

**BRITISH COLUMBIA  
MINISTRY OF FORESTS AND RANGE**

# **100 Mile House Timber Supply Area**

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

**Effective September 6, 2006**

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## Table of Contents

Objective of this Document.....	1
Description of the 100 Mile House Timber Supply Area.....	1
Critical issue: Epidemic mountain pine beetle infestation .....	2
Expedited process for an urgent AAC determination to address the infestation .....	2
History of the AAC .....	3
New AAC determination .....	4
Information sources used in the AAC determination .....	4
Role and limitations of the technical information used .....	5
Statutory framework.....	6
Guiding principles for AAC determinations .....	6
The role of scenarios .....	8
Scenarios for the 100 Mile House TSA .....	9
Consideration of Factors as Required by Section 8 of the <i>Forest Act</i> .....	10
Land base contributing to timber harvest.....	10
- general comments .....	10
- old growth management areas .....	11
- woodlot licences and community forests.....	11
- Crown land reserves .....	12
Existing forest inventory.....	12
- volume estimates for existing stands .....	13
Expected rate of growth.....	14
- minimum harvestable ages .....	14
Regeneration delay .....	15
Not-satisfactorily-restocked areas.....	15
Silvicultural systems .....	16
Incremental silviculture .....	16
Utilization standards .....	16
Decay, waste and breakage.....	17
Integrated resource management objectives .....	17
- cutblock adjacency, forest cover and green-up .....	18
- visual resources .....	19
- identified wildlife .....	19
- mule deer winter range .....	20
- other wildlife .....	21
- community watersheds and hydrology .....	21
- trails .....	22
- landscape-level biodiversity .....	23
Other information .....	23
- Interior log grade changes .....	23
- land use plan.....	24
- First Nations considerations .....	24
Alternative harvest flows .....	27
Minister’s letter and memorandum .....	27
Local objectives .....	28
Forest health.....	29
Unsalvaged losses .....	30
Small scale salvage .....	31
Mountain pine beetle epidemic.....	31

Reasons for Decision.....36  
Determination .....41  
Implementation.....41  
Appendix 1: Section 8 of the *Forest Act* .....43  
Appendix 2: Section 4 of the *Ministry of Forests and Range Act*.....45  
Appendix 3: Minister’s letter of July 4, 2006.....46  
Appendix 4: List of Submissions Received.....48

## **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 (BC) in making my determination, under Section 8 of the *Forest Act*, of the allowable annual cut (AAC) for the 100 Mile House timber supply area (TSA). This document also identifies where new or better information is needed for incorporation in future determinations.

## **Description of the 100 Mile House Timber Supply Area**

The 100 Mile House TSA, approximately 1.23 million hectares in total area, is administered from the BC Forest Service (BCFS) 100 Mile House Forest District office in 100 Mile House, BC. The 100 Mile House TSA is one of fifteen TSAs lying within the Southern Interior Forest Region of BC.

The TSA is bounded on the west by the Fraser River, on the east by the Cariboo Mountains and Wells Gray Provincial Park, on the north by the Williams Lake TSA, and on the south by the Kamloops TSA. The 100 Mile House TSA has varied topography and climate. The flat, dry Interior plateau separates two mountain ranges – the Marble Range to the southwest and the Quesnel Highlands to the northeast. The western part along the Fraser River has a hot, dry climate, while the Cariboo Mountains to the east have a wetter climate and steep slopes.

A 2004 community profile showed that the population of the South Cariboo region has dropped slightly from about 16 000 in 1991 to about 14 700 in 2001. The main communities are 100 Mile House (including 108 Mile Ranch) and Clinton; smaller communities include Lac la Hache, Forest Grove, 70 Mile House, Lone Butte and Bridge Lake.

Three First Nations have communities in the 100 Mile House TSA. All three – Tsq’escen (Canim Lake), High Bar and Xatl’tem/Stwecem’c (Canoe Creek) bands – are Secwepemc (Shuswap) people. Other First Nations with traditional territories in the TSA are T’excelc (Williams Lake), Esketemc, Ts’kw’aylaxw (Pavilion), Bonaparte, Whispering Pines (Clinton), Skeetchestn and Simpcw (North Thompson).

The forests of the 100 Mile 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.

The dominant tree species in the TSA are lodgepole pine and Douglas-fir. Several other tree species occur including spruce, subalpine fir (balsam), western redcedar, western hemlock and various deciduous (hardwood) species.

The 100 Mile House TSA provides habitat for a wide variety of wildlife including mule deer, moose, black bear, lynx, marten and owls, as well as many fish species. Species at risk in the TSA include mountain caribou, grizzly bear, bighorn sheep, and the prairie falcon.

### **Critical issue: Epidemic mountain pine beetle infestation**

Mountain pine beetle (MPB) epidemics are natural events that attack lodgepole pine trees, however, the current infestation has reached an unprecedented level in BC's history. Provincial annual aerial survey data shows the MPB affected about 8.7 million hectares in 2005. Of the total area affected, 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). It was estimated in fall 2005 that the MPB has now provincially affected more than 400 million cubic metres of timber, up from about 283 million cubic metres in 2004. 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 57 percent of the total volume within the timber harvesting land base in the 100 Mile House TSA. The majority of this pine volume is considered mature (over 80 years old) and particularly susceptible to the MPB epidemic.

In 2001, the aerial forest health survey indicated 1178 hectares of MPB infestation in the TSA. By 2002, this had expanded to 15 544 hectares and by 2005, more than 600 000 hectares of attacked stands were identified. The area impacted by the MPB continues to expand rapidly in the TSA. About 36 million cubic metres of pine volume are projected to be killed by 2015, with about 40 million cubic metres (83 percent of the susceptible pine) killed by 2026 across the TSA's timber harvesting land base.

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 100 Mile House 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 area affected continues to expand rapidly, intervention may help to mitigate economic and environmental impacts.

The 100 Mile House Forest District's strategy and objectives in responding to the current infestation include, for example: directing harvest of the AAC to high priority (at least 70 percent pine component) MPB-killed or infested stands; recovering the highest value from beetle-infested timber before it deteriorates, while respecting other forest values; conserving the long-term values identified in the Cariboo-Chilcotin Land Use Plan; and developing retention strategies for biodiversity.

A significant portion of the current AAC is dedicated to harvesting infested or susceptible stands in support of the district's strategy. Even so, current harvest levels are believed to be insufficient to address the epidemic. There is an opportunity through a timely AAC

determination to increase the harvest of currently infested and susceptible stands to improve their economic recovery and to provide for their 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.*

In response to the need to address the current MPB infestation for the 100 Mile House TSA, an expedited review process was undertaken. This included a timber supply analysis and a public discussion paper prepared in April 2006 where comments were solicited.

Having reviewed the information about the current epidemic, I became further satisfied that a prompt 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.

On this basis, I have proceeded to make such a 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 100 Mile House TSA was established in 1981 with an AAC of 1 250 000 cubic metres. Effective 1996, the chief forester set the AAC at 1 362 000 cubic metres. In 2002, the chief forester determined the current AAC which is 1 334 000 cubic metres. The 2002 determination excluded 28 000 cubic metres per year for issued woodlots, but was otherwise unchanged from the previous 1996 decision.

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

<b>Apportionment</b>	<b>Cubic metres per year</b>	<b>Percentage</b>
Replaceable Forest Licences	802 782	60.2
BC Timber Sales	322 871	24.2
Pulpwood Agreement Timber Sale License	112 000	8.4
Forest and Range Agreements (First Nations)	51 097	3.8
Community Forest Agreements	20 000	1.5
Woodlots (additional)	20 000	1.5
Forest Service Reserve	5 250	0.4
<b>Total AAC</b>	<b>1 334 000</b>	<b>100.0</b>

## **New AAC determination**

Effective September 6, 2006, in order to support an effective forest management strategy in response to the MPB epidemic, the new AAC for the 100 Mile House TSA will be 2 000 000 cubic metres. This represents a 666 000 cubic metre (50 percent) increase from the previous AAC. This determination will remain in effect until a new AAC is established, which must take place within five years of the present decision. My expectations regarding the deployment of the **entire AAC** are discussed in “Implementation”.

## **Information sources used in the AAC determination**

Information considered in determining the AAC for the 100 Mile House TSA include:

- *100 Mile House Urgent Timber Supply Review: Binder for the AAC Determination Meeting, June 20-21, 2006.* (The binder includes additional reference background documents, data sources and inventories used in the timber supply analysis, and feedback received from public review). 2006. 100 Mile House Forest District;
- Public review comments (on the TSR Public Discussion Paper). Submitted April to June, 2006 (see Appendix 4 for a list of those providing submissions);
- *Urgent timber supply review for the 100 Mile House timber supply area: Public Discussion Paper.* April 2006. BC Ministry of Forests and Range;
- *Cariboo-Chilcotin Land Use Plan: 90-Day Implementation Plan, Final Report, 1995,* Province of BC;
- *Cariboo-Chilcotin Land Use Plan: Biodiversity Conservation Strategy, 1996, and Updates.* Prepared by Cariboo-Chilcotin Biodiversity Conservation Strategy Committee;
- *Regional Mule Deer Winter Range Strategy for the Cariboo-Chilcotin Land Use Plan; 1996;* Mule Deer Winter Range Strategy Committee;
- *Management Strategy for Mule Deer Winter Ranges in the Cariboo-Chilcotin. Part 1a: Management Plan for Shallow and Moderate Snowpack Zones; 2002;* Ministry of Forests;
- *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;
- *Guidance on the Design and Implementation of Stand-Level Retention for Cutblocks in Large-Scale Salvage Operations; 2005;* Jim Snetsinger, Chief Forester, Ministry of Forests and Range;
- *Abundance of Secondary Structure in Lodgepole Pine Stands Affected by Mountain Pine Beetle; 2006 draft;* K.D.Coates, C. DeLong, P.J. Burton, and D.L. Sachs; report for Chief Forester, Ministry of Forests;
- *100 Mile House Sustainable Resource Management Plan (final draft), 2005;*
- *100 Mile House District Forest Health Strategy.* 100 Mile House Forest District. 2006;
- *Clinton Creek Watershed Management Plan; 1989;* Village of Clinton and Ministry of Forests;

- *Stewardship and Sustainability in the Secwepemcul'ecw workshop*; 2006; organized by the Canim Lake Band and Forrex;
- *Robertson ecosystem based plan*; 2004; J. Thomas and R. Norwell; prepared in conjunction with Bonaparte (St'uxwtews) Indian Band and BC Timber Sales;
- *2005 Summary of Forest Health Conditions in British Columbia*; 2006; Joan Westfall for Ministry of Forests and Range; and overview summaries;
- *Provincial Level Projection of the Mountain Pine Beetle Outbreak: An Overview of the Model (BCMPB v2) and Results of Year 2 of the Project*; 2005; M. A. Eng, A. Fall, J. Hughes, T. Shore, B. Riel, and P. Hall;
- *Provincial Level Projection of the 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; M. A. Eng, A. Fall, J. Hughes, T. Shore, B. Riel, A. Walton and P. Hall;
- *Timber Supply Analysis: Mountain Pine Beetle Impact of Interior Timber Supply Areas*; 2006; Timberline Forest Inventory Consultants, prepared for the Council of Forest Industries (referred to as the "COFI report" in this rationale);
- Letter from the Minister of Forests to the chief forester, dated July 4, 2006, stating the Crown's economic and social objectives for the province (see Appendix 3);
- *100 Mile House Timber Supply Area Rationale for Allowable Annual Cut (AAC) Determination, Effective January 1, 2002*. 2001. Larry Pedersen, Chief Forester.
- *100 Mile House TSA Analysis Report*. 2001. BC Forest Service. (referred to as the "TSR 2 analysis" in this document);
- *Forest and Range Practices Act*, 2002 and amendments;
- *Forest and Range Practices Regulations*, 2004 and amendments;
- Technical review and evaluation of factors that affect timber supply through comprehensive discussions with BCFS staff, including the AAC determination meeting held at 108 Mile Ranch on June 20-21, 2006 and an over-flight of portions of the TSA with the district manager.

### **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 100 Mile House 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 100 Mile House 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 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 between 1992 and 1996. 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 in the Supreme Court of Canada. The AAC that I determine should not be construed as limiting the Crown's obligations under these 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 100 Mile House TSA. It is also independent of any decision by the Minister of Forests and Range with respect to subsequent allocation of the wood supply. I consider those aboriginal interests raised during the consultation process associated with timber supply review. 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.

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*.

Because the new regulations of the *Forest and Range Practices Act* are designed to maintain the integrity of British Columbia's forest stewardship under responsible forest practices, it is not expected that the implementation of the legislative changes will significantly affect current timber supply projections made using the Forest Practices Code as a basis for definition of current practice.

### **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 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 shortages 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 100 Mile House TSA timber supply analysis, no base case is presented. Instead, a number of possible scenarios related to the current MPB epidemic are presented representing different assumptions about harvesting practices, shelf life, etc. I have considered these scenarios along with many other sources of information relevant to making an AAC determination.

### Scenarios for the 100 Mile House TSA

Traditionally, several timber supply forecasts would be provided for the 100 Mile House 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 epidemic will consume all the mature lodgepole pine in the TSA and how far down the age profile it will affect. Originally it was thought that the beetles attacked only mature lodgepole pine stands, however, they have been observed in stands as young as 35 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 over storey 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 has been designed as an interim measure to provide timely, yet considered, AAC decisions in timber supply areas impacted by the MPB. This is referred to as the “TSR 3 analysis” or the “analysis” in this document. The first 20 years have been modelled in greater detail than in previous BCFS analyses. The projected spread of the MPB, shelf life and harvesting were tracked at the stand level on an annual basis. Exploration of the mid-term was more general and analysis was limited to those stands already planted or naturally regenerated today.

The long term (80 years and more into the future) was not specifically considered as it is unlikely to impact decisions about a harvest level directed at MPB impacted pine stands over the next five years. This removed the need to speculate on the establishment and growth of regeneration under varying amounts of residual over-storey.

Further, as mentioned, no base case is presented. Instead a number of possible scenarios are presented which I discuss further under *mountain pine beetle epidemic*. These scenarios demonstrate:

- over the next 20 years, the MPB is projected to have a bigger impact on the landscape than harvesting;
- significant consideration needs to be given to how the AAC is deployed;
- mid-term harvest levels are highly uncertain but will likely be below the current AAC;
- protecting mid-term timber supply requires that mixed stands containing some dead pine not be harvested;
- increased harvest levels can salvage significantly more timber without compromising the mid-term, provided that the entire cut is directed at pine-dominated stands; 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 analysts, I see no reason why the scenarios should not provide a suitable basis of reference for use in my considerations 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**

### Land base contributing to timber harvest

#### *- general comments*

The TSR 2 analysis formed the basis of the detailed 20-year forecasts for various scenarios developed in the TSR 3 analysis in support of this determination. The land base contributing to timber harvest as described in the TSR 2 analysis therefore largely still applies and will not be re-described or re-assessed in detail in this rationale. For a discussion of the various factors, see the previous TSR 2 timber supply analysis report and the 2002 AAC rationale report. An overview of the land base is as follows.

The total area within the 100 Mile House TSA is estimated to be 1.23 million hectares with an estimated 0.94 million hectares of Crown forests. Excluding woodlots, Crown land reserves, parks and protected areas, approximately 0.89 million hectares of Crown forest is managed by the BC Forest Service. Approximately 0.15 million hectares of total reductions to this total forest area are made to account for a variety of ‘netdown’ factors including: riparian areas; wildlife tree patches; caribou areas; environmentally sensitive areas due to soils, regeneration and avalanche hazards; inoperable areas; sites with low productivity; secondary (unmapped) roads; buffers around Class A lakes; and non-commercial forests. This leaves a current estimated land base of about 0.74 million hectares for the aspects of the TSR 3 analysis which emulated the TSR 2 base case assumptions.

The TSR 3 analysis varied from TSR 2 by further removing old growth management areas (OGMAs) from timber harvesting land base. Also, some assumptions made in the analysis about OGMAs, woodlots and miscellaneous reserves need to be assessed. I discuss these factors below.

*- old growth management areas*

The final draft 100 Mile House Sustainable Resource Management Plan (SRMP) was prepared to be consistent with, and help interpret, the direction provided in the Cariboo-Chilcotin Land Use Plan (CCLUP). The draft SRMP includes a map showing old growth management areas (OGMAs) which are intended to augment existing reserves (such as riparian reserves zones) in order to achieve the old forest retention aspects of the regional biodiversity conservation strategy. The biodiversity strategy was prepared in support of CCLUP implementation including the integration of resource targets.

The OGMAs represent about 116 762 hectares of the TSR 2-based timber harvesting land base. In the TSR 3 analysis, the OGMAs were further removed from the land base resulting in a 627 408 hectare current timber harvesting land base.

Based on current practice, there is minimal harvesting in the OGMAs in the 100 Mile House TSA. About 79 012 hectares of OGMAs are classified as ‘permanent’, 34 990 hectares are ‘transitional’, and about 2760 hectares as ‘rotating’. Salvage harvesting could proceed in ‘transitional’ OGMAs that are heavily attacked by the MPB or spruce bark beetle provided that an equivalent replacement area is identified. Similar and greater flexibility exists for ‘rotating’ OGMAs. This flexibility was not modelled in the analysis.

About 8840 hectares of the transition or rotating OGMAs have at least 70 percent mature pine and are expected to be heavily attacked by the MPB. This equates to about 1.4 percent of the timber harvesting land base. Consequently, some harvesting in these OGMAs could occur in the short term. I recognize this small upward pressure on the short-term land base in my “Reasons for Decision”. However, should harvesting occur in these mature pine-dominated stands, equivalent replacement areas need to be identified and added to the OGMAs. Therefore I have also recognized in my “Reasons for Decision” that any harvesting in OGMAs in the short term could represent a corresponding downward pressure on mid-term timber supply if replacement areas are taken from stands expected to contribute to timber supply in the mid-term.

*- woodlot licences and community forests*

The *Forest Act* requires AACs determined for TSAs to be exclusive of the areas and timber volumes allocated to woodlot licences and community forests. When woodlots and community forests are issued from a TSA, the required volumes are first allocated from an appropriate apportionment under the AAC for the TSA. Then, in the next AAC determination for the TSA, the TSA land base is reduced by the area of Crown land in all the woodlot licences and community forests issued since the previous determination, and the total volume in the issued woodlots and community forests are excluded from contributing to the AAC for the TSA.

The 32 existing woodlots in the 100 Mile House TSA, encompassing an area of 18 780 hectares of Crown land, were excluded in the analysis. There are currently no community forest agreements in the TSA; however, one has been offered to the District of 100 Mile House. The woodlot data source used in the analysis, however, also included 1171 hectares of additional ‘woodlot area’ that have not been issued (i.e., much of this

area consists of proposed woodlots). Consistent with my guiding principles, I therefore recognize in my “Reasons for Decision” that the exclusion of this 1171-hectare area in the analysis represents a very small upward pressure (about 0.2 percent) on short- and mid-term timber supply.

The minister has apportioned 40 000 cubic metres for additional woodlots and community forests in the TSA representing 3 percent of the current AAC. When new woodlots and community forests are issued, they can be excluded from the land base in support of the next determination. In the meantime, given the relative size of the apportionment to the entire TSA, and the fact that any future allocation decisions must be accounted in subsequent determinations, any uncertainty in this factor should pose low risk to timber supply.

*- Crown land reserves*

Various Crown land reserves, such as those established for the Use, Recreation and Enjoyment by Public (UREPs), were excluded from the land base in the analysis. This however included 6257 hectares of ‘miscellaneous reserves’ that BCFS staff advice should not have been deducted from the land base since harvesting activities are not inconsistent with these reserves. I therefore recognize in my “Reasons for Decision” a small upward pressure of 6287 hectares (about 1.0 percent) on short-, mid- and long-term timber supply to account for this factor.

Existing forest inventory

The current standard for forest inventory is the Vegetation Resource Inventory (VRI). VRI consists of two phases: phase 1 is the forest cover mapping based on photo interpretation, and 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.

For the 100 Mile House TSA, about 17 percent of the inventory was collected to VRI phase 1 and 2 standards under an Innovative Forest Practices Agreement (IFPA). The remaining approximately 83 percent of the inventory was completed to previous FCI standards for phase 1 with a VRI phase 2 also completed.

The forest inventory for the 100 Mile House TSA was projected for growth to 2005, and updated to account for disturbances such as harvesting and fire to the end of 2004. For the purposes of the analysis, a further 2.1 million cubic metres was removed from the inventory to reflect harvest levels in 2005.

About 60 percent of the timber harvesting land base consists of mature forests that are at least 80 years of age, whereas about 40 percent of the forests are considered immature. Lodgepole pine accounts for 57 percent of the volume across the timber harvesting land base, followed by Douglas-fir (29 percent), spruce (8 percent), deciduous species (4 percent), and other trees (2 percent).

When the MPB epidemic subsides, the TSA should be re-inventoried. The inventory needs to identify what has survived the epidemic so that volume estimates can be more

accurately assessed in support of the future determinations. I have recognized this need under “Implementation”.

*- volume estimates for existing stands*

In the timber supply analysis, estimates of timber volumes in old and young existing stands were projected using the Variable Density Yield Prediction (VDYP) model.

The inventory files for the approximately 17 percent of the TSA completed to VRI phase 1 and 2 standards (see *existing forest inventory* above) reflected these findings and were used in the analysis without the need to make further adjustments.

For the approximately 83 percent of inventory that was mapped to previous forest cover inventory standards, a VRI phase 2 ground sampling was completed with resulting statistical adjustments applied to the inventory attributes. Prior to the analysis, the inventory files did not account for these findings. For mature pine stands over 80 years of age in the unadjusted inventory, the ground samples indicate that inventory attributes result in a 14 percent over-estimation of volume. For immature pine stands between 30 and 80 years of age, the ground samples indicate that inventory attributes result in a 15 percent under-estimation of volume. The inventory volume estimates for mature Douglas-fir stands over 120 years of age were verified to be correct based on the ground sampling; the samples, however, indicate that the inventory attributes under-estimated younger fir stands between 30 and 120 years of age by 49 percent. The sampling work indicate that that inventory attributes over-estimated other coniferous-leading and deciduous-leading stands by 20 percent and 15 percent, respectively. These adjustments led to an overall 6 percent reduction in volume that was accounted for in the analysis. One of the reasons for the changes in estimated volumes was the significant change in age class distribution after the attribute adjustments were applied.

As discussed later, the scenarios developed for the analysis focus on mature pine stands that are most susceptible to the MPB. The adjusted attributes for these stands based on ground sampling, as noted above, resulted in 14 percent less mature pine volume in this analysis than reflected in the TSR 2 analysis.

I reviewed the inventory adjustments with BC Forest Service staff, including inventory staff with the Forest Analysis and Inventory Branch, and find that their use for the purposes of this analysis to be appropriate.

### Expected rate of growth

In 2005, Forest Analysis and Inventory Branch staff used VDYP 6 to provide a yield curve for each individual stand in the entire province. Those yield curves for the 100 Mile House TSA were used to estimate the annual growth of each stand over the next 20 years—the length of the detailed timber supply forecast in this analysis. In the analysis, only the portion of the stand estimated to survive the MPB epidemic, based on a model that projects the MPB outbreak (BCMPB v2), is grown. The volume for that portion of the stand already dead or predicted to die remains static.

As previously discussed, the 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 stands. The long term (80 years and more into the future) was not specifically considered as it would unlikely impact decisions about the amount of pine-leading stands to harvest over the next 5 years. This removed the need to speculate on the establishment and growth of regeneration under varying amounts of residual overstorey.

In the last determination in 2002, 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, 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 residual stands following the MPB epidemic that are not harvested and to verify and refine site productivity estimates for regenerated managed stands.

### *- minimum harvestable ages*

A minimum harvestable age is an estimate of the earliest age at which a forest stand has grown to a harvestable condition. The minimum harvestable age assumption mainly affects when second growth stands will be available for harvest within the timber supply model. This, in turn, affects how quickly existing stands may be harvested such that a stable flow of timber harvest may be maintained. In practice, many forest stands will be harvested at much older ages than the minimum harvestable age, due to economic considerations or forest cover constraints on harvesting that arise from managing for such values as visual quality, wildlife and water quality.

The timber supply analysis assumed that minimum harvestable age was the age in which a stand could attain a volume of 65 cubic metres per hectare. However, in the scenarios presented, the number of stands harvested by the model with a volume of only 65 cubic metres per hectare was negligible.

The majority of stands harvested in the analysis, based on harvest volumes, appear consistent with the average volume per hectare actually harvested by licensees between 2001 and 2006, which ranged between 123 and 209 cubic metres per hectare depending on the licensee. In addition, operationally the minimum volumes harvested over that time

period by licensees ranged from 72 to 85 cubic metres per hectare which indicates that licensees have been able at times to harvest stands with relatively low volumes.

Based on this assessment, and in discussions with BCFS staff, I accept how this factor was modelled in the analysis.

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

#### Regeneration delay

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 the timber supply analysis, an average regeneration delay of 4 years was assumed for all even aged stands. This represents the mid-point of 3 years reported delay for planted stands and 5 years for naturally regenerated stands in the previous TSR 2 analysis.

One of the challenges in the near future is to determine the effect of the MPB infestation on regeneration in stands, or portions of stands, that are not salvaged. It is important to assess the extent of advanced regeneration in these stands as this regeneration can support mid-term timber supply. I address the need for this assessment under “Implementation.”

In the meantime, I accept the 4-year average regeneration delay assumed for this analysis for harvested stands.

#### Not-satisfactorily-restocked areas

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 is 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 26 654 hectares of current NSR in the TSA under licensee obligation to reforest. An additional 1180 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. At any rate, uncertainty in this factor affects long-term timber supply which was not the focus of this analysis; also, the area involved is very small relative to overall size of the timber harvesting land base (i.e., less than 0.2 percent) thereby posing low risk to timber supply in the long-term.

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

Silvicultural systems

A clear-cut with reserve silvicultural system is the predominate system used in the 100 Mile House TSA. Most mature forest stands in the TSA were developed by stand-initiating disturbances due to fire or insects. Clearcutting with appropriate retention can be designed to emulate these natural processes. As such, an assumption of clear cut harvesting with reserves was used in the analysis for most stand types.

A modified harvest (or selection) system was applied to Douglas-fir leading stands in the Natural Disturbance Type (NDT) 4 portions of the TSA. Mature NDT 4 fir stands were developed under frequent stand-maintaining disturbances and infrequent stand initiating disturbances. Consequently, selection harvesting better emulates these natural processes.

The analysis modelled these currently practiced systems. I accept that the timber supply analysis has appropriately accounted for this factor for the purposes of this determination.

Incremental silviculture

In general, incremental silviculture includes activities such as commercial thinning, juvenile spacing, pruning and fertilization that are not part of the basic silviculture obligations required to establish a free-growing forest stand.

Currently there is a small amount of incremental silviculture practiced in the TSA. These activities were not modelled in the analysis as they were assumed to not impact the short-term timber supply forecast. BCFS staff advise that the analysis reasonably reflects current practice given the small area involved. These activities, although important locally, are not likely to have a measurable effect on timber supply within the TSA even in the mid-term given the limited area treated. For the purposes of this determination, I am satisfied with the treatment of this factor in the analysis.

**(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 standards

Utilization standards define the species, dimensions and quality of trees that are harvested and removed from an area during harvesting operations. In the timber supply 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 currently in place for nearly all licensees in the TSA. Slightly higher utilization standards exist for pulpwood agreement (PA) 16. PA 16 harvesting is generally well below the 112 000 cubic metres apportionment and therefore represents only a small portion of the overall harvest in the TSA. BCFS staff therefore conclude that the analysis reasonably reflects current practice

in regards to this factor. I concur with that assessment and do not feel any adjustments for this factor are warranted for the purposes of this determination.

Decay, waste and breakage

Random destructive sampling of trees within VRI phase 2 ground sampling was undertaken in the TSA to develop net volume adjustment factors (NVAF) that account for decay and waste. The analysis used inventory volumes for the TSA that reflect the application of the NVAFs.

The NVAFs, however, were not designed to account for the recent MPB epidemic and the subsequent deterioration of killed tree stems due to the exposure of wood to sunlight and wildlife activity (such as woodpeckers) which may cause tree stems to check faster than would be expected when the wood is protected by bark.

The analysis assumed that the quality of the wood for lumber was 100 percent until the assumed shelf life expired. BCFS district staff are concerned that the quality may not be 100 percent prior to the expiry of the shelf life and that available short term timber volumes may be lower than modeled in the analysis.

Although this may be true, all of the scenarios modeled (which I discuss later under *mountain pine beetle epidemic*) in the analysis indicate that there's more available pine to salvage, even in stands with more than 70 percent pine, than can be harvested under the assumed short-term harvest levels. Consequently, if there is greater loss to decay, waste and breakage than assumed in the analysis, there is the opportunity to harvest additional MPB affected pine stands. In addition, early indications from shelf-life studies underway is that the shelf life assumptions in most of the scenarios are conservative (i.e., a longer shelf life is expected). For these reasons, I do not make any adjustments to the analysis based on this factor. Shelf life studies underway should be completed before the next determination which will help inform the next analysis for this TSA and I refer to the importance of this work under "Implementation".

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

Integrated resource management objectives

The Ministry of Forests and Range 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* 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 reductions in the timber harvesting land base. I have accounted for these factors in 'Land base contributing

to timber harvesting.’ 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, forest cover and green-up*

To manage for resources such as water, wildlife and scenic areas, and 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 timber supply analysis for the 100 Mile House TSA, 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, community watersheds, mule deer winter range, etc. where varying forest cover requirements apply. These are discussed later for each of these values.

For the general IRM zone, a 3-metre green-up was modelled except for MPB impacted stands projected to be 50 percent or greater dead by volume where the green-up constraint was not in effect. This provided the flexibility in the short-term to harvest pine dominated stands subject to the MPB. This flexibility reflects current practice in the TSA.

After the public discussion paper (PDP) was prepared, BCFS staff noted that the green-up constraints in the analysis, where it was in effect, was incorrectly applied across the larger Crown forest land base rather than just within the IRM portion of the timber harvesting land base. Further, regeneration delay was mistakenly overlooked in assessing green-up. The scenarios in the PDP were re-run with the correct application of the green-up constraint and these numbers are presented when discussing the scenarios later (e.g., *mountain pine beetle epidemic*). Relative to the results presented in the PDP, the new estimates do not change any of the key conclusions discussed in the PDP or in this rationale. In large part this is because assumed shelf-life rather than green-up appears to drive the scenario forecasts in this analysis. For example, for most scenarios the short-term harvest is directed at stands with greater than 70 percent pine which are often projected to be more than 50 percent dead by volume; as discussed, green-up constraints in the IRM zone were not in effect for these types of stands.

In conclusion, although some discrepancies were noted by staff in how green-up was modelled, the relatively minor corrected numbers have been provided to me for this determination.

- *visual resources*

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, the final draft 100 Mile House Sustainable Resource Management Plan includes visual resource management 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.

As a consequence, the analysis recognized about 35 hectares of preservation, 23 649 hectares of retention, 69 149 hectares of partial retention, and 41 103 hectares of modification VQOs. The maximum recommended allowable percent alteration (i.e., area less than green-up) by VQO category within a landscape unit was modelled: 0 percent for preservation, 1.5 percent for retention, 7 percent for partial retention, and 18 percent for modification. It should be noted that the 3 metre green-up constraint was not removed in visual resource management areas even if stands are projected to be greater than 50 percent dead (as occurred in the IRM zone).

In reviewing this information with BCFS staff, I am satisfied that the timber supply analysis appropriately accounted for visual resources in the various scenarios presented.

- *identified wildlife*

The province's Identified Wildlife Management Strategy (IWMS) addresses plant communities and species at risk, and regionally significant species. "Identified wildlife" are those 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 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. 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 100 Mile House TSA, 17 species at risk and one 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. Only three WHAs have been established; the WHAs are for mountain caribou which I discuss later.

While few WHAs have been established, MOE prepared in April 2005 a background document regarding the management of species at risk in the CCLUP area based on the species in the 2004 order. The background document identifies 11 326 hectares for mountain caribou, 1200 hectares of known sites for badger, and 80 hectares for great blue herons. Although no area is identified for other species at risk, long-term projections suggest 7500 hectares might be needed. The hectares represent total area projections (i.e., they are not mature timber harvesting land base projections); for example, the caribou areas are almost entirely outside of the timber harvesting land base. Based on this background work, 12 WHAs have been proposed for badger and one for great blue herons.

Minimal impact on timber supply is expected for the new identified wildlife species listed in the June 2006 update given their habitat requirements.

The timber supply analysis modelled current WHAs but did not take into account proposed or potential future WHAs as these decisions have yet to be made. While the decisions to locate WHAs have yet to be made, the decisions to allow for a one percent impact on timber supply for identified wildlife is part of government's approved timber supply impact policy in implementing the Code, now FRPA. Therefore, I normally account for this impact in my determinations and am satisfied that this approach is warranted in this TSA.

I therefore recognize in my "Reasons for Decision" a one percent downward pressure on timber supply in the mid-term. With the focus on salvage harvesting an abundance of largely dead or dying pine-dominated stands in most scenarios in the first 20 years, I do not believe there is a need to account for the one percent impact in the short-term. If future decisions are made by government regarding the management of identified wildlife and species at risk that result in impacts on timber supply that are different than those assumed in this determination, this can be accounted for in subsequent timber supply analyses.

*- mule deer winter range*

There are 26 mule deer winter ranges entirely or partly within the TSA as identified in the final draft 100 Mile House SRMP. The SRMP was prepared to be consistent with the direction provided by the CCLUP, subsequent management strategy and implementation guidance for mule deer winter range. The winter ranges occur in Douglas-fir dominated stands. The winter habitat includes shrub forage used mostly in early and late winter, but also in typical snow depths litter fall from Douglas-fir is required for food. Consequently the logging method needed to maintain mule deer winter range habitat is light selective harvesting.

The timber supply analysis scenarios that modelled an AAC uplift focused on stands with at least 70 percent pine for the first 10 years; the analysis therefore excluded the Douglas-fir dominated stands associated with mule deer winter range. In those scenarios that did not model an uplift, and for the final 10 years of all other scenarios (where a 20-year short-term analysis was undertaken), only the pine content of the stands within the winter ranges were available for harvest provided that the pine volume exceeded the minimum

harvest volume of 65 cubic metres per hectare. Outside of OGMAs, about 56 223 hectares of timber harvest land base occur in mule deer winter ranges including 14 956 hectares with pine volumes exceeding 65 cubic metres per hectare.

In reviewing this factor with BCFS staff, I am satisfied that mule deer winter ranges were appropriately accounted for in the analysis. I note that in all the scenarios, only the pine content within the mule deer winter range was available for harvest.

*- other wildlife*

Mountain caribou are listed as a species at risk with less than 2000 animals in the world, almost all of which live in BC. Suitable winter habitat is important to maintaining caribou populations; as snow depths increase, caribou move up in elevation into subalpine forests where they feed on arboreal lichens. The CCLUP and subsequent implementation work have defined a “no harvest” and “modified harvest” zones for caribou. In the analysis, harvesting was excluded from both areas. The “modified” harvest area represent only about 205 hectares of timber harvesting land base so the exclusion of these areas has a negligible effect on timber supply.

Mountain goats are regionally important but key habitat in the TSA is largely outside the timber harvesting land base with only seven hectares estimated to be in the land base, which Forest Analysis and Inventory Branch staff indicate may be purely an artifact of the mapping overlays that supported the analysis. Harvesting was excluded from all goat winter ranges and natal areas identified in the final draft 100 Mile House SRMP for the purposes of the analysis.

Bighorn sheep are provincially listed as a species at risk and are regionally important. Key habitat occurs in the Marble Range provincial park. Outside the park, key habitat includes about 923 hectares of timber harvesting land base, largely on dry, steep slopes and in visual resource management areas. These areas will likely never be harvested. For the purposes of the analysis, harvesting was excluded from all mapped sheep habitat identified in the final draft SRMP.

The final draft SRMP addresses other wildlife, such as moose and grizzly bear, and provides management objectives. These other wildlife were not specifically accounted for in the analysis because their management is not expected to have an additional TSA-level impact due to their broad and scattered distribution within the TSA.

In reviewing the approach taken in the timber supply analysis to account for caribou, goats, sheep and other wildlife with BCFS staff, I am satisfied that the analysis has adequately accounted for their habitat needs. The habitats of caribou, goats and sheep represent a very small portion of the timber harvesting land base, so any uncertainty in this factor will have a negligible impact on timber supply particularly in the short term.

*- community watersheds and hydrology*

Clinton Creek is the only designated community watershed in the 100 Mile House TSA. The Management Plan for the watershed constrains harvesting to no more than one percent per year. A very minor amount of harvesting has occurred in the watershed. The

timber harvesting land base outside OGMAs within the watershed totals 2606 hectares. This relatively small area was excluded from harvesting in the analysis in the short-term but contributed to reported mid-term volumes. None of these stands had a pine content that exceeded 70 percent. Therefore, their exclusion does not affect short-term timber supply availability associated with uplift scenarios. In reviewing this factor with staff, I am satisfied that the analysis appropriately modelled these watershed constraints in the TSA.

Bridge Creek and the Bonaparte River watersheds have specific objectives for fish and water quality in the CCLUP. The higher elevations of both watersheds have significant pine components and are where the majority of sustained run-off comes from. Salvage harvesting therefore could have significant implications on downstream flows and consequent habitat and water quality values. Under *mountain pine beetle epidemic*, I stress the need for increased levels of retention to reduce the negative impacts associated with a greater rate of harvesting on non-timber values including hydrologic and associated fisheries values.

- *trails*

Consistent with the CCLUP and subsequent recreation corridor management strategy, the final draft 100 Mile House SRMP recommends the maintenance of a 50 metre management zone on either side of buffered trails (identified on Map 9 in the SRMP) with the treed area inside the zone having a combined basal area retention of at least 85 percent. The CCLUP recognized trails in the TSA have not been designated under the *Heritage Conservation Act*.

In the analysis, the entire management zone totalling 5744 hectares was excluded from harvesting. This included 3173 hectares of stands with more than 70 percent pine. It was assumed that in the short-term, ample salvage opportunities existed elsewhere in the TSA given the magnitude of the MPB infestation.

In reviewing this factor with BCFS staff, I conclude that the analysis was more restrictive in the short-term than expected practices would suggest given the area of pine-dominated stands within the management zone where some salvage opportunities exist. I recognize in my “Reasons for Decision” a slight upward pressure in short-term timber supply of up to 0.5 percent to account for the 3173 hectares of stands with at least 70 percent pine that are estimated to occur in the trail management zones.

*- landscape-level biodiversity*

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 is often considered a key landscape-level consideration. Old forest retention can be achieved through the location of old growth management areas (OGMAs). This was accounted for in the analysis by the removal of OGMAs from the land base as previously discussed.

The CCLUP also includes mature plus old targets which were declared a higher level plan under the Code and have been carried forward under FRPA. The final draft 100 Mile House SRMP further defines these targets locally. The targets vary depending on natural disturbance type (NDT), biogeoclimatic zone, and the biodiversity emphasis option (low, intermediate, or high) for each landscape unit. The minimum targets ranged from 8 percent mature plus old in NDT3 Sub-Boreal Pine-Spruce zone (SBPS) with a low emphasis option to 54 percent in NDT1 Engelmann Spruce-Subalpine Fir (ESSF) zone with a high emphasis option. The definition of “mature” for the purpose of the targets was greater than 100 years of age for all biogeoclimatic zones except the ESSF where it was defined as greater than 120 years of age.

The mature plus old targets defined in the SRMP were modelled in the analysis. The CCLUP regional biodiversity conservation strategy (via Update Note #8) allows for the temporary drawdown of mature plus old targets to salvage stands with high lodgepole pine component and high beetle-caused mortality. Although this flexibility exists, BCFS staff indicate, however, that the targets assumed in the analysis were not a significant constraint on the scenarios. Consequently, I do not believe uncertainty in this factor will pose a consequential impact to short-term timber supply.

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

Other information

*- Interior log grade changes*

On April 1, 2006, new log grades were implemented for BC’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 and therefore were not modelled in the analysis nor considered in the AAC determination.

Under the new system, grades will be based on the log’s size and quality when it is scaled without regard to whether it was derived from a dead or live tree at harvest. To better account for all harvested volumes in AAC cut control, logs that were previously

considered grade 3 endemic or grade 5 will now be charged to the AAC. Therefore this volume needs to be considered in this determination.

The model used in the analysis to estimate existing stand volume (VDYP) does not report the volume of dead but potentially useful timber that exists in a stand. The total volume of useful timber is therefore greater than that estimated using VDYP. The inventory audit conducted for the 100 Mile House TSA, prior to the MPB epidemic, indicated that the potential volume from dead trees is approximately 6.4 percent of the volume from live trees over 60 years of age. Data from the harvest billing system from the period 1995 to 2004 indicate that grade 3 endemic and grade 5 volume is about 7.5 percent of the volume scaled from live trees at time of harvest.

To account for potentially usable volumes from dead trees, BCFS staff believe that the analysis underestimated timber supply by about 6.4 to 7.5 percent. I concur with that assessment, and account for about a 7 percent upward pressure on short- and mid-term timber supply in my “Reasons for Decision” based on this factor.

*- land use plan*

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 final draft 100 Mile House SRMP. The CCLUP and 100 Mile House SRMP were used in the analysis when accounting for various resource values. I am therefore satisfied that the scenarios presented to me are consistent with the direction provided by the land use plan.

*- First Nations considerations*

Three First Nations have communities in the 100 Mile House TSA. All three – Tsq’escen (Canim Lake), High Bar and Xatl’tem/Stwecem’c (Canoe Creek) bands – are Secwepemc (Shuswap) people. Other Secwepemc First Nations with asserted traditional territories in the TSA are T’excelc (Williams Lake), Esketemc, Bonaparte, Whispering Pines (Clinton), Skeetchestn and Simpcw (North Thompson). The Ts’kw’aylaxw (Pavilion) First Nation, a Stl’atl’imc community, also have asserted traditional territories within the TSA.

Some of the First Nations in the TSA noted above are involved in forest activities within the TSA including harvesting, silviculture and fire fighting, and have frequently expressed an interest in increasing their involvement. Some First Nations have joint ventures with major licensees. The Canim Lake and Canoe Creek bands both have woodlots in the TSA; the Canim Lake band also holds a non-replaceable forest license. The Bonaparte Band was one of the first in the Southern Interior Region to enter into a Forest and Range Agreement (FRA); the Esketemc First Nation also signed a FRA in 2004, and Pavilion signed an FRA in 2005. Accommodation agreements were signed in 2005 and 2006 with the Pavilion and Canoe Creek bands, respectively. The Canim Lake and Canoe Creek bands recently signed in 2006 interim agreements for Forest and Range

Opportunities (the successor to FRAs). Several other First Nations are in various stages of negotiations with respect to accommodation agreements which could significantly increase their involvement in forestry. Additional forestry opportunities should exist for First Nations as efforts increase to salvage stands killed by the mountain pine beetle.

Agreements-in-principle are being negotiated under the BC Treaty Process with the Northern Shuswap Tribal Council, which includes the Canim Lake, Canoe Creek, Soda Creek and Williams Lake bands, and the Esketemc First Nation.

First Nations have expressed concerns about the possible impacts of timber harvesting on values important to them including ethno-botanical forest resources and areas of cultural, medicinal and spiritual importance, as well as on fisheries and wildlife resources. The Northern Shuswap Tribal Council is developing a land use plan which is anticipated to identify their interests in these values.

I am also aware of input from the Bonaparte Indian Band for the neighboring Lillooet TSA timber supply review. For the Lillooet TSA review, the Bonaparte band presented several traditional use studies within boundaries that they identify as traditional territory and they have specifically provided an ecosystem based plan for areas within the Robertson Creek drainage of the Kamloops TSA. Although the plan has not been adopted by government, the plan identifies their key values and recommends specific management strategies to address those values. BCFS staff have also provided me with land base summary information around the identified traditional territory.

An archaeological overview assessment was carried out for most of the TSA in 1998 and was completed in 2002. The assessment indicates the relative potential for archaeological resources to be found, based on terrain features and anthropological factors, and is used to help determine where on-the-ground archaeological impact assessments are to be carried out. BCFS district staff note that most known cultural heritage resources in the TSA are found near water bodies and therefore often coincide with riparian reserves that are excluded from the timber harvesting land base. Consequently, in the analysis, no additional reductions or constraints have been applied. When new cultural heritage resources are located, for example, in the course of planning forest activities, district staff consult with First Nations and, for sites protected under the *Heritage Conservation Act*, with archaeology staff in the Ministry of Tourism, Sports and the Arts.

The BC Forest Service 100 Mile House Forest District consulted with First Nations regarding this timber supply review. The consultation process consisted of:

- A letter in October 2005 advising First Nations of the upcoming timber supply review to determine the need for an AAC uplift in order to salvage losses due to the mountain pine beetle. In response, some First Nations expressed an interest on when a meeting would be held and when the public discussion paper would be circulated.

- An invitation sent in November 2005 to First Nations to attend an informal meeting about the timber supply review on November 24<sup>th</sup>, 2005. No First Nations representatives, however, attended the meeting.
- An invitation sent on February 2006 inviting four select First Nations, with whom there had been significant dialogue about forestry in the TSA in the past to attend another informal timber supply review meeting to present and discuss preliminary results from the timber supply analysis. A representative from the Canim Lake band attended the meeting on February 14<sup>th</sup>, 2006..
- A presentation in March 2006 by the BC Forest Service on the timber supply review process in BC in general at a “Stewardship and Sustainability in the Secwepemcul’ecw” workshop organized by the Canim Lake band and FORREX. Some questions about the 100 Mile House TSA timber supply review were raised and answered at the workshop.
- An invitation on April 10, 2006 to First Nations to provide comments on the public discussion paper regarding the urgent timber supply review for the 100 Mile House TSA. In the letter, First Nations were also invited to attend a public information session that was held in May 16, 2006. A representative from the Esketemc First Nation attended the session.
- On April 26, 2006, an e-mail was sent to First Nations confirming the date for an information session that was scheduled specifically for First Nations on May 30, 2006. The date was chosen, based on telephone conversations, to enable the largest number of First Nations’ representatives to attend. Five individuals representing five First Nations attended that session.

A representative of the Canim Lake band provided a written submission with several recommendations. In my “Reasons for Decision”, several of the recommendations are addressed such as the need for retention strategies, targeting of stands with greater than 70 percent pine, and targeting of bark beetle infestations in spruce-leading stands.

The Bonaparte Indian Band responded with a letter on June 15, 2006 where they raised the issue of aboriginal rights and title, and provided similar concerns as raised by the earlier Canim Lake band submission. The BCFS responded to Bonaparte Indian Band on July 11, 2006 and committed to further opportunities of consultation on the concerns raised in the June 15<sup>th</sup> letter once an AAC determination is made. From the information on aboriginal interests that is available to me, the specific nature, scope or geographic extent of aboriginal rights, including title, have not yet been determined, although we are in receipt of Bonaparte Indian Band’s boundary of their traditional territory and how it exists in the 100 Mile House Timber Supply Area.

I am also aware of First Nations interest in expanding employment opportunities and how an increase in the AAC could facilitate this interest. This interest will be conveyed to the minister who has responsibility for apportioning the AAC.

I believe the analysis has reasonably accounted for cultural heritage resources, and none of the information available to me leads me to believe that First Nations’ interests have a downward influence on timber supply relative to the analysis. 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. Should new information be provided in the future, it can be accounted for in future determinations.

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

Alternative harvest flows

The nature of the transition from harvesting old growth to harvesting second growth is a major consideration in determining AACs in many parts of the province. In keeping with the objectives of good forest stewardship, AACs in British Columbia have been and continue to be determined to ensure that short-term harvest levels are compatible with a smooth transition to medium and long-term levels. Timber supplies need to remain sufficiently stable so that there are no inordinately adverse impacts on current or future generations. To achieve this, the AAC determined must not be so high as to cause later disruptive shortfalls in supply nor so low as to cause immediate social and economic impacts that are not required to maintain forest productivity and future harvest stability.

Several scenarios presented in the timber supply analysis for the 100 Mile House TSA, which are described later under *mountain pine beetle epidemic*, focus on the current impacts of the MPB epidemic by assessing effects on short-term timber supply in detail and on mid-term in general. This was needed to help ensure that a balance is struck between salvaging susceptible mature pine volumes while helping to provide timber supply in the mid-term. These scenarios assess the impacts of alternative harvest flow in the short-term based on both the level of harvesting and the focus of the harvesting on targeted stands. I have considered these scenarios, as representing alternative rates of timber harvesting from the TSA, in my determination.

- (c) **the nature, production capabilities and timber requirements of established and proposed timber processing facilities;**

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

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

Minister's letter and memorandum

The Minister has expressed the economic and social objectives of the Crown for the province a letter dated July 4, 2006 to the chief forester (attached as Appendix 3). This letter replaces the July 28, 1994 letter and a February 26, 1996 memorandum regarding economic and social objectives.

The letter stresses the importance of a stable timber supply while being mindful of other forest values. The letter also highlights objectives in the BC's Mountain Pine Beetle

Action Plan, that are applicable for areas of the interior including the 100 Mile House 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. 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 that regard, as noted previously in *land use plan*, the CCLUP and 100 Mile House SRMP were used in the analysis when accounting for forest values in the land use plan including non-forest resource values. The various scenarios provided me for consideration, as described below under *mountain pine beetle epidemic*, address shelf-life assumptions that are integral to the economic recovery of dead pine volumes. In my “Reasons for Decision”, I address the need to focus the majority of the AAC on stands with greater than 70 percent pine to promote economic sustainability for affected communities after the epidemic subsides by protecting non-pine volumes that can support mid-term timber supply. I also refer there to the need for retention planning given the nature of large-scale salvage operations due to the MPB infestation in order to conserve non-timber values. In “Reasons for Decision”, I also examine and account for the non-pine species requirements for manufacturing by the major licensee in the TSA.

### Local objectives

The Minister’s letter of July 4, 2006, asks that I 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.

Local objectives for land and resource use in the 100 Mile House TSA are largely captured in the Cabinet approved Cariboo-Chilcotin Land Use Plan (CCLUP) and related strategies and implementation documents including the final draft 100 Mile House SRMP (see *land use plan*). As previously discussed, the timber supply analysis assumptions for several factors were based on the direction in CCLUP and the SRMP. I am therefore satisfied that the scenarios provided are consistent with local objectives as expressed by these plans.

The *Urgent timber supply review for the 100 Mile House timber supply area: Public Discussion Paper* released in April 2006 resulted in a number of public comments, concerns and questions. District staff shared with me the many comments received including those from First Nations that I discussed earlier under *First Nations considerations*. A list of those who provided submissions are provided in Appendix 4. BCFS staff provided me with the comments as they relate to each of the factors that I have considered in this determination, and also provided me with an overall summary of public comments by issue. Comments addressed a variety of issues including forecast assumptions, shelf life, market supply and pricing, diversification and competition, community stability and economy, mid-term timber supply, value-added products,

environment and habitat, incentives and reward mechanisms, employment, forest practices, First Nations concerns and interests, administrative challenges, and several other topics. I have carefully reviewed these comments as they relate to the various factors described in this rationale that influence my determination.

Some of the comments are outside the ambit of my authority in making an AAC decision; many of these comments, however, will be considered through decisions made in other venues. For example, uncertainty in shelf life assumptions was a concern raised by several public comments – a concern I share. For these reasons, studies are underway to improve our estimates regarding shelf life so that this information can be factored into subsequent determinations; I have noted the importance of these studies under “Implementation”.

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

### Forest health

Several biotic and abiotic factors affect forest health in the 100 Mile House TSA. Forest stands are susceptible to a variety of damaging agents including wildfires, windthrow, disease and insects. Timber volume losses due to insects and diseases that normally affect stands (endemic losses) are generally measured and accounted for in the forest inventory and growth and yield estimates.

Infestations of key concern in the TSA, other than the mountain pine bark beetle (MPB) epidemic which I discuss later, include the spruce bark beetle, balsam bark beetle, western spruce budworm, and the Douglas-fir bark beetle. Given the magnitude of the MPB infestation, non-pine species such as spruce, balsam and Douglas-fir will be vital in supporting timber supply in the mid-term. Therefore continued concerted forest health efforts will be needed by the district and licensees to address these damaging agents.

The spruce bark beetle population markedly expanded in 2003 with a total 27 300 hectares of stands now affected by the beetle in the TSA. Although many of these attacked stands are a mixture of spruce and balsam, about 73 percent of the spruce in attacked stands has been killed by beetle. Nearly 4 million cubic metres of spruce volume have been killed by the bark beetle from 2003 to 2005. There is no indication that the spruce beetle infestation is slowing down. The shelf life of killed spruce trees is limited as they are located in moist to wet ecosystems. Many infested stands are found on highly productive sites, as indicated by a high site index; if they are not salvage harvested and reforested, a significant long-term loss of volume could ensue.

Relative to the MPB and spruce bark beetle, the other insect infestations are currently less of a concern. The infested area of balsam bark beetle has dropped from 26 722 hectares in 2004 to 15 446 hectares in 2005. Although the total area affected is comparable to the spruce bark beetle, volumes killed are much less with about 344 000 cubic metres estimated losses between 2003 and 2005.

About 57 892 hectares were affected by the western spruce budworm in 2005. Approximately 4500 hectares are projected to suffer severe defoliation, while the other

stands will be less severely affected. To address the budworm, about 7700 hectares were treated with Btk within the TSA in 2005. The defoliation does not imply tree mortality but reduced growth rates cause volume losses. Budworm population have been at epidemic levels since 1998 and although populations have fluctuated, there is no sign of collapse.

The Douglas-fir bark beetle infestation is not epidemic at this point in the TSA, although assessments indicate populations are increasing. Most of the scenarios in the timber supply analysis directed all harvesting in the short-term to stands with greater than 70 percent pine in order to enable the salvage harvest of MPB attacked areas. These scenarios did not account for mortality losses due to other agents particular the spruce bark beetle. Spruce-balsam stands make up about 9 percent of the TSA. Therefore district staff are concerned that no additional harvest allowance for the spruce beetle was accounted for in the analysis in these scenarios. Management of other insects aimed at controlling the infestation, particularly the spruce bark beetle, would help protect mid-term timber supply.

Volume losses due to the spruce bark beetle (about 4 million cubic metres) are about 10 percent those projected due to the MPB (about 40 million cubic metres). I concur with the need to control and salvage the spruce bark beetle (and other less prevalent insects), particularly when needed to protect mid-term timber supply. I therefore recognize in my “Reasons for Decision” the need to provide volume in my AAC decision to address other (non-MPB) forest health concerns.

The 100 Mile House District Forest Health Strategy addresses the MPB and non-pine forest health agents in the TSA. It is important to know the extent to which this strategy is being implemented so that these efforts can be factored in to the next determination. I have noted the need for this work under “Implementation”.

### Unsalvaged losses

Unsalvaged losses are timber volumes destroyed or damaged, by such agents as fire or disease, that are not recovered through salvage operations. The 100 Mile House TSA is well positioned to salvage many significant losses due to biotic and abiotic forest health factors given that it has an extensive road network and highly operable terrain, as well as the presence of major licensees and small scale salvage operators who have had a history of salvaging potential losses. Nevertheless, some unsalvaged losses do occur and, at some level, should occur since some dead trees can provide valuable functions across the forest landscape.

The previous timber supply analysis assumed annual non-recoverable losses of 34 370 cubic metres per year based on an estimate of recent averages and these losses were subtracted from the total harvest flow. The annual losses at the time were based on estimates from wildfire, wind damage, and a variety of insects and diseases. Since then, a major mountain pine beetle epidemic has and is occurring in the TSA. Unsalvaged losses due the MPB overwhelm potential losses due to other agents, and I address these potential losses below under the *mountain pine beetle epidemic* as they relate to various scenarios. I am satisfied that for the purposes of this determination that the current

analysis has adequately accounted for unsalvaged losses by focussing on potential losses as they related to the MPB which I address later.

### Small scale salvage

The small scale salvage program has been active in the 100 Mile House Forest District since its inception in 1998. From 1998 to 2003, the program was the key harvesting tool used by the district staff to deliver forest health objectives within the TSA. The volume issued and harvested under the program has increased significantly over the last several years from about 70 000 cubic metres in 2003 to nearly 130 000 cubic metres in 2005. The program now includes timber volumes for small business opportunities important in local communities. BCFS district staff note, for example, that small scale salvage harvesting supports a portion of the fibre profile utilized by the local log home sector within the TSA.

Small scale salvage harvesting is charged to the Forest Service Reserve which has an allocation of only 5250 cubic metres in the TSA. This is well below actual harvest levels due to small scale salvage. Public input to the public discussion paper included the desire to have part of the AAC allocated to small scale salvage program. BCFS district staff also support the need for an apportionment to the program.

Small scale salvage has an important role in supporting forest health management and in providing unique socio-economic opportunities within the TSA. A provincial small scale salvage program review is nearing completion which will help to better define the purpose of the program. My determination of an AAC does not include apportionment – that is the role of the minister. In my “Reasons for Decision”, I recommend to the minister that consideration be given to an apportionment for small scale salvage in recognition of the program’s important role in the TSA.

### Mountain pine beetle epidemic

Mountain pine beetles (MPB) are part of the natural process in lodgepole pine ecosystems. However, the current provincial outbreak has reached an unprecedented level in BC’s history of recording such events. The 2005 annual aerial overview survey indicates that about 8.7 million hectares of the province are affected including about 4.8 million hectares in the Southern Interior Forest Region. An immediate collapse to 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 huge pine mortality affects available timber supply and habitat, and associated economic and environmental values.

In 2005, based on the BCFS aerial overview forest health survey, the area with red attack in the 100 Mile Forest District was about 620 000 hectares. This is a dramatic expansion from about 1200 and 15 000 hectares infested in 2001 and 2002, respectively. Lodgepole pine represents about 57 percent of the total volume in the timber harvesting land base in the TSA. To date, the MPB has killed about 14 million cubic metres of mature pine – the equivalent of 10 years of harvest based on the current AAC. About 36 million cubic

metres of mature pine volume are projected to be killed by 2015 (i.e., an additional 22 million cubic metres) with another 4 million cubic metres of pine mortality expected between 2015 and 2026.

To address this epidemic for the purposes of this urgent timber supply review, various scenarios were developed for public review and consideration in support of this determination. In the scenarios, mature growing stock refers to stands greater than 80 years of age that are available for harvest – that is, they are in the timber harvesting land base.

Scenarios A, B, and C, as presented in the public discussion paper, illustrate that the MPB will have a bigger impact on the TSA than harvesting. Assuming a continuation of the current AAC, harvesting alone is expected to reduce mature growing stock by 27.5 million cubic metres by 2026. In contrast, the MPB alone (without harvesting) is expected to reduce the live standing inventory by 40 million cubic metres by 2026.

Scenarios 1, 2 and 3, also presented in the public discussion paper, illustrate that the total reduction in mature growing stock in 20 years will depend on the extent that harvesting and attacked or susceptible pine stands overlap. The most mature growing stock, 35.6 million cubic metres, was retained by first harvesting those stands with highest volumes of pine (scenario 2). Scenario 1, which prioritized stands for harvest based on highest volumes regardless of species composition, resulted in a 20 percent reduction in mature growing stock by 2026 relative to scenario 2. Scenario 3, where harvest was directed to stands dominated by species other than pine, resulted in a 34 percent reduction in growing stock in 20 years relative to scenario 2.

A general evaluation of mid-term timber supply illustrated that the more mature growing stock that is carried into the mid-term (2026 to 2099), the better. Furthermore, what minimum volumes licensees can economically harvest will determine how long the growing stock available in 2026 will contribute to mid-term timber supply.

BCFS staff advise that various integrated resource management (IRM) constraints typically reduce theoretical harvest levels by a quarter to a third. Using scenario 2 as an example, assuming: (i) these IRM constraints, (ii) that licensees could harvest very low volumes (i.e., to 65 cubic metres per hectare), and (iii) current AAC harvest levels beyond 2026; then the available mature growing stock would likely be exhausted by 2045. However, if licensees could only economically harvest stands with at least 150 cubic metres per hectare, the effective growing stock drops by 20 percent and this growing stock would likely be exhausted before 2040.

If mature stands greater than 80 years of age in 2026 are exhausted by 2045, the harvest beyond 2045 would depend on even-aged stands that are currently less than 60 years of age and the continued partial cutting of Douglas-fir stands. If all even-aged stands that are 40 to 59 years of age in 2006 were harvested between 2046-2055, ignoring the impact of constraints, they would only support a theoretical harvest level of 500 000 cubic metres per year. This is a 60 percent reduction from the current AAC. If all even aged stands aged stands that are 20 to 39 years of age in 2006 were harvested in their entirety in the subsequent 20 years (from 2055 to 2075), the harvest levels could rebound and exceed 800 000 cubic metres per year in the second decade (from 2066 to 2075) but still

well below the current AAC. To make this evaluation, the inventory information was used to estimate the area productivity and composition of these young stands and managed stand yield curves (TIPSY) were used to project future volumes.

These estimates, however, are maximums as approximately 50 percent of these volume projections come from young lodgepole pine stand that are currently less than 60 years of age, and there have been reported significant MPB attack in stands less than 60 years old in the TSA. The impacts on young pine stands represent a potentially significant but currently unknown downward pressure on timber supply that I have recognized in my “Reasons for Decision”. I have also noted the need to get a better assessment of these potential losses under “Implementation”.

The key conclusion here is that a significant pinch point in timber supply is expected mid-century that strongly suggests that extraordinary efforts need to be directed to protect mid-term timber supply within the TSA given the magnitude and extent of the current and projected MPB infestation. This further suggests that salvage efforts should be directed as much as possible towards stands with the highest pine content so that stands with surviving non-pine species can continue to contribute to mid-term timber supply.

Stands in the TSA over 60 years of age with at least 70 percent pine have very high pine content (about 90 percent pine on average) and therefore have on average very low non-pine volumes - about 13 cubic meters per hectare. Clearly such stands would not provide a mid-term harvest opportunity and should be salvaged while they still have economic value.

Stands with 40 to 69 percent pine that are over 60 years of age have a more substantive non-pine volume, averaging about 87 cubic metres. There is a good chance that the surviving non-pine volumes will provide merchantable volumes in the mid-term, and therefore efforts should be made to leave these stands unharvested over the next 10 years. Finally, stands with less than 40 percent pine content over 60 years of age should be left for the mid-term as they averaged 161 cubic metres per hectare of non-pine volume in 2005.

As previously mentioned, by the end of 2015, 36 million cubic metres of pine is projected to be killed across the timber harvesting land base. Restricting the harvest from 2006 to 2015 to stands with at least 70 percent pine would allow 26 million cubic metres of dead pine to be potentially harvested. The other 10 million cubic metres of dead pine outside this pool of stands would not be harvested to protect mid-term timber supply.

As a consequence of these conclusions, scenarios 4, 5 and 6 were developed, as presented in the public discussion paper, which restrict all harvesting to stands with at least 70 percent pine for the initial 10 years (from 2006 to 2015). These scenarios also assume:

- at least 70 percent pine stands with the highest merchantable volumes would be harvested first
- after 10 years there would be no need to restrict harvesting to stands with at least 70 percent pine
- that harvest levels would have to drop below the existing AAC during the second decade to ration out the remaining economically viable stands until managed

stands achieve a merchantable volume, and, with that in mind, a harvest rate of one million cubic metres per year was chosen for the second decade

Scenarios 4 and 6 assume a sawlog shelf life of 3, 5 and 10 years for wet, moist and dry ecosystems, respectively in the TSA. Scenario 5 assumes a longer shelf life – 6, 8 and 13 years for wet, moist and dry ecosystems, respectively.

Under scenario 4, a harvest level of 1.87 million cubic metres per year could be maintained for the entire initial 10 years of the harvest forecast. With scenario 6, a harvest level of 2.6 million cubic metres could be maintained for 5 years but then would need to drop to 1.6 million cubic metres for the following 5 years.

Under scenario 5, which is scenario 4 with the more optimistic shelf life assumptions, a harvest level of 2.1 million cubic metres could be maintained for the entire initial 10 years of the harvest forecast.

Subsequent to the preparation of the public discussion paper, another scenario was tested with even more optimistic shelf life assumptions (i.e., 11, 13 and 18 years for wet, moist and dry ecosystems, respectively). This scenario was not considered plausible based on limited current information about shelf life, but nevertheless was undertaken to test a very optimistic set of assumptions. Under this scenario, the harvest forecast for the first 10 years could be increased to 2.3 million cubic metres per year.

Scenarios 4, 5 and 6 were evaluated with respect to the volume of pine that could be salvaged and the impact on merchantable growing stock in 2026. For the purposes of this assessment, merchantable growing stock was assumed to be stands greater than 80 years of age with merchantable volumes of 150 cubic metres per hectare or more. The information below represents the corrected volumes subsequent to the public discussion paper (as discussed in *cutblock adjacency, forest cover and green-up*).

For scenario 4, 17.5 million cubic metres of pine can be salvaged (about 67 percent of the potential pool of 26 million cubic metres) with 22.4 million cubic metres of merchantable growing stock projected by 2026. For scenario 6, 19.7 million cubic metres of pine can be salvaged (about 76 percent of the total pool) with 22.1 million cubic metres of merchantable growing stock available by 2026. For scenario 5 with longer shelf-life assumptions, 19.6 million cubic metres of pine can be salvaged with 22.5 cubic metres of merchantable growing stock available by 2026.

Public input tended to favour scenario 4 with a wide variety of reasons provided. Some support was also expressed for scenario 6, maintaining the existing AAC, scenario 5, an uplift below scenario 4, and an uplift below scenario 5.

Scenarios 7 and 8 tested the impact on timber supply if only the “uplift” portion of the harvest (i.e., in excess of the current AAC) in scenarios 4 and 6, respectively, were restricted to stands with at least 70 percent pine. For scenario 7, about 11.3 million cubic metres of pine would be salvaged (35 percent less than scenario 4) with 18.0 million cubic metres of merchantable growing stock by 2026 (about 20 percent less than scenario 4). For scenario 8, 13.2 million cubic metres of pine could be salvaged (about 33 percent less than scenario 6) with 17.4 million cubic metres of merchantable growing stock by 2026 (about 21 percent less than scenario 6).

When comparing scenarios 7 and 8 with scenario 2 (where the current AAC is deployed to stands with highest pine volumes first), the total amount of pine salvaged are roughly equivalent, but the growing stock available in the mid-term under scenarios 7 and 8 are considerably less (about 30 percent) than scenario 2.

The results from scenarios 7 and 8 strongly suggest that not targeting the existing AAC to stands with greater than 70 percent pine will be detrimental to mid-term timber supply in the 100 Mile House TSA.

A report prepared for the Council of Forest Industries (COFI), titled *Timber Supply Analysis: Mountain Pine Beetle Impact on Interior Timber Supply Areas* (March 2006), was provided for consideration. The report suggests a more aggressive approach to salvage harvesting of MPB attacked stands by focusing harvest at stands with at least 40 percent pine. The report assumed a shelf life of 5, 10 and 15 years for wet, moist and dry ecosystems, respectively. The COFI analysis used an older inventory that did not contain the statistical adjustments that reduce mature pine volumes by 14 percent (see *volume estimates for existing unmanaged stands*). The other key discrepancies were the assumed size of the timber harvesting land base; the COFI analysis had a 10 percent larger land base than assumed in TSR 2, and may not have further reduced the land base for OGMAs as was done in the BCFS analysis. As a consequence, the COFI scenario in their report indicates much higher harvest level of about 4 million cubic metres are possible over the first 10 years. Taking into account these two factors should theoretically reduce that harvest level to approximately 3 million cubic metres per year over the first decade.

BCFS staff tested COFI's preliminary analysis by developing scenarios 9 and 10. These scenarios used most of the assumptions in the BCFS analysis, for example, related to volume estimates for mature pine stands and the size of the timber harvesting land base. The scenarios, however, applied COFI's shelf life assumptions and allowed stands with at least 40 percent pine to be harvested. Using these assumptions, both scenarios indicated an initial harvest level of about 2.9 million cubic metres per year, which could be maintained for 10 years in scenario 9, and for 6 years for scenario 10. Both scenarios assume 1 million cubic metres in second decade.

Scenario 9 focused harvests on at least 40 percent pine stands with the highest merchantable volumes first. This scenario indicates about 24.5 million cubic metres of pine could be salvaged (about 40 percent more than scenario 4) with about 20.6 million cubic metres of merchantable growing stock remaining in 2026 (about 8 percent less than scenario 4). Scenario 10 focused harvests on at least 40 percent pine stands with the highest volume of non-pine first. This resulted in about 22.2 million cubic metres of salvaged pine volumes (about 27 percent more than scenario 4) with 17.1 million cubic metres of merchantable growing stock in 2026 (about 24 percent less than scenario 4).

Scenarios 9 and 10 illustrate widening the pool of stands eligible for harvest to stands with at least 40 percent pine allows more pine to be salvaged but could have significant detrimental impacts on mid-term timber supply depending on which stands within the pool are harvested first. Stands with a high proportion of affected pine could degrade, becoming non-economic to harvest if stands with the lowest pine content are the target of initial salvage efforts.

Scenario 4 and 6 assume what I believe may be conservative shelf-life assumptions based on preliminary studies on this topic. If true, there may be some opportunity to extend the salvage of pine-killed stands beyond the 10 years assumed in these scenarios. However, the analysis used the version of the projections of the MPB epidemic based on 2004 data, as this was what was available at the time of the analysis. Since the analysis was undertaken, projections based on 2005 data suggest the epidemic may peak sooner; if so, this will hasten the time in which pine trees are killed in the TSA and may off-set some of the possible effects of a longer-assumed shelf-life. As a consequence I take more guidance in the shelf-life assumptions in scenarios 4 and 6 than in more optimistic scenarios such as 5, 9 and 10.

After carefully considering all of the scenarios (1 to 10) and associated assumptions, I conclude in my “Reasons for Decision” that a significant increase in the AAC is warranted, but that most of the new AAC (i.e., the current levels plus the increase) needs to be directed at stands with at least 70 percent pine. This is needed in order to maximize salvage of dead or susceptible pine prior to the expiry of their shelf life and to protect non-pine volumes critically needed to support mid-term timber supply. Increasing the AAC to harvest stands with at least 70 percent pine also allows these stands to be reforested with faster growing regenerated managed stands (relative to existing unmanaged stands) that can increase estimated volumes in the long-term. Under “Implementation”, I stress the need that harvesting performance be monitored by BCFS staff on an annual basis in cooperation with forest licensees, and that I be provided with these results in order to assess the extent to which stands with at least 70 percent pine are in fact being harvested.

Increased harvesting operations related to an increase in the AAC can lead to an increased risk to biodiversity, habitat, riparian resources, and watershed integrity. This highlights the need for increased levels of retention to reduce the negative impacts on these values that may be associated with a greater rate of harvesting. In December 2005, I provided *Guidance on Landscape and Stand Level Structural Retention on Large-Scale Operations Associated with Mountain Pine Beetle Killed Timber*. The guidance is intended to assist forest professionals in the planning and implementation of salvage operations. In this document I provide a recommended proportion of stand-level retention based on opening size. I encourage licensees to consider this guidance, in the development and implementation of retention plans, as they harvest the higher AAC that I have determined for this TSA. I reflect on the importance for retention plans further in my “Reasons for Decision”, and the need to track these efforts under “Implementation.”

My decision is predicated on a number of assumptions including the projected mortality of pine in the TSA, the shelf life of killed trees, and the importance of targeting stands with at least 70 percent pine. I am prepared to revisit this determination and reassess this decision if key assumptions that affect timber supply in the TSA significantly vary based on new information.

## **Reasons for Decision**

In reaching my AAC determination for the 100 Mile House 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- and mid-term timber supply 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 allowable short-term timber supply over the next 5 years, via an AAC decision, 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-term timber supply depicted in the analysis may have been underestimated and the evaluation of mid-term timber supply too pessimistic:

- *old growth management areas*: about 8840 hectares of at least 70 percent pine stands in transition or rotating OGMAs were deducted from the timber harvesting land base. Some harvesting within these OGMAs may occur which suggests that short-term timber supply represented in the analysis may be underestimated by up to 1.4 percent.
- *woodlot licences*: about 1171 hectares of the total area deducted for woodlots were in fact not issued to woodlots. This area should continue to contribute to timber supply in the TSA until the decision is made to issue the woodlots. As a result, timber supply depicted in the analysis is underestimated in the short- and mid-term by a very small amount (about 0.2 percent).
- *Crown land reserves*: about 6257 hectares of miscellaneous reserves were deducted from the land base when in fact these types of reserves do not preclude timber harvesting. As a result, timber supply depicted in the analysis is underestimated in the short- and mid-term by about 1.0 percent.
- *trails*: about 3173 hectares of stands with at least 70 percent mature pine are estimated to occur in the trail management zones which do allow for some timber harvesting, yet these stands were excluded in the analysis. As a result, timber supply depicted in the analysis is underestimated in the short-term by about 0.5 percent with a similar impact expected in the mid-term.
- *Interior log grade changes*: prior to recent log grade changes, usable volumes from dead trees accounted for in growth and yield estimates (VDYP) were not charged to the AAC, and this approach was modelled in the analysis. Under the new log grade system, which is now in effect, potentially usable volumes from dead trees associated with growth and yield estimates will be charged to the AAC.

As a result, timber supply depicted in the analysis is underestimated in the short- and mid-term by about 7 percent in the short- and mid-term based on the inventory audit and harvest billing data.

The following factors have been identified why the evaluation of mid-term timber supply may be too optimistic relative to assumptions made in the analysis or evaluation of mid-term timber supply:

- *old growth management areas*: should stands containing at least 70 percent pine in transition or rotating OGMA be harvested in the short-term, which I have accounted for above as a potential underestimation of timber supply in the short-term, this would constitute a corresponding up to 1.4 percent overestimation of timber supply in the mid-term as replacement areas would need to be added to the OGMA to compensate for any harvested stands, and these additional areas would largely be precluded from timber harvesting.
- *identified wildlife*: a 1 percent overestimation in timber supply to account for the potential impacts of managing for species at risk under the identified wildlife management strategy within the TSA in the mid-term.
- *young pine mortality*: an unquantified, but potentially significant overestimation of timber supply in the mid-term since the evaluation assumed no volume losses due to the MPB in immature lodgepole pine stands when in fact losses have been reported. I speak to this important issue further under “Implementation”.

The cumulative impact of these factors where the analysis may have either under- or over-estimated timber supply indicate that the short-term timber supply depicted in the analysis is underestimated. Given the unknown impact due to young pine mortality, I find it likely that the assumed timber supply in the mid-term evaluation is overestimated. This suggests greater caution on mid-term timber supply may be warranted relative to what was assumed in the mid-term evaluation. I address these implications relative to my decision below.

Ten scenarios were provided to me in the analysis which tested various assumptions about harvest levels, the relative focus of harvests on pine dominant stands, shelf life, and other factors that were discussed above under the *mountain pine beetle epidemic*; most of the scenarios are also described in greater detail in the April 2006 public discussion paper.

Scenarios 1, 2 and 3 illustrated that the total reduction in mature growing stock in 20 years will largely depend on the extent that harvesting and attacked or susceptible pine stands overlap. Scenarios 4, 5 and 6 demonstrate the implications of focussing harvest on stands with at least 70 percent pine in order to maximize that overlap and protect mid-term timber supply. Scenarios 7 and 8 illustrated that focussing only the “uplift” portion of the total harvest level (i.e., above the current AAC) to at least 70 percent pine stands results in significant negative impacts on mid-term timber supply relative to scenarios 4, 5 and 6. As a consequence, I do not find scenarios 7 or 8 to be an acceptable benchmark for my determination. Scenarios 9 and 10 showed that focussing short-term harvests on stands with at least 40 percent pine results in less mid-term timber supply relative to scenario 4. Having considered the information and in discussions with BCFS

specialists, I have concluded that scenarios 9 and 10 are not appropriate given the vulnerability of the TSA to mid-term timber supply.

Scenario 5 assumes a more optimistic shelf life than scenarios 4 and 6. Although there may be some optimism based on preliminary studies that these assumptions are reasonable, this is offset by the 2005 MPB data and projections which suggest that the pine trees will be killed sooner than projected based on the 2004 data that was available and used in the timber supply analysis.

Scenario 4 and 6 employed similar shelf life assumptions. Under scenario 6, the initial 5 years of the annual harvest forecast are higher (i.e., 2.6 million cubic metres) than scenario 4, but then in the subsequent 5 years the annual harvest level needs to substantially drop by nearly 40 percent (to 1.6 million cubic metres). In contrast, scenario 4 suggests that a more stable 10-year initial annual harvest of 1.87 million cubic metres is possible. Relative to scenario 6, I consider scenario 4 a more appropriate benchmark for my determination as it provides for a more stable timber supply, which should provide more stability to local communities. The harvest level depicted in scenario 4 also provides slightly more volume in the mid-term which is a key concern in the TSA following the salvage harvesting of MPB killed pine volumes.

After reviewing in detail each of the above scenarios with BCFS staff, and discussing the implications to short- and mid-term timber supply, I accept scenario 4 as a suitable reference for my decision. This scenario, for the most part, provides a reasonable balance between salvage of susceptible pine volumes in the short-term while providing for non-pine volumes needed to support mid-term timber supply. Other scenarios may enable the salvage of more pine volumes in the short-term, but provide greater risk to mid-term timber supply in the TSA.

Under scenario 4, a harvest level of 1.87 million cubic metres per year could be maintained for the entire initial 10 years of the harvest forecast before dropping to a long-term harvest level of 1 million cubic metres. Scenario 4 projects that about 17.5 million cubic metres of pine could be salvaged (67 percent of the potential pool of 26 million cubic metres) with 22.4 million cubic metres of merchantable growing stock projected by 2026 to support mid-term timber supply. However, this scenario assumes that all of the harvest is directed towards at least 70 percent pine stands.

I view the underestimation of timber supply in the short-term relative to that assumed in the analysis as providing even greater flexibility, than assumed in scenario 4, that initial harvest levels can be achieved. I am concerned about increasing the initial harvest levels in scenario 4 for stands with at least 70 percent pine, to account for this underestimation, due to the potentially corresponding impacts on mid-term timber supply in consideration of advanced regeneration that likely exists in some of these stands (which I discuss below). I am particularly concerned about impacts in the mid-term because of the unknown, but potentially significant, overestimation of assumed timber supply depicted in the mid-term evaluation due to mortality losses in young pine stands.

The one important factor missing in scenario 4, given its exclusive focus on susceptible mature stands at least 70 percent pine, is some allowance for mitigating the effects of other forest health concerns, particularly the spruce bark beetle. Some harvesting of

stands affected by the spruce bark beetle will be needed to salvage potential losses, and more importantly, where possible, to help protect mid-term timber supply by averting a potential spruce bark beetle epidemic.

As discussed above under *forest health*, volume losses due to the spruce bark beetle are expected to be about 4 million cubic metres or about 10 percent of the 40 million cubic metres of volume losses projected due the MPB epidemic. Most of the spruce stands affected by the bark beetle, however, occur in mixed stands with balsam. Therefore, leaving some of the affected stands will be important so that surviving balsam volumes are available in the mid-term.

Providing an overall AAC of 2 million cubic metres allows for 1.87 million cubic metres to be focussed on stands with at least 70 percent pine (as assumed in scenario 4) while also providing an additional 0.13 million cubic metres (about 7 percent) per year to address other forest health issues particularly the spruce bark beetle in stands dominated by spruce.

In making my decision, I also recognize the critical need to direct the vast majority of the AAC to stands with at least 70 percent pine as assumed in scenario 4. Other scenarios (e.g., scenarios 7 and 8) indicate that focussing just some of the AAC at these stands, while allowing considerable harvesting in stands with less than 70 percent pine will have a significant impact on mid-term timber supply. Under “Implementation”, I stress the need that harvesting performance be monitored by BCFS staff on an annual basis in cooperation with forest licensees, and that I be provided with these results in order to assess the extent to which stands with at least 70 percent pine are in fact being harvested.

A number of stands with at least 70 percent pine will not be harvested given my AAC decision (e.g., under scenario 4 about 33 percent of the volume in these stands are not salvaged). The careful selection of stands to harvest, and stands to be left for the mid-term, should be strongly influenced by the status of advanced regeneration in these stands. Stands with reasonably well stocked advanced regeneration may be better left unharvested in short-term so that existing regeneration can provide volumes in the mid-term. Other strategies may exist where the stand is harvested in manner that protects advanced regeneration. Prior to the next determination, I request under “Implementation” that licensees work with BCFS district staff to assess the extent of advanced regeneration in unharvested stands with at least 70 percent pine and to report on efforts to protect advanced regeneration in these stands so that these efforts can be factored into the next analysis.

I note that there is no apportionment for small scale salvage (SSS) in the TSA and that existing and expected harvesting far exceeds the Forest Service Reserve. I will therefore recommend to the minister that he consider apportioning some of the AAC for small scale salvage harvesting. Small scale salvage harvesting should help contribute to the district forest health strategy.

In my considerations that have led me to increase the AAC by 50 percent from 1 334 000 to 2 000 000 cubic metres in order to address the MPB epidemic, I am concerned that increased harvesting operations can lead to increased risk to watershed hydrology, biodiversity, habitat and other non-timber values. I therefore strongly

encourage forest licensees to consider my recent guidance on the retention strategies related to large-scale salvage operations, to develop retention plans in the TSA for their harvesting operations, and to report on the extent to which they were able to follow those guidelines and prepare and implement retention plans prior to the next determination. I request under “Implementation” that licensees work with BCFS district staff in this regard.

## **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 2 000 000 cubic metres. My expectations regarding the deployment of the **entire AAC** are discussed below under “Implementation”.

This determination is effective September 6, 2006, 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 salvage performance, 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 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 100 Mile House TSA.

- *AAC focus:* my determination is predicated on directing approximately 90 percent of the harvest at stands with at least 70 percent pine in order to optimize salvage opportunities while reducing risk to mid-term timber supply. Because of the importance of this issue, I need the assurance that in fact the **entire AAC** is being directed in a manner consistent with this 90 percent target. I urge BCFS district and regional staff to work with staff in the Forest Analysis and Inventory Branch to monitor licensee performance on an annual basis in cooperation with forest licensees, and that I be provided with a report of these results in order to assess the extent to which stands with at least 70 percent pine are in fact being harvested.
- *Shelf life:* Studies are underway to develop better estimates on shelf-life and I strongly support the timely completion of these and other studies that may be necessary to help ensure that more reliable assessments of shelf life are available prior to the next determination.

- *Young pine mortality:* potentially significant losses to mid-term timber supply due to MPB killed young lodgepole pine stands were not accounted for in the analysis. I have addressed this as an unquantified downward pressure. I urge BCFS staff to provide reasonable estimates of these losses in support of the next timber supply review.
- *Retention planning and implementation:* the substantial increase in the AAC due to this determination underscores the importance for retention planning and implementation so that non-timber values are addressed as harvest levels increase. I request that licensees work with BCFS district staff to report on retention planning and implementation efforts.
- *Advanced regeneration:* a number of stands with at least 70 percent pine will not be harvested given my AAC decision. Stands with reasonably well stocked advanced regeneration may be better left unharvested, or carefully harvested to protect regeneration, so that the regeneration can provide volumes in the mid-term. Prior to the next determination, I request that licensees work with BCFS district staff to assess the extent of advanced regeneration in at least 70 percent pine stands and to report on efforts to protect advanced regeneration in these stands so that this information can be factored into the next analysis.
- *Existing forest inventory:* consideration needs to be given to re-inventorying the TSA after the MPB epidemic has subsided. The inventory needs to identify what has survived the epidemic so that volume forecasts can be more accurately determined in support of the future determinations.
- *Growth and yield, and site productivity estimates:* I encourage BCFS staff and/or forest licensees to assess growth and yield on residual stands following the MPB epidemic that are not harvested and to verify and refine site productivity estimates for regenerated managed stands using locally derived data. This information will be important in support of future determinations.
- *District Forest Health Strategy:* I urge BCFS district staff to report on how well the 100 Mile House district forest health strategy is being implemented and opportunities for improvement so that this can be factored into the next determination.



Jim Snetsinger  
Chief Forester

September 6, 2006

## **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's letter of July 4, 2006**

#### **Appendix 4: List of Submissions Received**



JUL 04 2006

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

Dear Jim:

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

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

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

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

Page 1 of 2

Minister of  
Forests and Range  
and Minister Responsible  
for Housing

Office of the  
Minister

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**Jim Snetsinger**

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

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

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

Sincerely yours,

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

**Rich Coleman**  
**Minister**

## **Appendix 4: List of Submissions Received**

### **First Nations**

Canim Lake Band  
Bonaparte Indian Band

### **Forest industry**

Ainsworth Lumber Co. Ltd.  
Canada's Log People Inc.  
Canadian Forest Products Ltd.  
McDermid Harvesting Ltd.  
100 Mile Lumber (Division of West Fraser Mills)  
Pope and Talbot  
Sitka Log Homes Inc.  
Tolko Industries Ltd.

### **Forest consultants**

Montane Forest Consultants Ltd.  
Infinity-Pacific Stewardship Group

### **Resort tourism**

Moosehaven Resort

### **General public**

Ten submissions from individuals

### **Government agencies**

Ministry of Environment