pine, Douglas-fir, spruce, subalpine fir (balsam), western redcedar and western hemlock. Various deciduous (hardwood) species are also present on the land base. I have reviewed the information and assumptions and am satisfied that the species and age class distribution were appropriately represented in this analysis.

- *inventory volume estimates*

The current standard for forest inventory is the Vegetation Resource Inventory (VRI) which consists of two phases. Phase 1 is the forest cover mapping based on photo interpretation. Phase 2 consists of ground sampling which can be used to verify or adjust the photo-interpreted attributes of the mapped forest cover polygons. In some instances, VRI phase 2 is applied to the older forest cover inventory (FCI) mapping to verify or adjust polygon attributes.

Within the Williams Lake TSA, about 10 percent of the inventory was collected to VRI phase 1 and 2 standards under an Innovative Forest Practices Agreement (IFPA). The remaining 90 percent of the inventory was collected to FC1 standards and was ground sampled, projected for growth to 2005, and updated to account for disturbances (e.g., fire, harvest) to the end of 2004. Volume adjustments were determined separately for the IFPA area and for the FC1 area. The volume adjustments for the FC1 area used new volume adjustment compilation methods that resulted in an 11.5 percent increase over old inventory volumes. Forest Analysis and Inventory Branch staff indicate that they are satisfied that the updated compilation procedures are appropriate.

Because the IFPA area was compiled when the VRI phase 1 and 2 standards were applied, the new compilation methods were not used in the analysis. As a result, the use of older compilation methods suggests that volumes within the IFPA area may be underestimated. I have recognized in my "Reasons for Decision" that the use of an updated statistical volume adjustment on the VRI portion of the land base may represent a corresponding upward pressure on the short- and mid-term timber supply.

I am aware that in the previous timber supply review, the former chief forester noted an overestimation of yield in western redcedar and western hemlock forest types. Improved inventory information for these forest types was not essential for this analysis because the harvest priority in the model assumed that pine-leading stands would be harvested first. Interior western redcedar and western hemlock are currently being examined and improvements in net volume will be available for future determinations where a more thorough assessment of mid-term timber supply will be needed.

Expected rate of growth

- *growth rates*

This analysis provided a detailed assessment of short-term timber supply over the next 20 years, and a general assessment of mid-term timber supply limited to already established mature stands. The mid- (beyond 50 years) and long-term timber supply (80 years or more into the future) were not specifically considered in the analysis because it is not expected to impact decisions about the amount of pine-leading stands to harvest over the next 5 years. The consideration of only short and general mid-term timber supply removed the need to speculate on the establishment and growth of regeneration under varying amounts of residual overstorey. Nevertheless, I am mindful of long-term stewardship objectives and that such objectives are addressed in the consideration of short- and mid-term timber supply.

In the previous timber supply review, prior to the MPB epidemic, the chief forester recommended that staff collect and analyze more local data regarding site productivity estimates for the TSA. Although this information was not essential for this analysis, I note that it will be important in support of future determinations where a more thorough assessment of mid-term timber supply will be needed. Consequently, under "Implementation", I encourage BCFS staff and/or forest licensees to assess growth and yield on regenerated managed stands to verify and refine site productivity estimates.

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

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

Abnormal infestations

- *mountain pine beetle*

The majority of the pine volume within the Williams Lake TSA is considered mature (over 80 years old) and particularly susceptible to the MPB epidemic. Based on BCFS aerial surveys, the rate of expansion of the area under red attack has been in decline since 2003. From 1999 to 2000 there was no significant change in infestations. From 2000 to 2001 the rate of infestations grew 73 percent, from 2001 to 2002 the growth was 77 percent and from 2002 to 2003 the growth peaked at 89 percent. From 2003 to 2004 the infestation growth was 35 percent and from 2004 to 2005 the growth was 8 percent. Although there has been a decline in the rate of expansion, there has been an intensification of the pine damage within each survey polygon due to the increased beetle population with low winter mortality.

An immediate collapse of the beetle infestation does not appear likely since the recent trend of warm winters is expected to continue. Mortality projections indicate the infestation could last 10 more years with the potential to kill more than 80 percent of the merchantable lodgepole pine in the province's Interior. This unprecedented pine mortality affects available timber supply and habitat, as well as the associated economic and environmental values.

As preferred habitat decreases, forest health specialists note that the beetles are now attacking stands as young as 20 years old. Surveys indicate there are 145 000 hectares of stands between 20 and 55 years that have been impacted by the beetle. Within these stands, the average beetle attack level is 25 percent, with younger stands having significantly less attack than older stands. The impact of beetle attack in younger age classes was not accounted for in this analysis. Although the attacked younger stands represent less than 1.9 percent of the THLB, these stands were anticipated to contribute to the mid-term timber supply. While information about the mortality of young stands was not essential given the scope of this analysis, monitoring the condition of young stands will be important in support of future determinations where a more thorough assessment of mid-term timber supply will be needed. Consequently, under "Implementation", I encourage BCFS staff and/or forest licensees to assess mortality of young pine stands to provide reasonable estimates of losses.

I note that in the analysis, two critical recommendations for the next five years of harvest were made to minimize the impact to the mid-term timber supply. The first critical recommendation is that harvest must be focused in stands composed of at least 70 percent pine with high percentages of beetle infested or killed stems. The second critical recommendation is to focus harvest on the pine stands located west of the Fraser River.

The analysis projects that the majority of the remaining mixed species stands occur to the east of the Fraser River, and that these stands are important to the mid-term timber supply. The analysis also indicates that the supply of available stands containing at least 70 percent pine to the east of the Fraser River is nearly depleted. The model projects that 75 percent of the dead pine (about 73 million cubic metres) within the TSA will occur to the west of the Fraser River.

Within the forests to the west of the river, there are large areas of low volume stands that occur naturally, or are the result of the beetle infestation in the early 1980's. When these stands become infested, their decline to non-recoverable loss areas will be rapid. Therefore it is critical to harvest these stands before they become unmerchantable.

In conclusion, I acknowledge that there are many factors that will determine how the above two recommendations are implemented and have further discussed this in my "Reasons for Decision". I note that harvesting in the short term that is inconsistent with the critical recommendations could represent a corresponding downward pressure on mid-term timber supply, as does the unaccounted for mortality in young pine stands.

- *spruce bark beetle*

Based on BCFS aerial surveys of the Williams Lake TSA, the rate of growth of area infested with spruce bark beetle red attack has been in decline since 2003. Aerial surveys are generally conservative to account for the difficulty of mapping the gradual color change of spruce beetle infested trees and for the masking effect of the mountain pine beetle infested trees interspersed with spruce. From 1999 to 2000 the rate of infestations grew 77 percent; from 2003 to 2004 the growth peaked at 79 percent and from 2004 to 2005 the growth was 23 percent.

The decrease in growth of the area infested with spruce bark beetle is attributed to the intensive control programs utilizing trap trees and sanitation harvest. Winter mortality surveys conducted in 2006 indicate low adult mortality and high progeny to parent ratios, suggesting that the spruce bark beetle infestation will continue to impact mature spruce

stands. Unlike the mountain pine beetle, the spruce bark beetle infestations can be managed through the application of forest health measures. The spruce stands are anticipated to contribute to the mid-term timber supply therefore it is important that implementation of forest health measures be continued.

The management of spruce bark beetle may be limited by spruce beetle occurring in stands that are not economically viable for controlled harvest programs (e.g., moribund stands, stands accessed by water) and by the presence of western spruce budworm. The shelf-life of spruce beetle-killed stands is limited to one to three years due to the faster decay of spruce in moist to wet ecosystems. The majority of spruce-leading stands have high site indexes; if these stands are not harvested and re-forested promptly it will result in significant long-term losses in productivity.

The spruce beetle attacked stands have approximately 68 percent mortality rate and the total area impacted is about 35 500 hectares (or 1.9 percent) of the THLB. While some of the spruce bark beetle infested stands are within OGMAs or other no-harvest or modified-harvest areas, the majority of stands are situated within the THLB. The primary focus of the current timber supply review is pine-leading stands. As such, harvest priority in the timber supply model focused on high-risk pine and did not make allowances for spruce mortality; spruce-leading stands were not initially harvested in the model and were expected to contribute to the mid-term timber supply.

While the impact of the spruce bark beetle on the mid-term timber supply was not specifically reviewed in this analysis, it will be important in support of future determinations where a more thorough assessment of mid-term timber supply will be needed. Consequently, under “Implementation”, I encourage BCFS staff and/or forest licensees to monitor the incidences of spruce bark beetle, the viability of control programs and non-recoverable losses (NRL) in high site index stands.

I also acknowledge that while critical recommendations for the next five years of harvest were made with respect to mountain pine beetle, flexibility must be maintained to manage other forest health issues, such as spruce bark beetle, that will affect mid-term timber supply. The spruce bark beetle control program should be maintained with the goal of balancing the control program with the maintenance of the mid-term timber supply. I have recognized in my “Reasons for Decision” that harvesting in the short term that is inconsistent with this goal could represent a corresponding downward pressure on mid-term timber supply.

- *balsam bark beetle, Douglas-fir beetle and western spruce budworm*

BCFS aerial surveys of the Williams Lake TSA indicate that the rate of growth of area infested with balsam bark beetle red attack has been in decline since 2002. From 2001 to 2002 the growth peaked at 59 percent and from 2004 to 2005 the rate of growth was 18 percent.

Most of the infestations occur in high elevation inaccessible stands or in areas already excluded from harvest. As the balsam bark beetle occurs in trace or low infestations, there is no specific control program in place to manage balsam bark beetle. Salvage associated with the spruce bark beetle control program also often addresses balsam bark beetle infestations due to the mixture of spruce and balsam within this TSA. The expected range of attacked stands within the THLB is less than two percent. The timber supply analysis accounted for endemic mortality due to balsam bark beetle.

Based on BCFS aerial surveys of the TSA, the rate of growth of area infested with Douglas-fir beetle red attack has been in decline since 2003. From 2002 to 2003 the growth peaked at 65 percent, while in 2004 to 2005 the growth was 46 percent.

The decrease in growth is attributed to the intensive control programs utilizing trap trees and sanitation harvest. Winter mortality surveys conducted in 2006 indicate low adult mortality, high progeny to parent ratios and high green to red attack ratios, suggesting that the Douglas-fir beetle infestation will persist in impacting mature Douglas-fir stands. Similar to the spruce bark beetle infestations, the Douglas-fir bark beetle can be managed through the application of forest health measures. The Douglas-fir stands are anticipated to contribute to the mid-term timber supply therefore it is important that forest health measures are undertaken.

The management of Douglas-fir beetle may be limited by the existing drought conditions, the presence of the western spruce budworm, and the occurrence of Douglas-fir forest within constrained areas such as OGMAs, mule deer winter range and visual areas. The expected range of stands attacked by the Douglas-fir beetle within the THLB is less than two percent. The focus of this timber supply review is pine-leading stands; therefore the impact of the Douglas-fir bark beetle attack was not specifically accounted for in this analysis.

The rate of growth of western spruce budworm infestations within the TSA increased 79 percent from 2001 to 2002, 49 percent from 2002 to 2003, 40 percent from 2003 to 2004 and 25 percent from 2004 to 2005. While the rate of growth appears to be in decline when examining the number of hectares infested, the intensity of the budworm is increasing within smaller areas. An active forest health program is contributing to the management of the budworm. In 2006, the biological pest control agent, *Bacillus thuringiensis, kurstaki,* or Btk was aerially applied to 27 482 hectares of infested stands.

Western spruce budworm utilizes lodgepole pine, Douglas-fir, spruce, balsam and occasionally hemlock as host trees. Severe defoliation of mature stands does not typically result in mortality but causes volume losses and wood quality impacts due to reduced growth rates, stem deformation and dead tops and branches. When a mature stand is infested, the resulting loss of understory is significant.

The impact of the spruce bark beetle and the Douglas-fir beetle in spruce- and Douglas-fir-leading stands, which typically have uneven or layered stand structures, is compounded by the presence of western spruce budworm. The budworm causes severe defoliation in the understory of these stands, leading to very little or no young and intermediate advanced regeneration if the overstory is affected by beetles.

Similar to the spruce bark beetle and Douglas-fir beetle, western spruce budworm can be managed through the application of forest health measures. These measures include planned harvest to control the increased rate of spread of the spruce budworm and to capture the mortality of stands due to forest health factors, and the use of Btk. If the population of western spruce budworm collapses, there could be a small impact on the mid-term timber supply, if the outbreak continues to expand, there will be a much larger impact. Given the scale of the MPB infestation and the pine focus of the timber supply analysis, the impact of the western spruce budworm was not specifically accounted for in the model.

While the investigating the impact of the Douglas-fir beetle and the western spruce budworm on the mid-term timber supply was not essential for this analysis, it will be important in support of future determinations where a more thorough assessment of mid-term timber supply will be needed. Consequently, under "Implementation", I encourage BCFS staff and/or forest licensees to monitor the incidences of Douglas-fir beetle and western spruce budworm, the viability of control programs and non-recoverable losses.

While critical recommendations for the next five years of harvest were made with respect to mountain pine beetle, flexibility must be maintained to manage other forest health issues, such as Douglas-fir beetle and western spruce budworm, that will affect the mid-term timber supply. The Douglas-fir beetle and western spruce budworm control programs should be maintained with the goal of balancing the control program with the maintenance of the mid-term timber supply. I have recognized in my "Reasons for Decision" that harvesting in the short term that is inconsistent with this goal could represent a corresponding downward pressure on mid-term timber supply.

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

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

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

Expected time to re-establish stands

- *stand regeneration*

Not satisfactorily restocked (NSR) areas are those where timber has been removed, either by harvesting or by natural causes, and a stand of suitable forest species and stocking has yet to be established. Areas where the standard regeneration delay has not yet elapsed since harvesting are considered 'current' NSR and fluctuate with the amount of disturbance (e.g., harvesting, fires) currently taking place. Since 1987 there has been a legal obligation to reforest harvested areas. Where a site was harvested prior to 1987 and a suitable stand has not yet been regenerated, a classification of 'backlog' NSR is applied.

There are 96 000 hectares of current NSR in the TSA under licensee obligation to reforest. An additional 6000 hectares of backlog NSR was identified in the TSA. It is possible that some of this backlog is now restocked, as the silvicultural records may be out-of-date, or that some of it will never be treated because it is not economically viable. Uncertainty in this factor affects long-term timber supply.

Regeneration delay is the period between harvesting and the time at which an area becomes occupied by a specified minimum number of acceptable, well-spaced seedlings. In this analysis, an average regeneration delay of 2 years was assumed for all even-aged stands. The actual effect of the mountain pine beetle on regeneration delay will be dependent on site conditions and the harvest strategy implemented operationally.

Without harvesting, the analysis indicates that the MPB infestation could cause over half a million hectares of land to become non-recoverable loss area. The projected NRL areas in the Williams Lake TSA lie to the west of the Fraser River and have limited secondary structure that could contribute to the mid-term timber supply. While a detailed assessment

of the impact of the NRL and NSR areas on the mid- and long-term timber supply were not essential for this decision, it will be important in support of future determinations where a more thorough assessment of mid- and possibly long-term timber supply will be needed. Consequently, under "Implementation", I encourage BCFS staff and/or forest licensees to monitor the extent of non-recoverable losses and the advanced regeneration in these stands.

I have recognized in my "Reasons for Decision" that MPB-killed stands that are not harvested and subsequently not regenerated within two years as modelled could represent a corresponding downward pressure on the mid-term timber supply.

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

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

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

Silviculture

- *harvest systems*

The predominant harvesting system within the TSA is clearcut with retention (e.g., reserving Douglas-fir stems within pine- or spruce-leading stands). One exception is selective harvesting within Douglas-fir leading stands in ungulate winter range for uneven-aged stand management. Given the primary focus of the timber supply review was on pine-leading stands, a clearcut harvesting system was assumed in the analysis.

Several comments related to harvest systems were received during public input. The first point was that there was no discussion of partial cutting of mixed species stands to remove dead pine. The second point was to maximize the clean-up of dead and dying trees while providing maximum preservation of unattacked mature trees and all healthy understory. The third point was to utilize equipment designed to permit maximum retention of all healthy mature tress and healthy understory. The fourth point was to use single tree selection or small group selection as a silvicultural system.

Having reviewed the public comment, I note that the current timber supply analysis demonstrates that the majority of damage to pine trees will be in stands with at least 70 percent pine content. I note that the application of partial and selective harvest systems may provide logistical difficulties (e.g., immediate access, economics, damage to non-pine component) in these types of stands. While I encourage licensees to explore methods to capture pine while maintaining the non-pine content, where practicable, I do not foresee that such methods will be used extensively given current economics and practices. In conclusion, I am satisfied that harvesting systems were adequately represented in the analysis for the purposes of this determination.

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

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

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

Utilization

- *interior log grade changes*

In April 2005 new log grade changes were implemented for B.C.'s Interior. Under the previous grade system, a log was assessed at the scale based on whether the tree was alive or dead at the time of harvest. Under the previous log grade system, grade 3 endemic (a dead sawlog the result of 'normal' mortality observed in a mature stand) and grade 5 (dead tree with greater than 50 percent firmwood and log defects such as twists, knots and heart rot) were not charged to the AAC if harvested.

As a transition measure between the log grade systems, the renewable forest licence holders and the Ministry of Forests and Range agreed to utilize cut control adjustment factors. A memorandum outlined the factors and required a review of the adjustment factors as part of the next TSR process. With the conclusion of this timber supply review, the adjustment factors will no longer apply to the Williams Lake TSA.

Prior to the mountain pine beetle epidemic, the model used to estimate existing stand volume did not report the volume of dead timber that existed in a stand. Depending upon the state of forest health, a large volume of logs could have been harvested and utilized that had not been accounted for in the stand volume. As a result of changes to the log grade system, I have considered this dead volume in my AAC determination. There are three sources of information that can be used to estimate this volume: inventory audit plots, the harvest billing system or the cut control adjustment factors.

The inventory audit plots indicate that the potentially useful dead volume is approximately 6.4 percent of the green volume for the forested land base over 60 years of age. The harvest billing system indicates that the potentially useful dead volume is approximately 8.3 percent. The cut control adjustment factor for pine indicates that dead useful pine volume is 11.7 percent. Both the inventory audit plots and the harvest billing system are inclusive of all species while the cut control adjustment factor is specifically determined for pine.

I have considered the different sources of information and the focus on harvesting pine-leading stands and have concluded that existing stand volume estimates may be underestimated by up to 8 percent. As a result I have determined that short- and mid-term timber supply may be underestimated by up to 8 percent. I have discussed this further in my "Reasons for Decision".

- *utilization standards*

Utilization standards define the species, dimensions and quality of trees that are harvested and removed from an area during harvesting operations. In the analysis, a 30-centimetre maximum stump height and 10-centimetre minimum top diameter was assumed for all

species. In addition, for lodgepole pine, a 12.5-centimetre minimum diameter at breast height (DBH), and for all other species, a 17.5-centimetre DBH, was modelled.

These assumptions reflect the standards and licence requirements that were in place for nearly all licensees in the TSA. Slightly higher utilization standards exist for pulpwood agreement (PA) 16. PA 16 harvesting represents only a small portion (2.8 percent) of the overall harvest in the TSA therefore their utilization standards were not modelled.

As of October 2003, the requirement for agreement holders to cut and remove Crown timber was removed from the *Forest Act* though an amendment to Section 103.1. Instead of licensees having to cut and remove timber that meet or exceed the utilization standards, licensees have a choice (commonly referred to as "take or pay") in removing timber. A waste assessment payable to the government will be billed for any merchantable timber remaining on the cutblock; the waste assessment is based on the Timber Merchantability Specifications within the Provincial Logging Residue and Waste Assessment Procedure Manual. As MPB-infested trees decay and lose economic value, licensees may choose to leave more timber on the cutblock. Having reviewed the information and discussed it with BCFS staff, I am satisfied that the utilization standards were appropriately modelled in the analysis and are suitable for use in this determination.

- *minimum harvest criteria*

Minimum harvest criteria define the lowest stand volume, for modelling purposes, considered to be merchantable. In the timber supply analysis, stands were considered merchantable when they attained a minimum volume of 65 cubic metres per hectare. The harvest priority strategy, in addition to other forest requirements, result in the selection of stands harvested in the model.

The analysis projects that approximately 20 percent of the harvest will be in low volume stands, that is, stands between 65 and 100 cubic metres per hectare. Actual historic volume analysis illustrates that harvesting in stands less than 85 cubic metres per hectare typically occurs only under non-replaceable forest licenses (NRFLs)—the type of license anticipated to be utilized to harvest increased volume associated with an AAC increase.

I encourage BCFS district and regional staff to work with the Forest Analysis and Inventory Branch to monitor licensee performance on an annual basis in cooperation with forest licensees, and that I am provided with a report of these results in order to assess the effectiveness of NRFLs targeting low volume stands. I have recognized in my "Reasons for Decision" that harvesting that is inconsistent with targeting low volume stands may have a corresponding downward pressure on mid-term timber supply.

- *decay, waste and breakage*

This analysis accounts for decay, waste and breakage in two ways. Firstly, standard inventory adjustments and secondly through the use of shelf-life assumptions for MPB-impacted stands. The inventory approximates decay, waste and breakage of the trees within a stand using net volume adjustment factors (NVAFs). The NVAFs were developed in 1999 from random destructive sampling of trees during completion of the VRI phase 2 and do not reflect the current decay, waste and breakage experienced by pine infested with mountain pine beetle.

For MPB-infested stands the decay, waste and breakage factor assumed that trees were not affected by decay, waste and breakage (e.g., factor is 0 percent) until the assumed expiry of the shelf-life, when the factor became 100 percent. BCFS District staff have expressed concern that individual trees may exhibit greater variability in decay, waste and breakage than the fixed shelf-life for sawlogs would indicate (e.g., every tree will be merchantable based on its respective shelf-life). Therefore, billed volumes could be lower and more area would need to be harvested than was reflected in the analysis.

While the impact of the decay, waste and breakage factor on the mid-term timber supply was not a primary concern in this analysis, it will be important in support of future determinations where a more thorough assessment of mid-term timber supply will be needed. Consequently, under "Implementation", I encourage BCFS staff and/or forest licensees to monitor the decline of stands to provide more refined estimates of decay, waste and breakage for incorporation into future analyses.

I have recognized in my "Reasons for Decision" that if the decay, waste and breakage realized in some component of the stand is more rapid than inferred through the shelf-life assumptions in the model, it could represent a corresponding downward pressure on the short- and mid-term timber supply.

- *shelf-life*

For the purposes of this analysis, the term shelf-life will refer to the limited time during which commercially viable products (i.e., sawlogs) can be economically recovered from stands affected by forest health factors such as MPB. In this analysis, the shelf-life for sawlogs was assumed to be 5, 8 and 14 years. Three shelf-lives were provided to account for the differences attributed to the moisture regime of the affected stand. The longest shelf-life would be expected to occur in the drier ecosystems and the shortest in the wettest ecosystems. I note that while the shelf-life assumptions used in the model are likely reasonable for sawlogs, they may not be reflective of other forest products.

The previous MPB infestation that occurred in the Chilcotin Forest District was mainly in the dry ecosystems west of the Fraser River, and harvesting occurred for approximately 15 years after the collapse of the infestation. The timber supply analysis report prepared for the Council of Forest Industries (COFI) used shelf-life assumptions of 5, 10 and 15 years. I note that a number of shelf-life studies are underway and early results indicate that the greatest reduction in quality occurs within the first few years of the death of the tree. I am also aware that market conditions, milling technology and product demand play a large role in the ability of a given licensee to utilize varying qualities of fibre.

One of the critical recommendations for the next five years of harvest is to focus on the pine stands west of the Fraser River. These stands occur in drier ecosystems, to which the maximum shelf-life is applicable. However, infested or killed stands occurring in moister sites will likely be more productive and have been a higher priority for harvest by licensees. In conclusion, I recognize the high degree of uncertainty associated with shelf-life but find that it was reasonably represented in the analysis. The results of ongoing shelf-life studies will be required to support future determinations. Consequently, under "Implementation", I encourage BCFS staff and/or forest licensees to monitor the results of the shelf-life studies in order to provide reasonable estimates prior to the next determination.

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

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

(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

Non-timber objectives

The Ministry of Forests and Range is required under the *Ministry of Forests and Range Act* to manage, protect and conserve the forest and range resources of the Crown and to plan the use of these resources so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated. The *Forest and Range Practices Act* (FRPA) and other legislation provide for, or enable, the legal protection and conservation of timber and non-timber values. Accordingly, the extent to which integrated resource management (IRM) objectives for various forest resources and values affect timber supply must be considered in AAC determinations.

The timber supply analysis has addressed some IRM objectives through deductions in the timber harvesting land base. I have accounted for these factors in 'Composition of the forest.' In this section, I account for IRM objectives where the land base continues to contribute to timber supply but are subject to various forest cover and adjacency constraints.

- *cutblock adjacency / green-up*

To avoid concentrating harvesting-related disturbance in particular areas, operational practices limit the size of cutblocks and maximum disturbances (areas covered by stands of less than a specified height), and prescribe minimum green-up heights required for regeneration on harvested areas before adjacent areas may be harvested. Green-up requirements help to achieve objectives for water quality, wildlife habitat, soil stability and aesthetics. Adjacency, green-up and forest cover objectives guide harvesting practices to provide for a distribution of harvested areas and retained forest cover in a variety of age classes across the landscape.

In the analysis, in order to represent the desired conditions necessary to meet the various objectives in different areas consistent with the Cariboo-Chilcotin Land Use Plan (CCLUP), the timber harvesting land base was zoned for different values such as visual resources, mule deer winter range, etc. where varying forest cover requirements apply. The details are discussed for each of these values under the specific headings below.

To simulate large-scale salvage operations predicted as a result of MPB-related salvage, green-up requirements were applied to the Crown forested area outside of the more restricted visual areas, rather than just the IRM portion of the THLB, as is typically modelled. Green-up requirements were modelled as a forest cover requirement whereby a maximum of 40 percent of stands within a landscape unit could be less than 3 metres in height (approximately 15 years old).

I have discussed these requirements with staff and note that the application of this forest cover requirement is consistent with current management which provides for greater flexibility to provide for the salvage of MPB. I am therefore satisfied that the cutblock

adjacency / green-up considerations were appropriately modelled in the analysis and are suitable for this determination.

- *scenic areas*

The *Forest Practices Code* (the *Code*) and FRPA enable scenic areas to be designated and visual quality objectives (VQOs) to be established so that the visible evidence of forest harvesting can be kept within acceptable limits. Scenic areas recognized under the Code have been carried forward for the purposes of FRPA and need to be managed consistent with the requirements under the *Forest Planning and Practices Regulation.* Although VQOs have not been legally established within the Williams Lake TSA, the approved and draft SRMPs include management for visual resources areas (which are similar to the scenic areas) and recommended VQOs. These zones and objectives were modelled in the analysis as they reflect current practice and are consistent with existing FRPA legal requirements.

The current VQOs were accounted for in the analysis by modelling the maximum recommended allowable percent alteration by VQO category within a landscape unit. I am satisfied that the visual resource areas and visual quality objectives were appropriately modelled in the analysis and are therefore suitable for use in this determination.

- *landscape-level biodiversity*

Biodiversity is the diversity of plants, animals and other living organisms in all their forms and levels of organization. Landscape-level biodiversity can be conserved by maintaining forests with a variety of patch sizes, seral stages, and forest stand attributes and structures, across a variety of ecosystems and landscapes. Given other forest management provisions that provide for a diversity of forest stand conditions, old forest retention, as described in the CCLUP, is often considered a key landscape-level consideration.

The SRMPs were prepared to be consistent with, and help interpret, the direction provided in the CCLUP, including biodiversity requirements, as outlined in the Biodiversity Conservation Strategy and subsequent updates. The retention of old forests is being achieved through the management of OGMAs (considered and addressed under a separate factor) and no-harvest areas such as riparian reserves, critical fish habitat and caribou habitat. As described in previous factors, these areas have been accounted for within the THLB. The CCLUP also identifies the need to manage for mature forests. Targets for mature-plus-old forest cover requirements vary depending on Natural Disturbance Type (NDT), the biogeoclimatic ecosystem classification and the biodiversity emphasis option within each landscape unit. In the model the mature-plus-old targets were applied to the Crown forest area.

While some flexibility exists within the requirements to address forest health measures, BCFS staff indicate that harvesting practices are currently reflecting the old and mature-plus-old requirements. In conclusion, I am satisfied that the landscape-level biodiversity was appropriately modelled in the analysis and the information is therefore suitable for this determination.

- *stand-level biodiversity*

Wildlife tree patches were addressed in the CIP 2 dataset (discussed earlier under *defining the timber harvesting land base* section), through a reduction to the THLB. This reduction considered both area and yield accounting for WTPs in the previous timber supply analysis. The reductions for WTPs in the TSR 2 (2001) analysis are consistent with the *Landscape Unit Planning Guide*.

In December 2005 I provided guidance on landscape and stand-level retention to forest professionals to mitigate the impact of large-scale operations on other resource values such as biodiversity and hydrological function. In that document (referenced under "Information sources used in the AAC determination"), I provided a recommended proportion of stand-level retention based on opening size.

Within the Williams Lake TSA, analysis has indicated that extremely large contiguous areas of timber harvesting land base that are at least 70 percent pine content and considered merchantable are not equally distributed within the TSA. It is therefore unlikely that large contiguous clearcuts will be created due to the variability in merchantability of stands across the landscape west of the Fraser. This may tend to reduce the risk of extremely large harvest openings. In addition, district managers may decide to require additional retention to manage the risk. As such, specific considerations for enhanced retention were not modelled for the current TSR 3 analysis.

While information on licensees' consistency with the recommendations to incorporate enhanced levels of retention to mitigate the impact of large-scale salvage operations on biodiversity and hydrological function was not essential for this analysis, it will be important in support of future determinations where a more thorough assessment of mid-term timber supply will be needed. Consequently, under "Implementation", I encourage BCFS staff and/or forest licensees to monitor the extent of allowances to green-up and the levels of retention across the landscape. I also encourage the collaborative development of a landscape level retention strategy by a multi-stakeholder group, and that this group report on the extent to which they were able to follow those guidelines and prepare and implement retention plans prior to the next determination. In conclusion, I am satisfied that the higher levels of stand-level retention recommended in my 2005 guidance document do not pose a significant risk to short-term timber supply and I accept the assumptions regarding stand-level biodiversity as suitable for this determination.

- *hydrologic considerations*

The unprecedented scale of the mountain pine beetle (MPB) infestation and the widespread mortality of lodgepole pine stands are known to affect watershed and hydrological processes.

Stand mortality and salvage logging can impact watershed hydrology by affecting water yield (the total amount of water flowing out of a watershed), magnitude and timing of peak flows (the highest stream flows), erosion processes and sedimentation. The loss of pine foliage reduces snow interception and sublimation (the process of snow and ice changing directly into water vapor without first melting into water) which results in increased snow pack, and the reduced shade levels in dead pine stands may result in accelerated snow melt.

The magnitude of hydrologic change typically depends on the severity and time since attack; the presence and amount of understory vegetation; the extent of salvage logging within stands and across a watershed; the occurrence of fire; the physical characteristics of the watershed, and the weather.

BCFS research ecologists and hydrologists are actively engaged in research projects involving MPB and hydrology in the central interior. These include studies on watershed sensitivity, snow accumulation and melt, the effects of riparian harvesting on fish habitat and ecology of small streams, and assessments of forest types along S4 creeks in pine-leading stands.

In the timber supply analysis for the Williams Lake TSA, hydrologic considerations were not explicitly modelled. However, provisions for adjacency, green-up and other forest cover objectives (e.g., landscape-level biodiversity, caribou) were incorporated into the analysis and are discussed earlier under the appropriate sections. I note that in practice, these requirements will help to minimize hydrologic impacts by guiding harvesting operations and providing for a distribution of harvested areas and retained forest cover in a variety of age classes across the landscape.

I am aware that the timber supply analysis indicates that in order to preserve mid-term timber supply, a majority of the AAC must currently be focused in stands west of the Fraser River in stands of at least 70 percent pine volume. While this suggests that any increase in AAC will be intensified on a reduced area, I note that in general, the west side of the TSA is characterized by flatter terrain with lower precipitation, and may be less susceptible to hydrologic impacts. I also note that a significant proportion of the TSA—about 62 percent of the 4.1 million-hectare TSA—is outside of the timber harvesting land base and unavailable for harvest. Although much of this area will also be severely impacted by the MPB, there will be no associated salvage harvesting because of limitations related to access, low timber productivity or merchantability, riparian buffers and habitat values. I also note that my determination does not prescribe a particular pattern of harvesting activity within a given watershed of the TSA.

I am aware that Forest Practices Board recently released the results of an investigation that simulated the potential changes in stream flow following MPB attack and salvage harvesting in the Baker Creek watershed west of Quesnel. Although the study area is outside of the Williams Lake TSA, I note that the findings—that salvage logging of beetle-infested trees can significantly increase stream flows and the frequency of flood events—are broadly applicable to the Williams Lake TSA.

I acknowledge the increased risk associated with salvage harvesting and note that negative impacts can be mitigated through the implementation of specific BCFS planning guidance. I encourage government and industry forest planners and practitioners to implement these recommendations where practicable:

- Design Guidelines for Erosion and Sediment Control Plans (1998) provides methodologies and techniques to reduce erosion and sedimentation.
- Recommended Operational Procedures to Address Hydrological Concerns (2004) provides practitioners with guidance when planning and implementing large scale salvage operations.

- Guidance on Landscape and Stand Level Structural Retention on Large Scale MPB Salvage Operations (2005) provides recommended strategies for mitigating watershed impacts.
- Chief Forester's response to MPB and potential 2007 flooding (March 2007) provides recommendations for planning and practice aimed at mitigating environmental impacts of salvage operations in beetle-infested areas.

In addition, I note that the CCLUP includes fisheries and hydrology components which aim to maintain and restore fish and other aquatic resources, as well as maintain hydrologic functions within watersheds. In major sub-basins including key watersheds in the eastern portion of the Williams Lake TSA, where timber harvesting exceeds 25 percent, the CCLUP requires that watershed assessments be completed using accepted procedures.

In conclusion, I have reviewed the information regarding hydrologic implications and acknowledge that there are risks associated with salvage harvesting in beetle infested areas. I request that BCFS staff in cooperation with licensees and Ministry of Environment specialists, continue to investigate, monitor and report to me regularly on the impacts of MPB-infested stands and salvage harvesting operations on hydrology over the course of the this determination period. The results of any studies and assessments will be incorporated into the next analysis and considered in future determinations. If additional significant new information is made available to me with respect to hydrologic implications on which I have predicated this decision, then I am prepared to revisit this determination sooner than the five years required by legislation.

- *species at risk – identified wildlife management strategy*

The province's Identified Wildlife Management Strategy (IWMS) addresses plant communities, species at risk, and regionally significant species. "Identified wildlife" are wildlife species and plant communities that have been established as requiring special management. Identified wildlife can be protected through the establishment of wildlife habitat areas (WHAs) with corresponding objectives or general wildlife measures. The objectives or general wildlife measures may preclude or constrain timber harvesting activity depending on the requirements of individual identified wildlife species or communities.

Government policy direction limits the timber supply impact of the IWMS provincially to one percent of the THLB. Operational policy direction has been to initially allocate the one percent impact equally to each forest district with acknowledgement that this approach can be refined if warranted. Impacts greater than one percent can still be addressed by government if required to protect species at risk, but using other tools such as land use decisions.

In the Williams Lake TSA, 21 species at risk and 4 plant community at risk are formally recognized by the Ministry of Environment (MOE) through provisions under FRPA via a 2004 order and a recent June 2006 update. Thirty-six wildlife habitat areas and associated general wildlife measures have been established for four wildlife species. The CCLUP also provides management direction for seven wildlife species.

The established WHAs were accounted for in the model but management for other habitat areas was not modelled. BCFS and Integrated Land Management Bureau (ILMB) staff indicate that there is sufficient flexibility in the analysis scenarios to accommodate the

management of habitat for other species. The species at risk requirements are expected to fit within the balance of the CCLUP timber targets and produce no additional long-term implications on the timber supply. Having reviewed the information and assumptions, I am satisfied that the analysis appropriately accounted for the identified wildlife management strategy and is therefore suitable for use in this determination.

- *mule deer winter range (MDWR)*

Mule deer are at the northern most extent of their continuous distribution; the MDWR occupies about 149 000 hectares of the THLB of the Williams Lake TSA. There are 48 recognized MDWRs that are entirely or partially situated within the TSA; suitable winter habitat is limiting to their population size. Within MDWR, forests need to be managed to maintain or promote Douglas-fir and to maintain and enhance the retention of large, old trees that provide snow interception and litter fall to maintain winter habitat. These conditions can be managed through light selective harvesting.

Winter range has been mapped and plans have been legally established through the Government Actions Regulation. I note that the plans are consistent with the direction of the CCLUP, including Part 1a and 1b of the Management Strategy for MDWR in the Cariboo-Chilcotin.

I note that the MDWR within the Williams Lake TSA is located in Douglas-fir-leading stands within which there is anticipated to be very little harvest during the next 10 to 20 years. The analysis appropriately assumed a short-term focus on stands of at least 70 percent pine. Having reviewed the information and assumptions, I am satisfied that the mule deer winter range was appropriately modelled in the analysis and have made no adjustments.

- *caribou*

Within the TSA there are two distinct populations of caribou: the northern caribou herd which is found in the west part of the TSA and the mountain caribou herd which is found in the east part of the TSA. Both northern and mountain caribou are dependent on lichen as their food source; the northern herd's preferred source is terrestrial (e.g., ground growing) lichen while the mountain herd prefers arboreal (e.g., growing on trees) lichen. As the landscape is modified by harvesting and by mountain pine beetle or other forest health issues, there will likely be an impact on the availability of mature lichen. The level of impact to the caribou resulting from the reduced availability of lichen is unknown.

Suitable winter habitat is important to maintaining caribou populations. Disturbance such as snowmobiling in key habitat or access created during salvage operations can affect the viability of the herds. The CCLUP provides direction for maintaining habitat values for caribou while the Identified Wildlife Measures Strategy has provided for the establishment of 22 WHAs for both northern and mountain caribou.

The model used in the analysis focused on harvesting stands composed of at least 70 percent pine. A forest cover requirement was applied in the model to simulate caribou habitat whereby a maximum of 11 percent of the THLB within the modified harvest area could be less than 20 years old. While the THLB area associated with the modified harvest area of the caribou habitat occupies 114 762 hectares, it is difficult to determine the percentage impact to the THLB due to the modified harvest.

I am advised that the northern caribou herd will likely be impacted by harvesting and the impact will be dependant on the intensity and extent of mortality and the harvesting strategy implemented. While information on the impact to northern caribou was not available for this analysis, it will be important in support of future determinations where a more thorough assessment of mid-term timber supply will be needed. Consequently, under "Implementation", I request that BCFS staff and/or forest licensees monitor the impact of large-scale salvage operations on the northern caribou.

Mountain caribou are listed as a species at risk with less than 2000 animals in the world, almost all of which live in B.C. The mountain caribou herd is anticipated to be little effected by increased harvesting related to the MPB because caribou habitat does not fall within high MPB-infested areas. Consistent with direction from the Species at Risk Co-ordination Office (SaRCO), the Provincial Mountain Caribou Science Team has developed recovery options for threatened mountain caribou herds. I am aware that SaRCO has proposed management in the Williams Lake TSA that suggests an impact equivalent to 1.26 percent of the THLB.

However, to be consistent with my guiding principles, I am unable to speculate on the decision to implement these management guidelines. While I am mindful of the SaRCO proposed management option, I recognize that in the short term given the MPB infestation, such a level of change will not have implications on the current AAC decision. In conclusion, I am satisfied the current management for mountain and northern caribou was appropriately modelled.

- *other wildlife*

Wildlife such as moose and small furbearers are addressed by various objectives in the SRMPs, but were not specifically accounted for in the analysis because their broad distribution within the TSA is not anticipated to impact timber supply. It is expected that the management for other wildlife will be met through the application of landscape-level biodiversity targets, WHAs, MDWRs, OGMAs and other areas where harvest is limited or not permitted. The strategic placement of non-recoverable loss areas and increased levels of retention could also provide for the management of wildlife. Having reviewed the assumptions, I am satisfied that the needs of wildlife other than those specifically referenced in this analysis has been adequately accounted for.

- *cultural heritage resources*

A cultural heritage overview (literature review) was conducted in 1997 and provides information on issues such as historical patterns of band membership, subsistence, settlement patterns and cultural practices. An archaeological overview assessment (AOA) was completed for the TSA in 1998 and is used to help determine where on-the-ground archaeological impact assessments (AIA) are required. Some band specific traditional use studies (TUS) were completed in 1998 and 2001. A small number of archaeological areas identified through AIAs or TUSs have been incorporated into wildlife tree patches.

In addition, the SRMPs include objectives related to the management of cultural heritage resources. BCFS staff will continue to consult with First Nations concerning such sites identified through AIAs, TUSs, and the evidence adduced in the Xeni Gwet'in Aboriginal title and rights litigation, and any such sites which may, in future, come to light through planning or forest operations, in connection with future statutory decisions. In conclusion,

I am satisfied that cultural heritage resources were appropriately accounted for in the analysis.

- *CCLUP / sub-regional planning*

Strategic land use plans such as the Cariboo-Chilcotin Land Use Plan (CCLUP) provide context and direction for forest operational planning by identifying objectives and targets for the management of various forest resources. Various strategies, documents and sub-regional sustainable resource management plans (SRMPs) have been prepared to help implement the direction provided in CCLUP, including the Horsefly, Williams Lake, South Chilcotin, Anahim and Chilcotin SRMPs. The CCLUP and SRMPs were used in the analysis when accounting for various resource values. I am satisfied that the CCLUP and SRMPs have been appropriately modelled and/or considered in this analysis.

The Ministry of Forests and Range (MOFR), the Ministry of Environment (MOE) and the Integrated Land Management Bureau (ILMB) are seeking legal protection of critical elements of the SRMPs. MOFR and MOE will seek protection for some elements under the Government Actions Regulation of the *Forest and Range Practices Act* while ILMB will seek protection for other elements under the Land Use Objectives Regulation of the *Land Act*. As one of the critical elements, the areas of special concern, identified in the approved Anahim Round Table SRMP will become legally protected.

There are two types of areas of special concern: community areas of special concern (CASC) and one goal 2 area. The creation of the goal 2 area is consistent with the CCLUP's protected area process while the creation of the CASC areas is consistent with the SRMP process. Although these areas have not yet been legally designated, I find that these areas can be considered to be balancing the current CCLUP targets. If these areas are not the areas eventually designated, the expectation in order to meet the CCLUP objectives would be that other equivalent areas would be designated. As such, I am satisfied that explicitly removing these areas is appropriate for the modelling the objectives and reasonable for the purposes of this determination.

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

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

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

<u>Other information</u>

- *innovative forest practices agreement*

In September 2006, Tolko Industries Ltd. applied for an increase in their AAC on forest license A20018 under their innovative forestry practices agreement in accordance with Section 59.1 of the *Forest Act*. The regional manager will review the application and a determination is expected in the spring of 2007. Information contained in the application for an AAC increase does not significantly influence my view about the current land base or management as presented for this Section 8 AAC determination.

As noted in my guiding principles, I will consider information on the types and extent of planned silvicultural practices. However, as the IFPA holder's implementation of the

proposed management may be dependent on the regional manager's determination, I will not speculate on the proposed forestry practices.

- *small scale salvage program*

The small scale salvage program (SSSP) is being implemented by the BCFS Southern Interior Forest Region, and the Chilcotin and Central Cariboo Forest Districts through the existing salvage non-replaceable forest licenses (SNRFLs) and future plans for more SNRFLs and forestry licenses to cut. The SSS program has been very active in the eastern portion of the TSA for several years, with a five year accumulated harvest of about 0.75 million cubic metres.

Harvesting associated with SSSP was accounted for in this analysis through a reduction factor that was intended to be applied to the pine-leading stands in several landscape units in the eastern portion of the TSA. However, the application resulted in an unintentional reduction of volume in non-pine leading stands in these landscape units. This latter reduction in volume can be accounted for by considering that there will be additional volume available for the mid-term timber supply.

While the SSSP historically targeted pine beetle attacked volume, the trend in the past year has been for the majority of the program to target fir and/or spruce bark beetle attacked volume. The short-term implications of SSSP have been appropriately modelled in this analysis.

- *harvest priorities*

The analysis examined the implications of three different harvest strategies: "maximum green volume", "maximum salvage" and "minimize non-recoverable loss". For each strategy, the model harvested stands with at least 70 percent pine content for the duration of the uplift. The maximum green volume strategy was intended to reduce the loss in value by harvesting stands with at least 70 percent pine before stands are attacked by the beetle. The model focused on the stands containing the highest unattacked volume in the shortest time possible.

The other two strategies are based on when stands experience non-recoverable losses. For the purposes of the analysis, this is defined as the point when stands are no longer considered economically harvestable, or are equal to or less than 65 cubic metres per hectare. The difference between the two strategies is that the "maximum salvage" strategy harvests the stands with the most dead volume first while the "minimize non-recoverable loss" strategy harvests stands that are predicted to experience higher NRLs the following year.

The minimize NRL strategy was intended to minimize the area of stands that become NRL by focusing harvest on the stands before the green merchantable volume declines below 65 cubic metres per hectare. This is important west of the Fraser River where there are extensive areas of low volume stands. The prediction as to when stands will become NRL is based on the amount of attack that has occurred and the length of time the dead trees have been left unharvested. This strategy requires more planning and better information on stand conditions than the maximum salvage strategy, therefore it is less likely to be operationally implemented.

The strategies represent three possible scenarios for harvest; analysis indicates that harvesting in at least 70 percent pine stands for as long as possible will have positive

impacts on the mid-term timber supply. Therefore it is likely that the maximum salvage strategy will represent the most feasible solution. I have recognized in my "Reasons for Decision" that harvesting in the short term that is inconsistent with the maximum salvage strategy could represent a corresponding downward pressure on mid-term timber supply.

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

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

Rates of harvest

- *alternative short-term harvests for salvaging stands with at least 70 percent pine*

The total volume and the dead pine volume harvested in stands with at least 70 percent pine were examined at three different rates of harvest for each of the three harvest strategies. The 'maximum salvage' and the 'minimize NRL' strategies yielded similar results while the 'maximum green' strategy results indicated much lower harvesting of total volume and dead pine volume.

The maximum salvage strategy achieves almost as much harvest in dead pine as the maximum green strategy does in total volume harvested. The maximum green strategy would be expected to yield a higher economic return because the proportion of dead volume to total volume is much lower. More green pine volume, which has higher lumber recovery factors and also higher lumber grade profiles, would be harvested under this strategy. The maximum green strategy would provide a short-term higher economic return but would not maximize the dead pine resource, which would contribute to more non-recoverable loss across the land base. I have recognized in my "Reasons for Decision" that harvesting in the short term that is inconsistent with the maximum salvage strategy would represent a corresponding downward pressure on mid-term timber supply. It is also clear that the higher the short-term harvest, the shorter the time dead stands are allowed to degrade and to possibly become non-recoverable.

- *uncertainty in the range of outcomes*

The prioritization of stands for harvest has a significant impact on the mid-term timber supply, regardless of whether the AAC is increased. There are currently over 200 million cubic metres of mature timber within the TSA; within 20 years, the harvestable inventory will decline below 90 million cubic metres. The harvest rate and strategy will determine whether the mid-term inventory is closer to 50 or 80 million cubic metres; if harvest is concentrated in stands with at least 70 percent pine content, the mid-term inventory will be higher than if the short-term harvest has a larger non-pine component.

The minimize NRL strategy conserves the greatest mid-term inventory, the maximum salvage strategy is slightly less effective and the maximum green strategy is significantly less effective at conserving the mid-term timber supply. The analysis indicates that as the annual harvest level is increased above 5.5 million cubic metres, the mid-term timber supply associated with the minimize NRL strategy is little different from the mid-term timber supply projected in the maximize salvage strategy. The rate of harvest and the harvest strategy can make up to a 30 percent difference in mid-term inventory.

The minimize NRL strategy would be difficult to implement as it would require intensive planning and certainty about the year of infestation, the impact of infestation and shelf-life. I have recognized in my "Reasons for Decision" that the maximum salvage strategy is feasible for implementation and will be significantly more effective at protecting the mid-term inventory than the maximum green strategy.

- *mid-term timber supply*

The analysis did not explicitly model the mid-term timber supply but did estimate the length of time a potential uplift could be in place for a given rate of harvest and harvest strategy, assuming harvest in stands with at least 70 percent pine content. For each 1 million cubic metres per year in increase to the AAC, for each harvest strategy, the length of the uplift decreased by two years due to the depletion of stands with at least 70 percent pine.

The longer the harvest is concentrated in stands with at least 70 percent pine content, the higher the mid-term timber supply. Almost as important, the higher the percentage of dead pine in a block, the longer the uplift can be maintained. As harvest is concentrated in the high percentage pine stands, the lower percentage pine stands and the non-pine stands continue to accumulate volume. The mid-term timber supply is dependent on the progression of the epidemic and the rate of harvest and harvest strategy. A reduced timber supply is expected to occur within 20 to 30 years, this is when the mid-term volume would be expected to contribute to the harvest.

The analysis shows that the best course of action is to implement the maximum salvage strategy within at least 70 percent pine stands for as long as possible. The monitoring of the use of this strategy will be important in support of future determinations where a more thorough assessment of mid-term timber supply will be needed. Consequently, under "Implementation", I encourage BCFS staff and/or forest licensees to implement the maximum salvage harvest strategy and to monitor the strategies' effectiveness in maximizing the mid-term timber supply.

I have recognized in my "Reasons for Decision" that the maximum salvage strategy produces a higher mid-term timber supply than the maximum green volume strategy because it is targeting dead volume.

- *impact of a partition*

Pursuant to Section8(5) of the *Forest Act*, the chief forester may specify portions of the allowable annual cut attributable to different types of timber and terrain in different parts of Crown land within a timber supply area. The 2002 AAC determination for the Williams Lake TSA included four partitions: conventional (main TSA), mountain pine beetle, western supply blocks, and problem forest types (pulpwood agreement 16).

A sensitivity analysis was performed that focused the current MPB partition of 850 000 cubic metres on stands with at least 70 percent pine and at least 30 percent dead as stipulated by current non-replaceable license requirements. The remainder of the harvest was focused on the highest volume stands of any species. This analysis reduced the merchantable growing stock in 20 years by 30 percent when compared to the maximum green strategy (which is itself the least favourable scenario for medium-term timber supply).

The analysis clearly indicates that regardless of the partitions, dead trees in stands with at least 70 percent pine must be harvested under all licenses. Flexibility to manage other pest species by harvesting dead trees of species other than pine, especially to protect the mid-term, must also be permitted. This information will be important in support of future determinations where a more thorough assessment of mid-term timber supply will be needed. Consequently, under "Implementation", I encourage BCFS staff and/or forest licensees to focus the entire AAC on harvesting in stands with at least 70 percent pine content.

I have recognized in my "Reasons for Decision" that regardless of partitions, it is clear that dead trees in stands with at least 70 percent pine stands must be harvested under all licenses to protect the mid-term timber supply.

- *the council of forest industries report*

The Council of Forest Industries released a report in March 2006 that outlines some strategic timber supply outcomes for 18 timber supply areas within the B.C. interior. For the Williams Lake TSA, the analysis assumed that MPB infested all stands with at least 40 percent pine and that shelf-life was 5, 10 or 15 years depending on the ecosystem moisture. As with the timber supply review analysis, the COFI report indicated that focussing the AAC into the harvest of pine stands provided the best mid-term outcome. The COFI report also indicated that increasing the AAC allows for salvaging of MPB affected stands without detrimental long-term impacts. I am satisfied that the COFI report supports the general management direction suggested by the outcomes in the timber supply review analysis for the Williams Lake TSA, and have considered it in this determination.

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

(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

<u>Economic and Social Objectives</u>

- *economic and social objectives of the crown*

The Minister has expressed the economic and social objectives of the Crown for the province in a letter dated July 4, 2006 to the chief forester.

The letter stresses the importance of a stable timber supply while being mindful of other forest values. The letter also notes that much of the interior of B.C. is in the midst of an unprecedented outbreak of the mountain pine beetle, which raises great challenges for communities affected by the epidemic. The status, progression and implications of the mountain pine beetle infestation is the critical issue for consideration in my determination of the AAC for the Williams Lake TSA.

The letter also highlights objectives in the B.C.'s Mountain Pine Beetle Action Plan 2005-2010, that are applicable for areas of the interior including the Williams Lake TSA, such as 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.

Regarding long-term economic sustainability, I note that the timber supply analysis provided me with three different harvesting scenarios and suggested that harvesting in at least 70 percent pine stands for as long as possible will have positive impacts on the mid-term timber supply. I have considered the implications of the analysis and these scenarios in making my determination. With regard to protecting other values identified in land use plans, I noted previously in this document that the CCLUP and SRMPs were used in the analysis when accounting for various resource values.

The minister also asks in the letter that a realistic assessment of timber volumes that can be utilized economically in MPB affected areas is needed and that I examine factors that affect the demand for 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. In this regard, I am aware of a recent BCFS analysis of timber demand and supply in the Williams Lake, Quesnel and 100 Mile House TSAs. The analysis suggests that there is the potential for an oversupply of volume should the AAC increase be targeted towards lumber production. I note that the AAC that I determine is independent of the apportionment process and the issuing of licenses. I also acknowledge the emerging opportunities and recent interest in non-lumber products such as bioenergy. The letter also refers to local objectives as expressed by the public. I acknowledge the many thoughtful comments received on the Public Discussion Paper and have discussed them elsewhere in this rationale under the appropriate factor. In addition, some public comments indicated a concern with sawlogs being the only merchantable use of the pine resource in the current TSR 3 analysis. This analysis considered sawlogs to be the only merchantable use of the pine resource because there has been no proposal in the Williams Lake TSA for alternative products. Should a market for alternative products develop in the Williams Lake TSA, I will reflect this in future determinations. I also encourage BCFS staff to be mindful of the potential for depressing the value of sawlogs when issuing new licenses.

- *community implications*

The forest industry is the main economic driver in the Williams Lake TSA. There are several lumber manufacturing, re-manufacturing and value-added manufacturing facilities, as well as a pellet plant and a wood waste fuelled electric generating plant within Williams Lake. Some of the manufacturing facilities associated with major licenses have made significant investments to prepare for the processing of unprecedented amounts of mountain pine beetle infested timber.

The communities within the TSA are dependent on forestry and the continued availability of timber supply. Within the communities are a number of small license holders, such as woodlot licenses, that are being affected not only by the economic reality of the availability of large volumes of beetle infested pine trees on the market, but with the mature pine on their small area based licenses being devastated by the epidemic. The rate of spread of the epidemic dictates that the pine must be removed on a large scale in order to salvage the resource while it is economically viable and to re-forest these areas as soon as possible. I am satisfied that the community implications have been appropriately considered in this analysis.

- First Nations consultation

Ten First Nations have communities within the Williams Lake TSA. Four are Secwepemc (Shuswap) communities – Xats'ull (Soda Creek), Xatl'tem/Stwecem'c (Dog Creek/Canoe Creek), Esketemc First Nation (Alkali Lake) and T'exelc (Williams Lake). Five are Tsilhqot'in (Chilcotin) communities – Tl'esqox (Toosey), Tl'etinqox (Anaham), Yunesit'in (Stone), Xeni Gwet'in (Nemiah Valley) and Tsi Del Del (Alexis Creek). One is a southern Carrier community – Ulkatcho.

Twelve First Nations that assert traditional territories in the Williams Lake TSA do not reside within the TSA. Three are Secwepemc (Shuswap) – Tsq'escen (Canim Lake), High Bar, and Whispering Pines/Clinton. One is Tsilhqot'in (Chilcotin) – 'Esdilagh (Alexandria). Four are southern Carrier – Lheidli T'enneh, Lhtako (Red Bluff), Nazko, and Lhoosk'uz Dene (Kluskus Band). One is Stl'atl'imx (Lillooet) – Ts'kw'aylaxw (Pavilion). Two are Coast Salish – Homalco and Nuxalk, and one is Kwakiutl – Da'naxda'xw/Awaetlala.

Some of the First Nations noted above are involved in forestry activities within the TSA including harvesting, silviculture and fire fighting, and have frequently expressed an interest in increasing their involvement. The Esketemc First Nation (Alkali Lake) has a woodlot, community forest and two non-replaceable forest licences. The Xats'ull (Soda Creek) First Nation has a woodlot and a community forest. The Xatl'tem/Stwecem'c (Dog Creek/Canoe Creek), Tl'esqox (Toosey) and T'exelc (Williams Lake) bands have woodlot licences. Ulkatcho has three non-replaceable forest licences and Tsi Del Del (Alexis Creek) has a joint non-replaceable forest licence with Tolko. The Tsilhqot'in Nation jointly manages a non-replaceable forest licence with West Fraser and Tl'etinqox (Anaham) has two non-replaceable forest licences that are managed in co-operation with Sigurdson Brothers. Several of these First Nations also hold non-replaceable forest licences in neighbouring TSAs.

The following First Nations have signed Forest and Range Agreements(FRAs) or Interim Agreements for Forest and Range Opportunities (FROs): Tsq'escen (Canim Lake), Xatl'tem/Stwecem'c (Dog Creek/Canoe Creek), Esketemc First Nation (Alkali Lake), Tletinqox (Anaham), Lhtako (Red Bluff), Nazko, Lhoosk'uz Dene (Kluskus Band), Ts'kw'aylaxw (Pavilion) and Xats'ull (Soda Creek). The following First Nations have entered into negotiations for FRA or FROs: T'exelc (Williams Lake) and High Bar.

Under the B.C. Treaty Process, agreements-in-principle are being negotiated with the Northern Shuswap Tribal Council (members of which are Tsq'escen (Canim Lake), Xatl'tem/Stwecem'c (Dog Creek/Canoe Creek), Xats'ull (Soda Creek), and T'exelc (Williams Lake)), Esketemc First Nation (Alkali Lake), and Nazko.

The Chilcotin and Central Cariboo Forest Districts jointly consulted with First Nations regarding this timber supply review. The consultation process included the following actions.

- A letter was sent to affected First Nations, that is, those with communities or asserted traditional territory in the TSA in April 2006, advising of the upcoming timber supply review to determine the need for an AAC increase in order to salvage losses due to the mountain pine beetle.

- A fax and/or e-mail was sent to affected First Nations in July 2006 notifying of the public discussion paper being released and providing dates for information sessions.
- A letter was sent to affected First Nations in July 2006 with the public discussion paper attached and an invitation to attend an information meeting in August.
- A fax and/or e-mail was sent to affected First Nations in August 2006 to remind of the information sessions.
- Information sessions were held in August with community representatives from the Tsilhqot'in Nation, the Secwepemc First Nations, the Southern Carrier Nation and the Ulkatcho First Nation.
- A fax and/or e-mail was sent to affected First Nations in August offering to meet again about the public discussion paper and to solicit comments on impacts to aboriginal interests.
- A fax and/or e-mail was sent to affected First Nations in September to remind of the deadline for comments on impacts to aboriginal interests.
- Information sessions were held in September with the Xatl'tem/Stwecem'c (Dog Creek/Canoe Creek) and T'exelc (Williams Lake).
- A notification letter sent in October to Ts'kw'aylaxw (Pavilion) and Da'naxda'xw/Awaetlala outlining the timber supply review and consultation process to date. Neither First Nation had been included in the previous correspondence as their claimed traditional territories within the Williams Lake TSA are very small.

The following First Nations provided comments related to the timber supply review process. Comments were recorded at information sessions with representatives from the Tsilhqot'in (Chilcotin) Nation, the Secwepemc (Shuswap) Nation, and the Southern Carrier Nation. Written comments were received from the Homalco, Esketemc First Nation (Alkali Lake), Ulkatcho, Tsq'escen (Canim Lake), Xats'ull (Soda Creek), Xatl'tem/Stwecem'c (Dog Creek/Canoe Creek), Lhoosk'uz Dene (Kluskus Band) and T'exelc (Williams Lake). All of the comments from First Nations were consolidated and summarized by BC Forest Service staff.

The summary of First Nations comments prepared by Forest Service staff includes four key statements:

- a substantial portion of any AAC increase should be directly awarded to First Nations with interests in the area affected;
- the impacts of increased harvest levels and large clearcuts on non-timber values, including biodiversity and wildlife (access) must be considered;
- the potential for other uses of beetle-kill trees should be considered, rather than focusing on sawlogs exclusively; and
- current and potential damage from other bark beetles, including spruce beetle, Douglas-fir beetle and balsam bark beetle, should be considered now.

I have reviewed both the comments received by First Nations and the summary prepared by BC Forest Service staff. I am aware of First Nations' interest in expanding employment opportunities and the significance of an increase to the AAC in meeting their interest. This interest will be conveyed to the minister who has responsibility for apportioning the AAC.

I am satisfied that the analysis has accounted for non-timber values, such as wildlife, through reductions to the timber harvesting land base or application of forest cover constraints; and that, for the purposes of this determination, these approaches have appropriately accounted for the management of non-timber values that are important to First Nations in the TSA. First Nations have provided many comments related to forest management, and I am satisfied that I have considered these issues in my determination.

I am aware that various First Nations have asserted Aboriginal title and rights claims within the Williams Lake TSA. Their title claims are advanced on the basis of large traditional territories that cumulatively cover the entire TSA. When a First Nation claims that particular discrete sites have special significance to them, I may be able to make a determination of whether the protection of such sites would warrant a reduction in the estimated size of the timber harvesting land base. However, none of the First Nations located within, or claiming lands within, the TSA has communicated an Aboriginal title claim of that type to the BCFS. I cannot be certain how the more generalized claims might ultimately affect timber supply in the TSA and do not feel justified in making adjustments to the projections of timber supply based upon such claims. If conflicts do arise between Aboriginal rights and any specific forest harvesting activities that may be proposed, the specific issues will be considered in detail at the time statutory decisions are made with respect to such harvesting.

I am aware of the litigation underway in the British Columbia Supreme Court with respect to an Aboriginal rights and title claim to the Brittany Triangle and the Nemaiah Valley Indian Band Trapline areas. I understand that the title claim, as made, is to the entire Triangle and Trapline areas, but that the Province and Canada dispute that claim. It is my understanding that the Province, in particular, is taking the position that if Aboriginal title exists in the claimed area, it is only likely to be found in sites of limited extent that coincide with areas that are already protected in connection with other values canvassed above in this rationale. The Aboriginal rights claimed in this litigation are hunting and trapping rights. I also understand that the Province has not disputed those rights insofar as they relate to subsistence purposes, but does not agree that they extend to commercial purposes. I am satisfied that the considerations I have provided above in this rationale in connection with biodiversity and wildlife issues, applies equally to the protection of Aboriginal hunting and trapping rights.

Based on the information discussed above, I conclude that no adjustments to the projected timber supply respecting First Nations' issues are required at this time. Notwithstanding the ongoing litigation respecting Aboriginal title and rights, the nature, scope, and geographical location of potential aboriginal rights and title within the Williams Lake TSA are inconclusive at this time. Consequently, I am uncertain as to whether those interests would logically extend to an impact on the AAC. Upon conclusion of the court case, I can assess whether timber supply may be affected by the court's findings on Aboriginal title and rights, and if warranted re-examine my determination prior to the five-year deadline for the next determination under the *Forest Act.*

- *public review*

The Public Discussion Paper (PDP) was released and made available on July 20, 2006, with a review and comment period ending September 18, 2006. The comments from the public were consolidated and summarized by BC Forest Service staff. The main topics raised in public comments were: the uplift level, enhanced retention, access, fire hazard, mid-term

timber supply, community stability and economy, environment, habitat and non-timber values, monitoring, other forest health factors, harvest strategy, forest practices, first nations, forecast (model) assumptions, mill wood requirements, partition and administrative issues. Overall, the public review supported the need for an increase to the AAC.

The Forest District staff presented the analysis results outlined in the discussion paper at open house meetings in six communities. The main topics raised by the public were: road infrastructure and access management, flooding of the lumber market and the impact on lumber prices, hydrological concerns due to logging and MPB, effect on mid-term timber supply if harvesting continues in the east, whether the analysis considered the difference in lost revenue versus the cost to rehabilitate NRL areas, why Douglas-fir and spruce beetle were not included in the model and analysis, who carries the liability on Crown land not addressed through a forest tenure, the need to be strategic in which stands are not harvested, wood quality, concerns associated with the Brittany Triangle area, timing of the next timber supply review, timber exports and the amount and type of uplift.

I have reviewed both the comments received by the public and the summary of topics prepared by BC Forest Service staff. I am satisfied that the analysis has accounted for these topics where it is appropriate that I consider them. The public has provided many comments related to forest management, and I have considered these issues in my determination.

Reasons for Decision

In reaching my AAC determination for the Williams Lake TSA, I have made all of the considerations documented above and have reasoned from them as follows.

The timber supply analysis for this urgent timber supply review focussed on providing an assessment of short-term timber supply and mid-term risk given the impacts of the mountain pine beetle (MPB) epidemic in the TSA. The considerations that weigh heavily in my determination are: (i) consistency with CCLUP and objectives for non-timber values; and the (ii) balance between harvesting susceptible and dead pine volumes in the short-term while enabling sufficient non-pine volumes to be maintained in support of mid-term timber supply. Given this focus, the unique approach taken in this timber supply analysis, to model in detail short-term timber supply and to provide an assessment of mid-term supply, was appropriate. The analysis provided me with the insights that I needed, through the provision of various scenarios, to make a determination about an AAC for the next five years and informed me of the potential consequences and impacts that decision could have in the mid-term.

When assessing short- and mid-term timber supply in the analysis, various assumptions were made. In my review of various factors, some of the assumptions suggest that short- and mid-term timber supply may have been under- or over-estimated.

In my considerations, the following factors were identified as reasons why the analysis of short- and mid-term timber supply may have been *underestimated* to a degree that may be quantified:

- *interior log grade changes:* as the model used to estimate existing stand volume did not report volume of dead timber that existed in a stand, timber supply depicted in the analysis is underestimated in the short- and mid-term by about 8 percent.

In my considerations, the following factors were identified as reasons why the analysis of mid-term timber supply may have been *overestimated* to a degree that may be quantified:

- *critical fish habitat*: the majority of the habitat is located in non-pine stands and could represent a corresponding downward pressure of up to 0.4 percent on the mid-term timber supply.

In my considerations, the following factors were identified as reasons why the analysis of short- and mid-term timber supply may have been *underestimated* to a degree that may not be quantified:

- *inventory volume estimates*: the utilization of an updated statistical volume adjustment on the IFPA portion of the land base (about 10 percent of the land base) could represent a corresponding upward pressure on the short- and mid-term timber supply.

In my considerations, the following factors were identified as reasons why the analysis of short-term timber supply may have been *overestimated* to a degree that may not be quantified:

- *decay, waste and breakage*: the lack of variability in shelf-life assumptions relative to what individual trees might experience could represent a corresponding downward pressure on the short- and mid-term timber supply as individual trees may become unusable as sawlogs before the general shelf-life occurs, requiring additional volume to be harvested to meet the AAC.

In my considerations, the following factors were identified as reasons why the analysis of mid-term timber supply may have been *overestimated* to a degree that may not be quantified:

- *old growth management areas*: should stands containing at least 70 percent pine in rotating OGMAs be harvested in the short term, this could constitute a corresponding overestimation of timber supply in the mid-term as replacement areas (i.e., non-pine stands) would need to be added to the OGMAs to compensate for any harvested stands, and these additional areas would largely be precluded from timber harvesting.
- *mountain pine beetle*: as optimal habitat decreases, the beetles are attacking stands as young as 20 to 35 years. These stands were anticipated to contribute to the mid-term timber supply and could represent a downward pressure on the mid-term timber supply if excessive mortality in these stands occur.
- *spruce bark beetle*: harvesting in susceptible stands that is inconsistent with the spruce bark beetle control program could result in a corresponding downward pressure on mid-term timber supply.
- *balsam bark beetle, Douglas-fir beetle and western spruce budworm*: harvesting that is inconsistent with the control programs could represent a corresponding downward pressure on mid-term timber supply.
- *stand regeneration*: less harvesting than modelled and delays to regenerate the non-harvested stands could represent a corresponding downward pressure on mid-term timber supply.

- *minimum harvest criteria*: harvesting that is inconsistent with targeting low volume stands may have a corresponding downward pressure on mid-term timber supply.
- *decay, waste and breakage*: as mentioned above, the lack of variability in shelf-life assumptions relative to what individual trees might experience could represent a corresponding downward pressure on the short- and mid-term timber supply as individual trees may become unusable as sawlogs before the general shelf-life occurs, requiring additional volume to be harvested to meet the AAC.
- *harvest priorities, alternative short-term harvests for salvaging stands with at least 70 percent pine, uncertainty in the range of outcomes, mid-term timber supply and impact of a partition:* The current harvestable inventory of over 200 million cubic metres will decline below 90 million cubic metres within the next 20 years. Harvesting in stands with at least 70 percent pine, the greatest amount of dead volume and to the west of the Fraser River will have the most positive impact on the harvestable inventory. Selection of harvest strategy and rate can make up to a 30 percent difference. Harvesting that does not have a dead pine focus is inconsistent with the maximum salvage harvest strategy and represents a downward pressure on mid-term timber supply.

From reviewing the cumulative impact of these factors where the analysis may have either under- or over-estimated timber supply, I have reasoned and concluded as follows.

As the majority of factors discussed in the "Reasons for Decision" are not quantifiable, it is not possible to review the factors arithmetically. Therefore the impact of factors is discussed in terms of their effect on the short-term timber supply, that is the timber supply available in the next 20 years, and the mid-term timber supply, that is the timber supply available from 21 to 80 years. The decision for the new AAC is based on the very short term, that is, the next 5 to 10 years, due to the catastrophic impact of the mountain pine beetle infestation. The rate of harvest and, more importantly, the implementation of a harvest strategy associated with the new AAC, will impact the mid-term timber supply.

While the exact nature of the combined mid-term result of these factors is difficult to predict with accuracy, it is apparent there will be some degree of mutual offset between under- or over-estimation. The resulting mid-term level is uncertain and will be dependent on the implementation of a harvest strategy to address the mountain pine beetle and on maintaining control programs for other forest health factors.

In the context of the current catastrophic mountain pine beetle infestation, it is not useful to attempt to place any finer point on these generalized considerations, beyond the conclusion that nothing in the considerations I have reviewed indicates that the forecasts presented cannot be relied on as providing a reasonable understanding of the potential effects of the mountain pine beetle, and its management, on the projected timber supply in the TSA.

In accordance with these projections I therefore conclude as follows. Significant mortality in the Williams Lake TSA attributable to the mountain pine beetle has occurred and is expected to continue. Analysis has shown the feasibility of increased harvests as part of a sound strategic approach to capture economic benefits and includes consistency with the biodiversity objectives of the CCLUP. Further, I expect an increased harvest in the short-term to offset concerns that shelf-life may be less than assumed and that increasing the harvest will provide the highest likelihood of economic harvest opportunities in the pine resource. A higher harvest will also provide opportunity to test the merchantability in

marginal stands before the next AAC determination. Therefore, it is my determination that an AAC of 5 770 000 cubic metres, which is an increase of 2 001 600 cubic metres, is both possible and necessary.

If the mountain pine beetle undergoes a population crash, the entire increase may not be required for the duration of the effective term of the AAC. For this reason, I am requesting that BCFS staff monitor and keep me apprised of the condition of the infestation, on the understanding that, as and when appropriate, I may revisit this determination at a date earlier than required by statute, for the purpose of determining a reduction.

Historically, agreement holders with replaceable license chose to operate in the eastern portion of the TSA. In 1999, a partition was established to create opportunity in the western supply blocks by non-replaceable forest licenses. I confirm the partition of 450 000 cubic metres within the three western supply blocks with the understanding that given significant amounts of pine in this portion of the TSA, additional harvesting above the partition level will need to take place there.

In 1996, a partition was established to address problem forest types. The partition was directed into certain stand types in the Pulpwood Agreement 16 area. I confirm the current partition of 107 000 cubic metres within Pulpwood Agreement 16.

I note that in the 1980s, a mountain pine beetle epidemic required control measures within the TSA. In response to this epidemic, a partition for mountain pine beetle-impacted stands was established in 1985 and continued through the subsequent determinations, although was decreased 1989 and 1992. For this determination, I will not consider a partition for the stands impacted by the 1980's epidemic.

Determination

I have considered and reviewed all the factors as documented above, including the risks and uncertainties in the information provided. It is my determination that a timber harvest level that accommodates objectives for all forest resources during the next five years and that reflects current management practices as well as the socio-economic objectives of the Crown, and the need to address the mountain pine beetle epidemic can be best achieved in the TSA by establishing an AAC of 5 770 000 cubic metres. This AAC includes the following partitions as follows:

- 450 000 cubic metres are attributable to the three western supply blocks,
- 107 000 cubic metres are attributable to the harvesting of problem forest timber types under Pulpwood Agreement 16.

The AAC of 5 770 000 cubic metres is inclusive of any adjustments to forest licenses to account for changes to interior log grades. My expectations regarding the deployment of the AAC are discussed below under "Implementation".

This determination is effective April 18, 2007, and will remain in effect until a new AAC is determined, which must take place within five years of the effective date of this determination. If significant new information is made available to me that affect this decision, such as information detailing poor performance in infested stands, I am prepared to revisit this determination sooner than the five year limit required by legislation.

Implementation

In the period during which this determination is in effect, I encourage BCFS staff and licensees to focus on the priorities noted below.

- *stands with at least 70 percent pine*: focus the harvest on stands with at least 70 percent pine content and with high percentages of beetle-infested or killed stems. These stands will virtually all be located west of the Fraser River and must be targeted by all licensees. I urge BCFS district and regional staff to work with the Forest Analysis and Inventory Branch to monitor licensee performance on an annual basis in cooperation with forest licensees, and request a report of these results in order to assess the extent to which stands with at least 70 percent pine content with high percentages of beetle infested or killed stems are in fact being harvested.
- *maximum salvage harvest strategy*: implement a maximum salvage harvest strategy and focus a significant proportion of the harvest on low volume, low value stands as the analysis shows that the maintenance of the AAC is dependent on significant harvest in stands below 100 cubic metres and provide a reasonable estimate of economic viability in these stands for the next determination.
- *forest health strategy*: revise the forest health strategy to address a maximum salvage harvest strategy while providing for the management of spruce bark beetle, Douglas-fir beetle and western spruce budworm through control programs that protect the mid-term timber supply.
- *strategic planning*: BCFS staff and forest licensees should develop strategic plans to ensure that the non-timber values, retention planning, hydrologic considerations and placement of non-recoverable loss areas to protect well stocked and healthy advanced regeneration are addressed as harvest levels increase.

In the period during which this determination is in effect, I encourage BCFS staff and licensees to undertake the tasks and studies noted below that I have also described further in the appropriate sections of this rationale document. I recognize that the ability to undertake these projects is dependent on available resources including funding. These projects are, however, important to help reduce the risk and uncertainty associated with key factors that affect the timber supply in the Williams Lake TSA.

- *growth rates*: I encourage BCFS staff and/or forest licensees to assess growth and yield on regenerated managed stands to verify and refine site productivity estimates.
- *young pine stand mortality*: I encourage BCFS staff and/or forest licensees to assess mortality of young pine stands to provide reasonable estimates of losses.
- *spruce bark beetle*: I encourage BCFS staff and/or forest licensees to continue to monitor the incidences of spruce bark beetle, the viability of control programs and non-recoverable losses in high site index stands.
- *Douglas-fir beetle and western spruce budworm*: I encourage BCFS staff and/or forest licensees to continue to monitor the incidences of Douglas-fir beetle and western spruce budworm, the viability of control programs and non-recoverable losses in order to provide reasonable estimates prior to the next determination.

- *shelf-life*: I encourage BCFS staff and/or forest licensees to monitor the decline of pine stands infested with or killed by mountain pine beetle to provide reasonable estimates of decay, waste and breakage. I encourage BCFS staff and/or forest licensees to monitor the results of the shelf-life studies in order to provide reasonable estimates prior to the next determination.
- *hydrologic considerations:* I request that BCFS staff in cooperation with licensees and Ministry of Environment specialists, continue to investigate, monitor and report to me regularly on the potential impacts of MPB-infested stands and salvage harvesting operations on hydrology over the course of the this determination period.
- *stand-level biodiversity*: I encourage BCFS staff and/or forest licensees to monitor the extent of allowances to green-up and the levels of retention across the landscape. I also encourage the collaborative development of a landscape level retention strategy by a multi-stakeholder group, and that this group report on the extent to which they were able to follow those guidelines and prepare and implement retention plans prior to the next determination.
- *northern caribou:* I request that BCFS staff and/or forest licensees monitor the impact of large-scale salvage operations on the northern caribou in order to provide reasonable estimates prior to the next determination.

Jim Snetsinger
Chief Forester

April 18, 2007

Appendix 1: Section 8 of the *Forest Act*

Section 8 of the *Forest Act*, Revised Statutes of British Columbia 1996, c. 157
Consolidated to October 21, 2004, reads as follows:

Allowable annual cut

8 (1) The chief forester must determine an allowable annual cut at least once every 5 years after the date of the last determination, for

(a) the Crown land in each timber supply area, excluding tree farm licence areas, community forest areas and woodlot licence areas, and

(b) each tree farm licence area.

(2) If the minister

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

(b) amends or enters into a tree farm licence to accomplish the 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 5 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 5 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 5 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 10 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 portions of the allowable annual cut attributable to

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

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

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

(6) The regional manager or district manager must determine an allowable annual cut for each woodlot licence area, according to the licence.

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

(a) the community forest agreement, and

(b) any directions of the chief forester.

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

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

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

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

(iii) silviculture treatments to be applied to the area,

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

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

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

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

(c) Repealed [2003-31-02]

(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.

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

Section 4 of the *Ministry of Forests and Range Act* (consolidated 2006) reads as follows:

Purposes and functions of ministry

4. The purposes and functions of the ministry are, under the direction of the minister, to

(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.

Documents attached:

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

Appendix 4: List of Submissions Received

BRITISH COLUMBIA

JUL 0 4 2006

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

Dear Jim:

Re: Economic and Social Objectives of the Crown

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

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

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

Minister of Forests and Range and Minister Responsible for Housing

Office of the Minister

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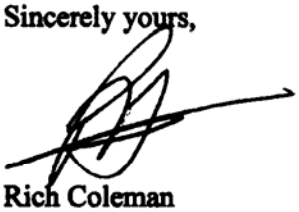
Jim Snetsinger

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

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

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

Sincerely yours,



Rich Coleman
Minister

Appendix 4: List of Submissions Received

First Nations

Tsilhqot'in (Chilcotin) Nation community representatives
Secwepemc (Shuswap) Nation community representatives
Southern Carrier Nation community representatives
Homalco First Nation
Esketemc First Nation (Alkali Lake)
Ulkatcho First Nation
Tsq'escen (Canim Lake) First Nation
Xats'ull (Soda Creek)
Xatl'tem/Stwecem'c (Dog Creek/Canoe Creek) First Nation
Lhoosk'uz Dene (Kluskus Band)
T'exelc (Williams Lake) First Nation

Forest Industry

Tolko Industries Ltd.
West Fraser Mills Ltd.
Westline Harvesting Ltd.
San Jose Logging Ltd.

Non-government organizations

Share the Cariboo-Chilcotin Resources Society
The Horsefly District Homeowners & Ratepayers Association
The Land Conservancy
United Steelworkers - Local 1-1425

Forest consultants

D.E. Gilbert, R.P.F. & Associates

General public

1 individual submission