

**BRITISH COLUMBIA  
MINISTRY OF FORESTS AND RANGE**

**Morice  
Timber Supply Area**

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

**Effective February 1, 2008**

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## **Objective of this document**

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

## **Description of the TSA**

*Location:* The Morice TSA is situated on the western edge of British Columbia's central interior plateau and covers approximately 1.5 million hectares of the Northern Interior Forest Region. The TSA extends from the most northerly tip of Babine Lake in the north to Ootsa and Whitesail lakes in the south.

Approximately 962 000 hectares within the TSA are considered productive forest land and 70 percent of this is available for timber harvesting under Crown tenure. Of this area, approximately 669 350 hectares or 45 percent is considered the timber harvesting land base (THLB) within the TSA boundary.

The TSA is administered by the Nadina Forest District in Burns Lake. The main community in the Morice TSA is Houston which accounts for about three-quarters of the population. The remainder of the population lives in smaller communities such as Topley and Granisle, or on the many ranches and farms along the Highway 16 corridor and in the area from Owen Lake to Francois Lake.

*First Nations:* The Morice TSA is within the traditional territories of eight First Nation groups including Cheslatta Carrier Nation, Nee Tahí Buhn Band, Skin Tyee Band, Wet'suwet'en First Nation, Lake Babine Nation, Moricetown Band Council, Tl'azt'en First Nation and Yekooche First Nation.

Cheslatta Carrier Nation, Nee Tahí Buhn Band, Skin Tyee Band, Moricetown Band Council and Yekooche First Nation have each signed Forest and Range Agreements (FRAs) with the Ministry of Forests and Range (MFR). These agreements provide tenure and revenue sharing opportunities for the First Nations. Moricetown Band Council has been issued a non-replaceable forest license in the Morice TSA in accordance with their FRA.

Wet'suwet'en First Nation and Lake Babine Nation each have a signed Interim Agreement on Forest and Range Opportunities (FROs). No forest tenures have been issued under these agreements within the Morice TSA. The Office of the Wet'suwet'en has been issued a direct award non-replaceable forest license in the Morice TSA.

*Environment:* I am familiar with the environment of the Morice TSA through my previous role as regional manager of the former Prince Rupert Forest Region, through discussions with Nadina Forest District staff and recent field reviews of the TSA.

The Morice TSA has a gentle, rolling landscape in the north and east, becoming more mountainous in the southwest. Major rivers include the Bulkley, Morice and Nadina. The overall climate is transitional between coast and interior, with cool summers and cold winters. The biogeoclimatic zone variants in the Morice TSA are dominated by subalpine balsam-spruce (SBS) forest types, with a significant amount of englemann spruce-subalpine fir (ESSF), as well as some coastal western hemlock (CWH).

The forests of the Morice TSA contain a diversity of plant and animal species. Within the THLB, lodgepole pine-leading stands predominate while the two other major tree species are hybrid spruce and subalpine fir (balsam). Trembling aspen, amabilis fir, western hemlock and mountain hemlock also occur in minor amounts. Numerous large mammal species are found, including black bear, moose, deer, caribou, cougar as well as various fish species.

Access to a diversity of landscapes, including lakes and rivers, provides a variety of recreation opportunities including camping, fishing, hunting, boating, snowmobiling, and backcountry recreation. In addition, the ranching industry depends heavily on Crown rangeland.

*Socio-economics:* More than half of employment within the Morice TSA is associated with the forest sector, making it one of the most forest dependant economies and least diversified economies in BC.

The Morice, Lakes, and Bulkley TSAs are very much economically linked and any changes to the available timber supply in one may have impacts on harvesting activity in the others, and on the collective forest industry in the three TSAs. The combined AAC for these three TSAs is 6.005 million cubic metres, with Morice TSA at 1.961 million cubic metres, Lakes TSA at 3.162 million cubic metres, and Bulkley TSA at 882 000 cubic metres.

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

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. Based on the 1999 to 2006 aerial overview of forest health and the British Columbia Mountain Pine Beetle (BCMPB) projection model, it is estimated that the total affected volume of both red- and grey-attacked pine trees, in the province is approximately 530 million cubic metres in 2007.

This represents approximately 40 percent of the total merchantable pine volume on the provincial timber harvesting land base (1.35 billion cubic metres). This unprecedented pine mortality is significantly impacting available timber supply and habitat, and associated economic and environmental values.

Normally, lodgepole pine less than 40 years old is not considered at risk to MPB because of the smaller diameter, good health and other attributes. Despite this, some

young stands are currently being attacked by the MPB, thereby reducing regenerating stand volumes and lower mid-term timber supply. The timber supply impact of mortality in young stands may be as little as 4 percent, but may be as high as 20 percent. This level of uncertainty indicates the need for additional work to provide a more refined estimate of mortality in young stands, which is underway.

While the forests of the Morice TSA have more species diversity than many TSAs in the northern interior, pine still represents 54 million cubic metres or 43 percent of the total volume within the THLB. The majority of this pine volume or approximately 50 million cubic metres, is mature or over mature, that is 60 years old or greater, and susceptible to the beetle epidemic within the TSA.

For 2006, the BCMPB.v4 projected that approximately 8.4 million cubic metres of pine will be killed in the Morice TSA. The projected kill for 2007 is 7.8 million cubic metres; and by 2010 it is estimated that the cumulative kill will be approximately 73 percent of the total mature pine volume. If beetle populations continue to expand as predicted by the MFR, the cumulative kill is expected to be approximately 78 percent of the total mature pine volume by 2018, when the infestation is projected to be over.

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 Morice TSA has been conducted.

### **Expedited process for an urgent AAC determination to address the infestation**

The Nadina Forest District’s strategy to deal with the impacts of the MPB epidemic is to maximize value recovery of dying and dead pine trees across the Morice TSA, with full consideration to protect and manage other non-timber resource values. MPB population levels are high across the majority of the TSA, and it is no longer possible to slow or prevent the epidemic. As such, the beetle harvest activities will be primarily focused on harvest and salvage of ‘in danger’, dying or dead lodgepole pine stands. This will reduce the net economic loss of timber value and provide the opportunity to bring beetle-killed forest land back into active production. Although lodgepole pine forests dominate a significant component of the Morice TSA, there exists significant diversity in many portions in terms of landscape features, elevation and species mix. This diversity provides opportunities for strategic retention planning to manage and protect other resource values.

The Nadina Forest District’s strategy and objectives in responding to the current infestation include guiding harvest power to high priority MPB-killed or infested pine stands, which are those stands equal to or greater than 70 percent pine component; reduce negative impacts of bark beetle infestations and salvage operations on biodiversity and other forest values as identified in the Morice LRMP; maintain the existing inventory as long as possible to minimize falldown impacts; ensure timely reforestation of attacked area; recover highest value from damaged timber; monitor beetle spread and harvested volume. In addition, most beetle management units in the

Morice TSA follow a salvage strategy and in light of climate change, the strategy calls for the monitoring of the rise of other forest health agents and of appropriate response actions.

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

As such, an expedited review process was undertaken that included a timber supply analysis and a public discussion paper (PDP) prepared and released for public and First Nations comment in June 2007. On this basis, I have proceeded to make an AAC determination in as timely a manner as possible, giving consideration to all the land use, forest growth, forest management, social and economic and other factors required by the statute to be considered. This rationale describes my considerations and reasoning on which my determination is based.

### **Innovative Forest Practices Agreements**

Six forest licensees operating in both the Morice and Lakes TSAs are holders of an Innovative Forest Practices Agreement (IFPA) with the MFR. These agreements are intended to provide the forest industry with opportunities to practice innovative forest management, in respect of which a regional manager may approve a forestry plan and determine related increases in the AACs of specific licences held by licensees participating in the IFPA. The determination of such increases in AAC resulting from innovative practices is provided for by Section 59.1 of the *Forest Act*.

The chief forester's determination of an AAC for an entire TSA under Section 8 of the Act, and the regional manager's determination of an AAC increase for specific licences under Section 59.1, are independent decisions. The Section 8 determination is based on analysis of current management practices and applies to the TSA as a whole. The determination for the IFPA is based on innovative actions taken by licensees to improve the productivity of the forest resource which can only be accomplished through their own actions and analysis in their own areas of operation, and their innovations contribute only to increases in the AACs of their own licences. To result in an AAC increase, the IFPA determination must reflect innovative practices not already accounted for by the chief forester in the AAC determination for the TSA as a whole. I have discussed the Morice and Lakes IFPA in more detail below, under '*Morice and Lakes Innovative Forest Practices Agreement*'.

### **History of the AAC**

The first comprehensive timber supply analysis was completed in 1981 with an AAC set at 2 000 000 cubic metres. In 1996, the chief forester determined the AAC to be 1 985 815 cubic metres, a level which essentially maintained the previous AAC after accounting for 14 185 cubic metres issued to woodlot licences. In October 2002 a new

AAC of 1 961 117 cubic metres was established which accounted for 24 698 cubic metres for additional woodlots.

Following the 2002 determination, the Minister of Forests apportioned 78 percent of the AAC to major licensees, 17 percent to BC Timber Sales (BCTS), and the remainder to First Nations, Woodlots, Community Forest Agreements, and Forest Service Reserve. Effective March 31, 2005 under Bill 28, approximately 4 percent or 75 000 cubic metres of the Morice TSA AAC was re-allocated to FRA/FRO non-replaceable licences and a community forest agreement.

Total volume issued under tenure for the Morice TSA is 2 126 536 cubic metres, which is 8 percent more than the allocated AAC.

### **Licensee performance**

West Fraser Mills and Canadian Forest Products are the two major licensees operating in the Morice TSA. The five-year cut control periods of both licensees ended December 31, 2006. By the end of this period licensees had cut approximately 90 percent of their combined cut, of which approximately 75 percent was pine species. There is currently an under cut of 744 790 cubic metres, of which, 494 066 is unrecoverable and 250 724 is recoverable for the cut control period ending December 31, 2010.

Since 2001, the annual volume of dead pine (grade 3 and 5) scaled has gradually increased; the annual volume of live (or green attack) pine scaled has steadily increased; and the annual volume of live and dead timber scaled from other species has steadily decreased. In April 2006, changes to the interior log grades made it difficult to distinguish 'green' pine trees from dead using the grading system. I note that overall, the volume of green harvested has been steadily decreasing since 2001.

### **New AAC determination**

Effective February 1, 2008, the new AAC for the Morice TSA will be 2 165 000 cubic metres per year. This represents an administrative adjustment of 203 883 cubic metres or approximately 10 percent to the previous AAC to account for the inclusion of the endemic dead potential volume, and includes a non-pine species partition, equating to 550 000 cubic metres per year.

This AAC will remain in effect until a new AAC is determined, which must take place within five years of this determination, unless postponed in accordance with Section 8 (3.1) of the *Forest Act*.

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

Information considered in determining the AAC for the Morice TSA includes the following:

- Technical review and evaluation of current operating conditions through comprehensive discussions with staff of the MFR staff including the AAC determination meeting held in Burns Lake on September 25 & 26, 2007.
- *Morice TSA Timber Supply Review: Binder for the AAC Determination Meeting, September 25 – 26, 2007.* (The binder includes additional reference background documents, data sources and inventories used in the timber supply analysis, and feedback received from public review), Nadina Forest District, 2007.
- *Comments on the Public Discussion Paper*, submitted to the Ministry of Forests and Range, June – August 2007.
- *Timber Supply Review for the Morice timber supply area, Public Discussion Paper*, Ministry of Forests and Range, June 2007.
- *Monitoring Harvest Activity across 16 Mountain Pine Beetle Impacted Timber Supply Areas*, Ministry of Forests and Range, Forest Analysis and Inventory Branch, June 2007.
- *Provincial-Level Projection of the Current Mountain Pine Beetle Outbreak: Documentation of revisions to the model resulting in BCMPB.v4*, Walton, A., Research Branch, Ministry of Forests and Range, Hughes, J., Research Consultant, April 2007.
- *Timber Supply and the Mountain Pine Beetle Infestation in British Columbia 2007 Update*, Ministry of Forests and Range, Forest Analysis and Inventory Branch, 2007.
- *Chief Forester's response to MPB and potential 2007 flooding.* Letter from Jim Snetsinger, Chief Forester, Ministry of Forests and Range, dated March 16, 2007.
- *Morice Land and Resource Management Plan*, Ministry of Agriculture and Lands, Integrated Land Management Bureau, 2007.
- Letter from the Minister of Forests and Range to the Chief Forester, Re: Economic and Social Objectives of the Crown, July 4, 2006.
- *Timber Supply Analysis Data Package Morice Timber Supply Area Timber Supply Review 2006.* Ministry of Forests and Range, July 2006.
- *Abundance of Secondary Structure in Lodgepole Pine Stands Affected by Mountain Pine Beetle*, Report for the Chief Forester, Coates, K.D., DeLong, C., Burton, P.J., and Sachs, D.L., Bulkley Valley Centre for Natural Resource Research & Management, May 26, 2006 2nd Draft.
- *Provincial Level Projection of the Mountain Pine Beetle Outbreak: An Overview of the Model (BCMPB.v3) and Results of Year 2 of the Project.* Eng, M.A., Fall, A., Hughes, J., Shore, T., Riel, B., and Hall, P., Ministry of Forests and Range website: <http://www.for.gov.bc.ca/hre/bcmpb/>, 2006.
- *Letter on log grade changes*, Bob Friesen, Ministry of Forests and Range, Tenures and Revenue Division, 2006.
- *Memorandum on log grade changes.* Doug Konkin, Deputy Minister, Ministry of Forests and Range, 2006.
- *Methodology for Determining the Adjustment Factor to Reconcile Historical Cut Control Practices with the New Log Grades*, BC Forest Service, 2006.
- *Ministry of Forests and Range Act*, consolidated to March 30, 2006.

- *Ungulate Winter Range Order for the Prince George TSA, Mountain Caribou (Takla Herd), 2006.*
- *Nadina District Forest Health Strategy, Ministry of Forests and Range, Lakes TSA, 2006.*
- *Hydrologic sensitivity of watersheds to MPB infestation in the B.C. Interior.* Summary of hydrologic consequences of the Mountain Pine Beetle infestation and salvage operations. Winkler, R., and D. Maloney, P. Teti, and J. Rex. Ministry of Forests and Range website.
- *Guidance on the Design and Implementation of Stand-Level Retention for Cutblocks in Large-Scale Salvage Operations, Jim Snetsinger, Chief Forester, Ministry of Forests and Range, December, 2005.*
- *2005 Overview of Forest Health in the Northern Interior Region. Summary of Aerial Surveys in the Northern Interior Forest Region, Ministry of Forests and Range, 2005.*
- *Background information for implementing species at risk objectives, Ministry of Environment, April 2005.*
- *Draft Ungulate Winter Range Order (U-006-002), Mountain Goat, Ministry of Environment, December 2004.*
- *Notice - Indicators of the Amount, Distribution And Attributes of Wildlife Habitat Required For The Winter Survival of Ungulate Species In The Morice Timber Supply Area, Ministry of Environment, December 2004.*
- *Notice - Indicators of The Amount, Distribution And Attributes of Wildlife Habitat Required For The Survival of Species At Risk In The Nadina Forest District, Ministry of Environment, December 2004.*
- *Forest and Range Practices Regulations, and amendments, 2004.*
- *Recommended operational procedures to address hydrological concerns, Ministry of Forests and Range, 2004.*
- *SIBEC Site Index Estimates in Support of Forest Management in British Columbia.* Mah, S, Nigh, G, Ministry of Forests and Range Forest Science Program, 2003.
- *Forest and Range Practices Act, and amendments, 2002.*
- *Morice TSA Rationale for AAC determination, Larry Pederson, Chief Forester, dated October 1, 2002.*
- *Timber Supply Analysis Report Morice Timber Supply Area Timber Supply Review, Ministry of Forests and Range, February 2002.*
- *Interim Harvesting Guidelines for the Telkwa Caribou Herd Recovery Program Area, 1999.*
- *The Procedures for Factoring Visual Resources into Timber Supply Analyses, Ministry of Forests, March 1998.*
- *Biodiversity Conservation Strategy, Ministry of Forests, July 1996.*
- *Biodiversity Guidebook, Ministry of Forests, 1995.*
- *Forest Practices Code of British Columbia, Guidebooks, MFR and MELP.*
- *Forest Practices Code of British Columbia Act, and amendments, 1995.*
- *Forest Practices Code of British Columbia Act Regulations, and amendments, 1995.*

## **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.

The analytical techniques used to assess timber supply are necessary 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. Although ongoing science-based improvements in the understanding of ecological dynamics 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, and do not necessarily provide complete answers or solutions to the forest management problems addressed in AAC determinations. However, the technical information and analytical methods do provide valuable insight into potential outcomes of different resource-use assumptions and actions and these are important components of the information that must be considered in AAC determinations.

In determining the AAC for the Morice 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 to manage uncertainty include:

- i. minimizing risk associated with making AAC determinations. To this end, 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. re-determining AACs frequently. This is particularly important in cases where projections of short-term timber supply are not stable, and to ensure AAC determinations incorporate current information and knowledge. Consequently, re-determining AACs at a minimum, every five years, is a legislated requirement as per Section 8 of the *Forest Act*. 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 of 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 or ecosystem-based management, remain uncertain, particularly when considered in combination with other factors. In each AAC determination I take uncertainties 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 analyze and account for the full timber supply impact 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 or conservation 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 as contributing any harvestable volume to the timber supply in AAC determinations. However, these areas may contribute indirectly by providing forest cover and other components to help attain other legislated resource management objectives such as those for biodiversity, wildlife, First Nation cultural resources, or those determined through government-to-government

discussions such as ecosystem-based management objectives.

The Morice TSA lies within the area covered by the Morice Land and Resource Management Plan (LRMP). 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 re-determine 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 made by the Supreme Court of Canada. I am aware of the Crown's legal obligation to consult with First Nations regarding rights and title in a manner proportional to the strength of their claimed interests and the degree to which the decision may impact these interests. In this regard, I will consider any information brought forward respecting First Nations' aboriginal interests, including operational plans that describe forest practices to address First Nations' interests. As I am able, within the scope of my authority under Section 8 of the *Forest Act*, I will address those interests. When aboriginal interests are raised that are outside my jurisdiction, I will endeavour to forward these interests to other decision-makers for consideration.

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

Overall, in making AAC determinations, I am mindful of my obligation as steward of the forest land of British Columbia, of the mandate of the MFR as set out in Section 4 of the *Ministry of Forests and Range Act*, and of my responsibilities under the Forest Practices Code and under the *Forest and Range Practices Act*. Section 4 of the *Forest and Range Practices Act* is reproduced as Appendix 2 of this document.

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 the 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 this range of forecasts, one is chosen which attempts to avoid excessive changes from decade to decade and significant timber shortages in the future, while ensuring the long-term productivity of forest lands. In typical analyses, this is known as the 'base case' forecast, and forms the basis for comparison when assessing the effects of uncertainty on timber supply. For the Morice TSA, rather than a base case, three possible scenarios with different assumptions were presented to me to consider, along with other sources of information. This alternative approach was used because our 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. Even though it is projected that approximately 78 percent of the mature lodgepole pine in the Morice TSA will be killed before this infestation is over, this is far from certain. It is also unknown how far down the age profile the MPB will affect. 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, the usual sensitivity analyses, for example, fine tuning the timber supply impact of small changes to the volume curves or THLB, were not conducted for the Morice TSA. Short-term timber supply under the current circumstances depends more on how we choose to deal with the projected MPB

epidemic rather than minor changes to land base or yield curves.

The analysis for Morice TSA timber supply review used data from a variety of sources including the Morice & Lakes IFPA and the Morice LRMP as described in the Morice TSA data package prepared in 2006. A computer model was used to project a number of possible timber supply forecasts over a 400-year planning horizon. The computer model was developed from the Spatially Explicit Landscape Event Simulator (SELES) that was used to support the Morice LRMP process. The model was modified for use in the timber supply analysis. The modifications allowed timber supply analysts to project the MPB infestation and available timber supply and incorporate assumptions of sawlog shelf-life. For the first 20 years of the forecasts, the projected spread of the MPB, shelf-life and harvesting were tracked at the stand level on an annual basis. The remainder of the forecast horizon was modelled on a decadal basis.

Three different timber supply forecasts or ‘scenarios’ were presented in the analysis. Each scenario projected a different rate and duration of harvest. These scenarios and their implications are described more fully in the section below.

#### Scenarios – analysis results

The first scenario showed the results of an increase in harvest by one million cubic metres for the first 10 years; the second scenario showed the results of no increase in the current AAC; and the third showed the results of an increase in harvest by 1 million cubic metres for the first 5 years. All scenarios assumed a stand required at least 150 cubic metres per hectare of merchantable volume to be considered a candidate for harvest. This minimum harvest criterion is more fully discussed in the ‘*minimum harvest criteria*’ section. Further, the analysis harvest rule prioritized harvest based on absolute highest stand volume being harvested first, regardless of species, and maintained the pine harvest focus by restricting or partitioning the amount of harvest in pine and non-pine stand types.

There are concerns about timber supply after the MPB epidemic is over; therefore the forests in the Morice TSA were treated as two populations. The non-pine population is comprised of stands where pine is less than 70 percent of the total stand volume. This population is expected to retain enough merchantable volume, after taking growth into consideration to be economically harvestable in the mid-term after the beetle epidemic ends. The pine population is comprised of stands where the pine volume is equal to or greater than 70 percent of the total stand volume. This group is expected to lose volume and become non-merchantable due to the MPB; therefore the target for short-term timber supply.

In scenario 1, uplift of 1 million cubic metres for the first 10 years, the non-pine portion of the Morice TSA can support a maximum sustainable non-pine harvest level of 885 000 cubic metres per year for the entire forecast period. To achieve the desired harvest target of 2 961 000 cubic metres per year, the harvest level from the pine portion of the Morice TSA was set at 2 076 000 cubic metres per year for the first 10 years.

I note that although this target is attainable, by the end this first 10 year period, almost all of the mature pine in the TSA is projected to be either killed and beyond shelf-life, or harvested. The harvest from the pine portion of the TSA drops to 10 000 cubic metres per year for the following 50 years. After year 60, harvest from the pine population can be increased to the long-term harvest level of 676 000 cubic metres per year.

The total non-pine growing stock gradually drops from the current level of 81 million cubic metres to a long-term level of approximately 41 million cubic metres. The total pine growing stock rapidly drops from the current level of about 44 million cubic metres to about 7 million cubic metres within the first 12 years. The pine growing stock then gradually recovers to approximately 29 million cubic metres in the long term.

In the second scenario, with no increase to the current AAC, the harvest from the pine population during years 11 to 59 would increase from 10 000 cubic metres per year to 125 000 cubic metres per year. Under this scenario, total volume harvested from the pine population is 4.25 million cubic metres less than that obtained in scenario 1 during the first 60 years but mid-term timber supply is more robust. Although more trees are killed by the MPB in the pine population under this scenario than in scenario 1, less live pine is harvested as only approximately 20 percent of the pine is expected to survive the epidemic, thereby conserving growing stock and enabling higher harvest rates in the mid term.

In scenario 3, uplift of 1 million cubic metres for the first 5 years, the mid-term harvest from the pine population could be as high as 200 000 cubic metres per year compared to 125 000 for scenario 2 and 10 000 for scenario 1. As in the previous two scenarios, the harvest level from the non-pine population is 885 000 cubic metres per year for the entire forecast period. The harvest from the pine population in scenario 3 is the same as that in scenario 1. However, the harvest rate in scenario 3 captures mortality while the MPB infestation is at its peak, but because harvest is reduced as the infestation slows, growing stock is conserved thus there is even greater opportunity to increase mid-term harvest than in scenario 2.

I am satisfied that these three scenarios provided me with a projected view of the harvest and growing stock levels over time. I referred to these scenarios while making my final AAC determination.

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

### **Section 8 (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,**

### Land base contributing to timber harvesting

#### *- general comments*

For this timber supply review, the THLB as summarized in table 2 of the February 2002 Morice Timber Supply Area Analysis Report, was updated to take into account changes that occurred since the last determination.

Reductions to the previous THLB include 22 000 hectares as a result of LRMP decisions; 2262 hectares for additional no-harvest areas after government to government discussions; and 573 hectares of high value caribou habitat in northeast portion of the TSA.

Rather than removing all land classified as agricultural land reserve (ALR), only a portion was removed. For each ALR zone, preference for land conversion was based on proximity to private land being closest first; deciduous-leading species first; and lowest elevation first. As a result, 10 223 hectares were added to the THLB. This is consistent with the LRMP.

As a result of these additional reductions and addition, the THLB used for this analysis was 669 350 hectares. I note that the Morice & Lakes IFPA conducted several analyses of the Morice TSA using differing assumptions which resulted in different THLB area. The difference between the TSR 3 THLB and the IFPA current status analysis with LRMP is 0.5 percent or 3225 hectares. I note that the IFPA current status analysis with LRMP used more accurate terrain stability mapping than ESA mapping and more refined scenario estimates to remove existing road areas from the THLB therefore the THLB derived is likely a better estimate of the THLB than the one used in TSR 3. The end result is that the two THLBs differ by 0.5 percent.

I have taken these additions and reductions to the THLB and as noted in the ‘**Reasons for Decision**’ section, I have taken this overestimation in the THLB into consideration when making my decision.

My considerations of the reasonableness of specific land base deductions as applied in the analysis are documented as follows.

*- economic and physical operability*

Operability is based on accessibility for the purpose of timber harvesting, and the economics of operating in certain terrain and timber types. Land classified as not meeting this definition was excluded from the THLB.

In the analysis for the Morice TSA, areas with slopes greater than 60 percent and above an elevation of 1360 metres were excluded. In addition, areas previously identified as inoperable in the historical forest cover inventory were also excluded. I note that combined, these exclusions resulted in a deduction of 21 492 hectares.

In TSR 2, an additional 26 081 hectares was removed from the THLB to account for areas unavailable for harvest due to high development costs. These areas are now completely overlapped by areas designated as protected areas or area specific resource management zones in the approved Morice LRMP. In this analysis, these areas are accounted for and discussed further below under '*exclusion of specific geographically defined areas*' and '*area specific resource management zones*' sections.

I am satisfied that the analysis regarding economic and physical operability reasonably reflects current management practices.

*- environmentally sensitive areas*

In the analysis for this timber supply review, approximately 114 000 hectares were removed to account for environmentally sensitive areas (ESAs). To account for highly sensitive recreation areas (Er1); and for areas classified as provincially significant for recreation (A0) on the provincial recreation inventory, approximately 6500 hectares were deducted. In addition, approximately 107 400 hectares were deducted to account for all other stands designated as highly sensitive areas and 20 percent of moderately sensitive soils areas.

Terrain stability mapping should have been used to remove areas with unstable soils. I note however, this was not done in the dataset used for the LRMP analysis and was inadvertently overlooked in this analysis. However, when considered with all the other land base reductions, the overestimation of the THLB is approximately 0.5 percent or 3225 hectares. As noted in '**Reasons for Decision**', I have taken this 0.5 percent overestimation in THLB into consideration while making my decision.

*- problem forest types*

Non-merchantable forest types are stands that are physically operable but not utilized in the Morice TSA.

In the analysis approximately 40 100 hectares of non-merchantable types were excluded from the THLB. These non-merchantable stands are primarily hemlock and deciduous leading stands. I note that all deciduous species were excluded from the estimation of volume in coniferous-leading mixed species stands.

I am satisfied that the analysis assumptions for problem forest types reflect current practices.

*- low productivity sites*

Low timber productivity occurs on sites not fully occupied by commercial tree species, or when factors inherent in the growing site, such as a poor availability of nutrients, a disadvantageous exposure, or the presence of excessive moisture, prevent a merchantable stand from reproducing within a reasonable time. Therefore, low timber productivity sites are not considered to contribute to timber supply.

For the Morice TSA timber supply review, forest development plan information such as existing and proposed cutblocks covering 101 000 hectares, was examined to define minimum site productivity criteria. Minimum site productivity criteria were chosen so that greater than and equal to 96 percent of existing and proposed cutblocks would remain in the THLB. Minimum site productivity requirements were not applied to any areas with a history of logging, but were applied to both immature and mature stands and where defined by leading species. The area excluded from the THLB due to low productivity equated to approximately 51 850 hectares, of which approximately 63 percent is either balsam- or spruce-leading stands.

An assessment conducted as part of this timber supply review confirms that these sites mostly correspond to stands incapable of generating a volume above 150 cubic metres per hectare by the time they reach 'old growth' status which is considered 140 years old in the Morice TSA. The licensees are using 150 cubic metres per hectare as the minimum stand volume for determining economic viability of a particular stand.

As part of the 2002 AAC implementation, the former chief forester instructed district staff to monitor harvesting performance on low productivity sites. A review of cruise data submitted between 2003 and 2007 indicated that stands with less than 225 cubic metres per hectare are currently not being harvested.

I note that although very little harvesting currently occurs on low productivity sites, I am satisfied that the analysis assumptions are reasonable because these non-pine leading stands will be relied upon for harvesting in the mid-term.

*- roads, trails and landings*

The road width recommended in the Morice TSA data package was 30 metres for mainline roads, 18 metres for operational roads and 10 metres for spur roads. However, I note that the reductions for roads, trails and landings used in the analysis were the same as those used in the 2002 timber supply review.

To account for existing roads, approximately 10 000 hectares were removed. To account for landings, a 2.1 percent reduction to existing cutblocks was applied, the same as used in the 2002 timber supply review. To account for future roads, approximately 19 200 hectares were removed.

Although there is uncertainty with the assumptions used, which minimally overestimates the THLB, I am satisfied that the roads, trails and landings information used in this timber supply review was reasonable and as noted in '**Reasons for Decision**', have taken this overestimation into consideration when making my AAC decision.

*- riparian areas*

In this timber supply analysis, a total of 9282 hectares were deducted for riparian habitat, which includes 8254 hectares for riparian reserve zones (RRZ) and 1028 hectares for riparian management zones (RMZ). In 2006, a review of approved Forest Development Plan (FDP) in the Morice TSA was completed. I note that the results of this review indicate that the level of retention in the RMZ for all riparian classes varies from site to site from a minimum of 0 percent basal area retention to a maximum of 100 percent. Further, information gathered from approved Forest Stewardship Plans (FSP) indicates that a minimum of 25 percent of the RMZ will be retained where a RRZ is required.

I note that generally current management practice for riparian management zones is to clearcut. However, there are some circumstances where retention for mitigating harvest impact on wildlife or reducing wind throw hazard within the RRZ is required. For instance, where a RRZ is not required, current practice is to retain non-merchantable conifer trees, deciduous trees, shrubs, and herbaceous vegetation within 10 metres of the channel or edge.

Although there is uncertainty with the assumptions used and deductions made for riparian areas in this timber supply review, the impact is minimal. I am satisfied that the assumptions used in the analysis reasonably approximate current practices.

*- specific geographically defined areas*

On May 1, 2007, the Morice LRMP was approved by government. The approved zoning confirmed the location and THLB exclusion status of 20 specific geographic defined areas. These areas were designated on June 30, 2004 as no harvest areas under Part 13 of the *Forest Act*. This order expired June 15, 2007. These 20 specific geographic defined areas were also recommended for designation as protected areas or as no harvest zones in the LRMP.

I note that since 2005, the major licensees operating in the Morice TSA have considered these 20 specific geographically defined areas as permanently unavailable timber supply purposes within their Sustainable Forest Management Plan (SFMP) and their IFPA. This is also confirmed through the current timber allocation plan, previously approved FDPs and approved FSPs. I am also aware that these 20 specific geographically defined areas have not yet been legally established. However, because the licensees have voluntarily agreed to refrain from harvesting within these areas for the past several years, I am satisfied that the assumptions used in this analysis reasonably reflect current management practice. Consequently, I accept the reductions that have been made to the

THLB respecting these land-use decisions and will be making no further adjustments to account for specific geographically defined areas in this determination.

*- community forests and woodlots*

The Morice TSA has approximately 33 575 hectares of area-based tenure including 19 362 hectares of woodlot licences and 14 213 hectares for a pending community forest agreement.

As of September 2007, the District of Houston has made application for a probationary community forest agreement covering 14 213 hectares which would support an AAC of approximately 20 000 cubic metres. A licence offer has been made by the Minister, which has been accepted and the licence award is imminent. As a result, the THLB will be overestimated by approximately 2 percent. As noted in the '**Reasons for Decision**' section below, I have taken this overestimation for the community forest licence into consideration in this timber supply review.

An evaluation for new woodlot licence potential within the TSA was undertaken in late 2006 to early 2007. From this assessment, no strong candidate areas were found mainly due to lack of adequate age class distribution in the candidate areas. As such, there are no new woodlot licences anticipated for the Morice TSA in the immediate future.

Since the previous timber supply review in 2002, two woodlot licences have had Schedule B land increases under the woodlot expansion program. As a result, the AAC attributed to woodlots should be increased by approximately 1500 cubic metres. As noted in the '**Reasons for Decision**' section, I have removed this volume from the available AAC for the Morice TSA in this determination. District staff informed me that they anticipate one additional woodlot licence to have a Schedule B land increase in the near future. Any future changes to woodlots will be considered in a subsequent timber supply review.

I am satisfied that the assumptions used in this timber supply analysis adequately reflect current management practices.

*- species and age class distribution*

Within the Morice TSA, pine stands dominate on 51 percent of the THLB, while the majority of the remaining stands consist of spruce and balsam. Once harvested, the pine, spruce and balsam dominated stands are generally regenerated to mixtures of pine and spruce, however, there is some natural ingress of balsam expected in the pre-harvest balsam dominated stands. As of 2006, stands within and outside the THLB are well distributed across all age classes. There are a large number of younger stands due to recent harvesting.

I am satisfied that the information presented to me on species and age class distribution is representative of the stands found within the Morice TSA and was appropriately reflected in the analysis.

### Existing forest inventory

From the 1998 inventory audit for the Morice TSA, initial indications were that standing volumes in operable stands over 60 years of age may be overestimated by approximately 5 percent, based on 25 plots; however, this difference is not statistically significant at the 95 percent confidence level.

In the 2002 AAC determination rationale, the former chief forester requested district staff to work with licensees to bring inventory depletions up-to-date. The depletion data used in this analysis is current to December 2005.

I acknowledge that the forest cover information used in this timber supply analysis is the best information available, and I am aware there is a possibility volumes maybe overestimated slightly. For this determination, I note that the existing inventory is suitable for doing this type of timber supply analysis and forms a good basis on which to make my decision.

### Expected rate of growth

For this timber supply review, the deciduous component of coniferous-leading stands was excluded from the volume estimates. Analysis units were stratified according to biogeoclimatic zones; leading species being pine, spruce or balsam; good, medium or poor site productivity; and natural, existing managed, future managed stand class.

The Variable Density Yield Prediction (VDYP) model (version 6.5a) was used to generate volume estimates for existing natural coniferous-leading stands. For existing natural stands, site productivity was obtained from the inventory estimates of site index. Standard decay, waste and breakage factors were used to generate VDYP volume tables, using the current waste benchmark of 10 cubic metres per hectare, set because of the MPB designation and salvage for the Morice TSA.

The standard MFR growth and yield model Table Interpolation Program for Stand Yields (TIPSY) was used to generate volume estimates for existing and future managed stands. Site Index by Biogeoclimatic Ecosystem Classification (SIBEC) estimates of site productivity were used for TIPSY curves.

I have reviewed and considered the information regarding the projected volumes for natural stands, managed stands, and waste, decay and breakage factors applied in this analysis. I am satisfied that the analysis assumptions were appropriate, accurate and reflect current management.

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

Stand regeneration, future growth rates

I have reviewed the information regarding regeneration, regeneration delay, operational adjustment factors and not-satisfactorily restocked areas (NSR). I note that there is currently only 172 hectares of backlog NSR in the Morice TSA and that this area was assigned to a TIPSY curve with species based on adjacent stands. I encourage and support the IFPA holders using the highest genetically improved stock available, as this will have a positive impact on the timber supply after the first 40 years. Overall, I am satisfied that the assumptions in the analysis for all these factors were appropriate. As a result, I will not discuss my considerations of these factors in this rationale.

*- Site index by biogeoclimatic ecosystem classification (SIBEC)*

The SIBEC project was initiated in 1994 when a need was identified to obtain better site index estimates than those from the forest inventory for old-growth stands. SIBEC site index estimates are acquired at the BEC site-series level and for more tree species and stand conditions. When conventional methods such as site index curves and growth intercept models cannot be reliably applied in old-growth or very young stands, the SIBEC model is used. This model assigns appropriate site index values to future stands once the over-mature stands are harvested, and to young stands that were assigned the site index value from the previous old-growth stand. Local data across the province has been collected to calibrate the SIBEC model.

The application of SIBEC estimates in timber supply analyses relies on the accuracy of the mapping technique. The estimates are usually applied using either predictive (PEM) or terrestrial (TEM) ecosystem mapping, but may also be applied by sampling the land base to determine the proportion of each BEC site series.

I note that the Morice TSA timber supply review included SIBEC site estimates in this analysis before the PEM met the accuracy requirements for inclusion in a timber supply analysis. The IFPA holders had completed a PEM, however it did not meet the required 65 percent accuracy level. Consequently, they completed more PEM work in an attempt to achieve the accuracy requirement. This work has been field checked and the data is in the process of being analyzed.

If this additional PEM work meets the accuracy requirements, then the site indices used in the analysis can be compared. The impact of using a PEM that has not met the standard, although unquantified at the time of this determination, does not pose a short term risk, therefore I recognize this as a tolerable risk, and I am satisfied that the analysis reflects current practice. In preparation for the next timber supply review, if the accuracy requirement is still not met, additional PEM work will need to be undertaken. As noted in the '**Implementation**' I request region and district staff to obtain the PEM data from the IFPA holders and if need be, complete an acceptable PEM to confirm the future use of SIBEC in yields. This information is to be included in the next timber supply analysis.

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

### Silvicultural systems and treatments

I have reviewed the information regarding silvicultural systems and I am satisfied that assumptions used in this analysis appropriately reflect current management practices which is predominately clearcut with reserves.

- (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**

### Timber harvesting

I have reviewed the information regarding the utilization standards and as discussed earlier, waste, decay and breakage factors used in this analysis for the Morice TSA, and I am satisfied that they were appropriately modelled and will not be discussing these factors further in this rationale.

#### *- interior log grade changes*

Prior to April 1, 2006, a log was assessed according to whether the tree it came from was alive or dead at the time of the harvest. Under the previous grade system, grade 3 endemic defined as the 'normal' mortality observed in a mature stand, and grade 5 defined as a dead tree with greater than 50 percent firm wood and log has defects such as twists, knots, and heart rot, were not charged to the AAC if harvested.

On April 1, 2006, new log grades were implemented for the BC Interior. Under the new system, grades are based on the log's size and quality at the time it is scaled or assessed without regard to whether it was alive or dead 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. Consequently, I will now account for this change in this determination.

I have discussed this factor extensively with staff and note that the model used to estimate existing stand volume, VDYP, does not report the volume of dead, but potentially useful, timber that exists in a stand at a given time. Pre-MPB epidemic, this dead volume either resulted due to between tree competition and/or endemic levels of pests and/or disease. The total volume of dead useful timber would therefore be greater than that reported by VDYP.

Possible sources of data regarding historical levels of potentially useful dead volume within stands include inventory audit plots, VRI phase II ground samples, permanent sample plots, and temporary sample plots.

At this time, the inventory audit is considered the best of the above-mentioned sources of data regarding dead potential timber in the Morice TSA. These data indicate that dead potential volume equates to approximately 12 percent of the green volume for the forested land base over 60 years of age.

District staff presented data from the harvest billing system for the period 1995 – 2004,

when taking dead logs to the mills was solely at the discretion of licensees. I note that this data showed that the sum of the grade 3 endemic and grade 5 volumes equated to approximately 11 percent of the green volume scaled.

Having reviewed the information presented to me on the interior log grade changes, I concur that the scenarios have underestimated timber supply by approximately 12 percent and have taken this into consideration in this AAC determination. I will discuss my considerations of this further under '**Reasons for decision**'.

*- minimum harvest criteria*

As noted earlier, all scenarios assumed a stand required at least 150 cubic metres per hectare of merchantable volume to be considered a candidate for harvest. District staff informed me that the licensees are using 150 cubic metres per hectare as their minimum stand volume for determining economic viability of a particular stand.

From public input, one licensee stated that the minimum harvest criteria should be 200 cubic metres per hectare for balsam and suggested that the analysis may overestimate the amount of volume available in the mid-term. In response, I note that no harvesting is occurring in stands with less than 225 cubic metres per hectare regardless of leading species. I further note that while little harvesting is currently occurring in stands with less than 225 cubic metres per hectare, most likely because of the current availability of high volume stands to harvest, the minimum harvest criteria of 150 cubic metres per hectare is likely reasonable when stands become scarce in the mid-term. If this trend were to continue, there will be an impact on the mid-term timber supply and I will reflect this in future determinations.

I am satisfied that the assumptions used in the scenarios for minimum harvest criteria and will have not have an impact in the short term, as harvesting in the low productivity sites will be available in the mid-term.

*- shelf-life*

A major assumption impacting the efficacy of any salvage program is the shelf-life of the dead lodgepole pine, or the length of time it will remain commercially viable. In this analysis the commercially viable product of concern was assumed to be sawlogs. Once the shelf-life is exceeded, the dead pine is assumed to revert to a non-recoverable loss (NRL). The NRLs may still be useable for chips or other non-sawlog uses.

Shelf-life depends on the moisture content of the log when it arrives at the mill, technology at the mill, and other factors. Despite the research studies underway in this province, there is no single "correct" number for sawlog shelf-life available. Based on anecdotal evidence gathered over the past few years, the shelf-life of individual trees assumed in this analysis is 2 to 3 years.

In the model, this means that trees killed by the MPB are assumed to be 100 percent useable as sawlogs for the first 2 years after death. In the third year, only 50 percent of

the volume is considered useful as sawlog material. From the fourth year onwards, all the dead trees are assumed to be unsuitable for sawlogs.

Although the scenarios analysed assumed that beetle-killed pine trees had a sawlog shelf-life of 2 to 3 years and the assumption that a stand should have at least 150 cubic metres per hectare to be merchantable, it will take approximately 4 to 7 years after initial attack before a stand which originally had 300 cubic metres per hectare to become unmerchantable. Therefore, as projected by the BCMPB model, the 'stand shelf-life' in the Morice TSA is approximately 4 to 7 years depending on merchantable volume before attack and the severity of attack.

Two sensitivity analyses were specifically conducted to examine the effect of different shelf-life assumptions on the pine component of timber supply. The first sensitivity analysis explored the impact of extending the sawlog shelf-life to 5 years. In the second sensitivity analysis a shelf-life of 20 years was used to assess the impact of harvesting most of the beetle-killed pine regardless of type of product.

The analyses suggest that if the sawlog shelf-life for beetle-killed pine trees is 5 years, it is possible to maintain a harvest level of 2.076 million cubic metres per year from the pine population for 10 years. The slightly longer shelf-life means that dead pine stands remain merchantable and are available for harvesting longer. As a result growing stock is conserved and the projected pine component of mid-term timber supply increases from 10 000 to 125 000 cubic metres per year.

If the shelf-life is 20 years, then it is possible to maintain a harvest level of 2.076 million cubic metres per year from the pine population for 16 years. The projected mid-term pine harvest then decreases to 250 000 cubic metres per year before increasing to a long-term level of 676 000 cubic metres per year.

From public input, three licensees commented on the shelf-life assumptions used. One stated that 'the 2 to 3 year shelf-life assumption used in scenario 1 is excessively short'. The other two licensees indicate that they believe that a five-year shelf-life is a more reasonable assumption 'as the lumber recovery factor is not significantly reduced during the first five years after attack', and that they currently use a shelf-life value of 5-years. In response, I note that these comments on shelf-life are assumptions relating at the stand level, where the 2 to 3 years corresponds to the time period when individual trees killed in a stand would be useable as sawlogs. As noted above, the stand shelf-life for stands in the Morice TSA is 4-7 years as not all pine trees in a stand are attacked the same year.

From public input, one licensee indicated that after the five-year shelf-life, some stands still could be salvaged if recent changes to scaled pricing were not in effect, and that 'the mid-term timber supply could be improved simply by adjusting the stumpage paid on dead pine volume to provide an incentive to salvage wood.' In response, I am cognizant of the MFR pricing system and the effects stumpage adjustments may have on the softwood lumber agreement. I have noted earlier that the interior log grades have recently been changed so the quality of the log when scaled will determine what grade

the log is, which determines the price of that log. In addition, grade 3 endemic and grade 5 logs can now be charged to the AAC. These changes were meant as an incentive to bring lower grade logs to the mills.

In conclusion, shelf-life is a complex issue as there are several factors such as stumpage rate, lumber price, sawmill configuration and technology, moisture regime at harvest site, and Canadian dollar exchange rate that have an impact on shelf-life. If the shelf-life is longer than that used in the model then more time is available to recover value from affected pine. I also acknowledge that the amount of pine projected to be salvaged is very sensitive to shelf-life. However, I am satisfied that the shelf-life was appropriately modelled based on the best information available.

- (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 (FRPA)* and other legislation provide for, or enable, the legal protection and conservation of timber and non-timber values. Consequently, the extent that integrated resource management (IRM) objectives for various forest resources and values affect timber supply, must be considered in AAC determinations.

All forest cover constraints required to manage for visual quality, wildlife habitat, old growth as well as area specific management objectives were respected in this analysis. These constraints are listed in the Morice TSA data package dated July 2006.

In the Morice timber supply analysis, some IRM objectives including ESAs, riparian zones, areas of cultural significance, and wildlife tree patches, were addressed through reductions in the THLB. I have accounted for the ESAs factor in the '*land base contributing to timber harvesting*' section. In this section, I account for IRM objectives where the affected portions of the land base continue to contribute to timber supply but are subject to various management requirements with respect to forest cover and adjacency.

I have reviewed the information presented to me regarding cutblock adjacency/green-up, stand-level biodiversity, and cultural heritage resources. I am satisfied that current practices were appropriately reflected in the analysis and accept the assumptions as modelled for use in this determination. As a result, I will not further discuss these factors in this rationale.

The factors discussed below are those for which I believe my consideration require more extensive documentation.

- *scenic areas*

The *Forest and Range Practices Act* enables scenic areas to be designated, and VQOs to be established, so that the visible evidence of forest harvesting may be kept within acceptable limits.

This analysis for the Morice TSA followed the Procedures for Factoring Visual Resources into Timber Supply Analyses (March 17, 1998). All scenarios assumed a visually effective green-up height of 5 metres.

The maximum allowable disturbance on the crown forested land modelled for visual quality classes 1, 2, and 3 were 1 percent, 5 percent and 15 percent respectively, while that for visual quality classes 4 and 5 was 25 percent. Current practice within the visual quality class areas is to continue harvesting within these areas as they are not 'log around' areas.

I have reviewed the information provided to me on scenic areas and am satisfied that these areas have been appropriately modelled and accounted for in the analysis. I note that approximately 12 percent of the THLB is in the retention / partial retention visual quality classes 1 – 3, and that this is the first year of monitoring to determine if the visual quality class objectives are being met. As noted in the '**Implementation**' section, I request district staff to report out on the performance within these visual quality class areas for the next timber supply review. This information will be incorporated into the next timber supply analysis.

- *landscape-level biodiversity*

Conserving landscape-level biodiversity involves maintaining forests with a variety of patch sizes, seral stages, and forest-stand attributes and structures, across a variety of ecosystems and landscapes. Together with other forest management provisions that provide for a diversity of forest stand conditions, the retention of old forest is a key landscape-level consideration. Old forest retention can be achieved through the location of old growth management areas (OGMAs).

As per the *Landscape Unit Planning Guide* (LUPG), Biodiversity Emphasis Options (BEOs) (i.e., lower, intermediate and higher) may be employed when establishing biodiversity management objectives for a landscape unit. It is generally considered that biodiversity can be adequately maintained in conjunction with the timber harvesting objectives when a reasonable distribution of options is maintained across the land base.

Within the Morice TSA, there is a provincial non-spatial old-growth order that applies. The landscape units and old-growth retention targets as were applied in the previous timber supply review were modelled in this analysis. Old-growth targets in landscape

units with a low biodiversity emphasis objective (BEO) were reduced by two-thirds. I note that the LRMP sets different seral targets than the provincial non-spatial old-growth order and the LUPG approach. When established as legal objectives, these targets will be somewhat more constraining on the timber supply, and I will take them into consideration at the next timber supply review.

I acknowledge that information submitted by Canfor and Houston Forest Products with their Forest Stewardship Plan (FSP), and information contained in the Morice SFMP indicate that some BEC variant combinations in some landscape units, for example the ESSFmv3 in the North Babine Landscape Unit or the SBSdk in the Houston Tommy Landscape Unit, are currently below the minimum target thresholds for old growth. However, I note that the overall targets for the BEC zone appear to be met.

Licensees also indicate that the deficit in all variants of the ESSF will be removed when the LRMP recommendation of using 140 years of age, rather than the current 250 years, for old growth age is implemented. I understand that the district is currently working with ILMB and other stakeholders to establish spatial OGMAs. Spatial OGMAs, as well as seral stage distribution objectives, wildlife tree retention objectives, patch size distribution objectives and objectives for no timber harvesting areas, once established, will help manage for landscape-level biodiversity.

Having reviewed the information provided for landscape-level biodiversity, I am satisfied that the assumptions used in this analysis were made using the best information available and are appropriate for this determination. I note, however, that there is some uncertainty regarding the current status for old-growth targets and that the district is currently monitoring FSPs to see if targets are being met. As noted in the '**Implementation**' section, I request district staff to monitor old-growth biodiversity retention relative to targets and report out for the next timber supply review.

- *wildlife*

For the Morice TSA, habitat mapping, wildlife habitat areas of general wildlife measures for deer, moose, elk, and grizzly bear is currently not available.

This timber supply analysis incorporated constraints to address northern caribou (Telkwa Caribou) as per the *Interim harvesting Guidelines for the Telkwa caribou Herd Recovery Program Area* (1999); mountain caribou (Takla Herd) as per the Ungulate Winter Range Order for the Prince George TSA (2006); and mountain goat as per the draft Ungulate Winter Range Order (U-006-002). The modelling assumptions for these species are also consistent with the Notice – Indicators of the amount, distribution and attributes of wildlife habitat required for the winter survival of ungulate species in the Morice TSA; and the Notice – Indicators of the amount, distribution and attributes of wildlife habitat required for the survival of species at risk in the Nadina Forest District.

I note that the Morice LRMP provides objectives for the identification of critical habitat and management recommendations for grizzly bear and deer. To support the

recommended Grizzly Bear Management Plan, Ministry of Environment (MOE) staff has completed habitat suitability mapping based on actual habitat use data. The mapping identifies static habitats and seral habitat. It is intended that specific operational practices will be prescribed for seral habitat. MOE staff will also be pursuing access management over a reasonable portion of the TSA for grizzly bear and caribou conservation, as per direction in the LRMP.

I understand that MOE is completing deer winter range mapping and that the majority of the best winter ranges are occupied by farms or the agricultural land reserve, and fringes on the SBSdk in the THLB. The deer are subjected to competitive pressure from agricultural expansion and timber extraction. MOE habitat estimates indicate that the winter range remnants are well below the effective threshold of 30 percent. MPB salvage harvesting is expected to occur in many of these remnants and MOE submits that there should be no further logging of deer winter ranges. I expect there will be enough dead pine to salvage thereby avoiding having to harvest in deer winter range. As noted in the '**Implementation**' section I urge district staff and licensees to work together to develop pine harvesting guidelines and adapt an interim policy to focus harvesting outside deer winter ranges.

I also understand that the Morice TSA provides attributes of goshawk habitat. MOE staff indicate that studies specific to the Morice TSA suggest that landscape-level habitat supply is more important than stand-level management practices, although individual nest sites should be protected by reserves of at least 24 hectares. If most of the even-age pine stands succumb to the MPB, goshawk, like pine marten, will adapt to other forest types for nesting. To this effect, MOE submits that non-pine types should be reserved from harvest at least until the mid-term together with a shift to single tree and group selection silviculture systems in the remaining non-pine types in the short term.

From public input, a guide outfitter was concerned that the increased harvest level for pine also increases the amount of harvest in non-pine species and that it is disastrous for their future and wildlife values. They believe that stands with spruce and balsam should be left for the future and mid-term timber supply. In response, I note that there is uncertainty regarding the impact of wildlife management on timber supply. However, this impact would be geographically specific and within the recommendations contained in the Identified Wildlife Management Strategy (IWMS).

Having reviewed the information on wildlife provided to me, I am satisfied that the assumptions used in the scenarios appropriately reflect current management practices. As noted in the '**Implementation**' section, I urge MOE to complete IWMS, WHAs, and deer winter ranges for the Morice TSA.

- *range*

Range is an important component of the MFR mandate and an important activity within the Morice TSA. Currently, there are 41 grazing licence agreements covering 138 584 hectares and 11 176 animal unit months; and 16 grazing lease agreements covering 2819 hectares.

I acknowledge that the MPB outbreak which increases harvesting activities, affects range mostly through the removal of natural range barriers and the introduction or spread of invasive plants.

Range barriers have been identified and mapped to facilitate other tenure referrals. Removing natural range barriers increases the control measures needed to keep the cattle from being in trespass. Costs to the tenure holder for having to construct new or maintain current fences on crown land increases, as does the time spent moving cattle. In addition, fencing as the control method, is not always the best approach as fences can have a negative impact on the movement and migration of wildlife populations.

Once introduced into an area, invasive plants are difficult and expensive to control and eradicate. Invasive plants compete with native vegetation and grasses and may result in altered ecosystems. They can have a significant impact on agricultural values by reducing yields. They can also be injurious or poisonous to livestock and protective defences on the plant, such as spines, can make it difficult for tree planters to re-forest a cutblock.

I acknowledge the district concern that there would be more contractors coming in from outside of the district with the potential of introducing damaging invasive plants into our forests and rangelands through seed movement on logging equipment and trucks.

From public input, a rancher expressed concern that increased harvest levels may impact natural range barriers. In response, to mitigate the impact of the MPB outbreak on range values and in order to strengthen range opportunities within the Morice TSA, district range staff is currently pursuing a number of initiatives related to a potential range strategy. When this range strategy is completed and implemented, many of the initiatives presented to me would lead to small reductions to the THLB and to an unquantified reduction to the growing rates of some managed stands.

I note that from the analysis reductions, approximately 21 000 hectares were removed from the THLB to account for agriculture land reserves, and as noted earlier in the '*Land base contributing to timber harvesting - general comments*' section, approximately 10 000 hectares were returned to the THLB. I am uncertain as to how much of this overlaps with the range tenure agreements. For this timber supply determination, I will not be making further reductions to account for grazing leases. However, as noted in the '**Implementation**' section, I request range staff to develop a range strategy which can be taken into consideration at the next timber supply review.

*- hydrologic considerations*

The Morice TSA is a highly diverse region with respect to ecosystems, fisheries and other aquatic resources, and includes major tributaries to the Fraser and Skeena River watersheds. It is also the home of several species at risk such as caribou and grizzly bear, and of world class anadromous fisheries.

The unprecedented scale of the MPB infestation and the widespread mortality of lodgepole pine stands are known to affect watershed and hydrological processes. Stand mortality and salvage logging can impact watershed hydrology by increasing water yield as well as the magnitude and timing of peak flows, which can influence erosion and sedimentation processes.

Hydrologists indicate the MPB influences the water cycle by killing pine which reduces stand level transpiration, and through the loss of pine foliage which reduces the interception and evaporation of precipitation which may result in increased snow pack and rainfall reaching the ground. Further, reduced shade levels in dead pine stands can accelerate snow melt. The magnitude of hydrologic change will depend on the severity and time since attack; the presence and amount of understory vegetation; the extent of salvage logging within stands and across a watershed; the occurrence of fire; the physical characteristics of the watershed, and the weather.

In March 2007 the Forest Practices Board released a study of potential changes in stream flow following MPB attack and salvage harvesting in the Baker Creek watershed west of Quesnel. Although the study area is located outside of the Morice TSA, the study suggests that salvage logging of beetle-infested trees can significantly increase stream flows and the frequency of floods.

MFR research ecologists and hydrologists are actively engaged in research projects involving MPB and hydrology in the central interior. These include studies on watershed sensitivity as identified by changes in snow accumulation and melt processes, water table elevations, and the effects of riparian harvesting on fish habitat and ecology of small streams, assessments of riparian zone composition along S4 creeks which are those creeks or streams less than 1.5 metres in width in pine-leading stands. Other relevant studies include a synoptic survey of riparian and stream function in the Bowron River watershed to assess their state of ecological function more than 20 years after large scale salvage and a study of S4 stream riparian function and water temperature within grey-attack and salvage harvested stands of the Vanderhoof Forest District.

In the timber supply analysis for the Morice TSA, hydrologic considerations were not explicitly modelled. However, provisions for adjacency, green-up and other forest cover objectives such as visual quality, landscape-level biodiversity and wildlife, were incorporated into the analysis and were discussed earlier. In practice, these requirements will help to lessen hydrologic impacts by guiding harvesting operations and providing for a distribution of harvested areas and retained forest cover in a variety of age classes across the landscape.

The timber supply analysis indicates that in order to preserve mid-term timber supply, harvesting must currently be directed to stands containing at least 70 percent pine. I note that harvesting of pine-leading stands over the next five years would likely be concentrated in the central portion of the TSA and may result in high Equivalent Clearcut Areas (ECAs) within some watersheds as determined by a qualified professional.

The IFPA SFMP for the Morice TSA contains a commitment related to ECAs of less than or equal to 30 percent, in sensitive watersheds which include portions of the Morice and Bulkley Rivers. Monitoring is completed every five years and is linked to certification requirements to ensure water quantity and quality are sustained.

MOE staff advocates confining uplift volumes to pure pine types, increasing riparian retention in salvage harvested stands to mitigate hydrological impacts, fisheries impacts, and biodiversity impacts through the application of ecosystem-based riparian best management practices developed under LRMP direction. They also recommend increasing coarse woody debris and wildlife tree retention.

In addition, MOE staff note that the Morice LRMP recommends partial cutting, selective harvesting, or commercial thinning be used instead of clearcutting "...to reduce the hydrological impacts of insect control activities". The Morice LRMP also recommends the establishment of a Watershed Advisory Committee and the establishment of hydrologic integrity indicators. I note that neither recommendation has yet been implemented.

While there may be increased risk associated with salvage harvesting, negative impacts may be avoided through the implementation of several specific MFR planning guidance documents cited in '*Information sources used in the AAC determination*'.

In conclusion, for the reasons mentioned above and the extensive salvage harvesting being implemented, hydrologic concerns need to be kept in the forefront when considering management practices and impacts on other resources and surrounding landscape. I encourage licensees to review the results of emerging research, access appropriate expertise to identify potential impact levels, and follow FRPA requirements regarding water quality and riparian habitat. I note the considerable uncertainty associated with the cumulative impact of hydrologic considerations on timber supply and have further discussed this in my '**Reasons for Decision**'.

*- area specific resource management zones*

As noted in the '*exclusion of specific geographically defined areas*' section above, the Morice LRMP identifies a number of Area Specific Resource Management Zones. For the remaining zones, forest cover constraints were applied as per the Morice LRMP. I note that the LRMP has seral stage targets for early, mature plus old, and old seral stages for the general forested area. However, since old-growth targets were modelled as per the provincial old growth order, only the early seral targets from the LRMP are included in this analysis.

I also note that as an outcome of the government-to-government discussions that occurred after consensus was reached on the final LRMP recommendations, the Old Fort Mountain area was added as an area specific management zone. In this area, harvesting activities are to be limited to forest health management such as single tree removal or small patch harvest. This area overlaps with approximately 1400 hectares of THLB.

Since small patch harvesting is allowed, the analysis should have assumed that no more than 30 percent of the area may be disturbed.

I acknowledge that there is uncertainty with the analysis assumptions in that approximately 900 hectares of THLB should have been constrained, resulting in a slight downward pressure on timber supply. Overall, I am satisfied that the analysis modelled to the specific requirements addressed in the LRMP and therefore acceptable for this determination. I will be making no further adjustments for these area specific resource management zones.

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

### Morice Land and Resource Management Plan

The planning process for the Morice LRMP began in October 2002. Final consensus was achieved by the planning table in March 2004. After final consensus, government-to-government negotiations between Government and First Nations in the plan area took place to identify and reconcile outstanding issues.

One of the outcomes of the government-to-government discussions was an increase in the proportion of protected area and a corresponding decrease in the amount of 'no harvest' area-specific resource management zone (RMZ). I note that for the purposes of the analysis both the protected areas and the 'no harvest' areas are unavailable for timber harvesting. Therefore, the change in zoning does not affect the assumptions used in this analysis, as discussed in the '*exclusion of specific geographically defined areas*' section above.

Another outcome was the addition of the Old Fort Mountain area specific management zone. In this area, harvesting activities are to be limited to forest health management such as single tree removal or small patch harvest. This area overlaps a small section of THLB as discussed in the '*area specific resource management zones*' section above.

These outcomes were incorporated into the final LRMP document which was approved by Cabinet in February 2007 and officially announced and released to the public on July 18, 2007.

The LRMP includes twenty geographic resources management zones (RMZ) and seven new protected area. Of the twenty area specific RMZ, five are designated as no timber harvesting areas, and forest cover constraints apply to an additional ten.

I note that to implement the LRMP, the MFR district office has overseen the completion of visual landscape inventory and is overseeing the completion of range best management practices and a lakeshore management strategy. This work will lead to the establishment of new scenic areas, new visual quality objectives, range best management practices, and lakeshore management zones and objectives.

I also note, that in collaboration with other agencies, industry and First Nations, the MFR district office is involved in a Biodiversity Technical Working Group tasked with technical aspects related to the establishment of land use objectives. This includes Old Growth Management Areas (OGMAs), High Biodiversity Emphasis Areas, seral stage distribution, patch size distribution, and wildlife tree patch objectives. I acknowledge the efforts of those who have participated in these initiatives, noting that any new information can be used in future timber supply analyses.

As noted above in the '*exclusion of specific geographically defined areas*' and the '*area specific resource management zones*' sections, I am satisfied with how the analysis modelled the assumptions from the LRMP and therefore am making no further reductions for the Morice LRMP in this determination.

### First Nations Consultation

The Morice TSA boundaries encompass portions of the traditional territories of eight First Nation groups which include Cheslatta Carrier Nation, Nee Tahí Buhn Band, Skin Tyee Band, Wet'suwet'en First Nation, Lake Babine Nation, Moricetown Band Council, Tl'azt'en First Nation and Yekooche First Nation; as well as one First Nation representation group, the Office of the Wet'suwet'en.

The Yekooche First Nation, Moricetown Band Council, Skin Tyee Band, Nee Tahí Buhn Band, and Cheslatta Carrier Nation have each entered in a Forest and Range Agreement which stipulates a 60-day response period when consulting on administrative decisions.

Lake Babine Nation has signed an Interim Agreement on Forest and Range Opportunities which also stipulates a 60-day response period when consulting on administrative decisions.

A consultation protocol has yet to be finalized with Wet'suwet'en First Nation under their signed Interim Agreement on Forest and Range Opportunities.

The Office of the Wet'suwet'en and Tl'azt'en First Nation have not entered any agreement with the Ministry of Forests and Range specifying consultation timelines.

Since no formal consultation process has been defined with the Wet'suwet'en First Nation, Office of the Wet'suwet'en and Tl'azt'en First Nation, a 60-day consultation was used and is consistent with MFR Consultation Guidelines.

The consultation process followed by MFR First Nations staff consisted of various letters, faxes and phone calls being directed to the above-mentioned First Nations throughout the duration of the 60-day consultation period of June 7 to August 7, 2007. All First Nations were given a written copy of the Public Discussion Paper and encouraged to bring forward any aboriginal interests specific to the Morice TSA that may potentially be impacted by the pending decision.

Consultation was also undertaken on the timber supply review process. This consultation occurred from April 11, 2007 to June 8, 2007. The consultation consisted of the methods described above, with the exception that a written copy of the data package was provided rather than the public discussion paper.

Throughout the consultation period, Nadina Forest District First Nations staff attempted to engage the above-mentioned First Nations in meetings or discussions concerning this decision. No meetings were requested by any of the First Nations.

I acknowledge that one First Nation commented that they have no concerns with the public discussion paper; and another First Nation provided a written request to transfer the non-replaceable forest licence awarded under their FRA from the Lakes TSA to the Morice TSA. I have added the issue of licence transfers in the '*alternative harvest flow*' section below. There were no other responses, written or verbal, related to aboriginal interests received from the other First Nations.

Consultation has been satisfactorily carried out and followed the Ministry of Forests Consultation Guidelines as well as consultation processes outlined in any agreements with the First Nations in the Morice TSA. I am satisfied that First Nations have been provided with reasonable opportunities to provide input on their aboriginal interests and how those interests may be affected by my AAC determination. Through this consultation effort no specific aboriginal interests were brought forward as being impacted that leads me to conclude that an adjustment relative to this timber supply analysis is required to account for aboriginal interests at this time. MFR staff will be available to meet with First Nations to discuss my determination and respond to any related questions.

#### Morice and Lakes Innovative Forest Practices Agreement (IFPA)

As noted earlier, in '*Innovative Forest Practices Agreements*', six licensees are participating in an IFPA in the Morice TSA. The Morice and Lakes IFPA was awarded in 1999. The IFPA is a partnership between six forest licensees in both the Morice and Lakes TSA and include Babine Forest Products, Canadian Forest Products, Decker Lake Forest Products, Fraser Lake Sawmills, Houston Forest Products, and L & M Lumber. A subsidiary company of the IFPA holders, known as Tweedsmuir Forest Ltd, has been created to facilitate the administration functions of the IFPA including planning processes, public advisory group, and timber supply analysis.

BCTS is a member of the IFPA Technical Committees and has adopted the SFMPs for both the Morice and Lakes TSAs.

As part of the Morice TSA SFMP, several timber supply analyses were completed. These included a current status scenario, which was based on TSR 2 assumptions which had limited modelling of the MPB epidemic; a current status scenario with LRMP, which includes LRMP provisions and MPB mortality projection; and a Mitigation Composite Scenario (MCS), which is based on the current scenario with LRMP and

with the addition of innovative practices and updated assumptions. This last scenario forms the basis for a request for an AAC increase under Section 59.1 (7) of the *Forest Act*.

On January 17, 2007, a request for an IFPA AAC increase in the Morice TSA was submitted to the regional manager of the Northern Forest Interior Region. While analysis work done for the IFPA indicates that a one million cubic metre AAC increase is possible, the request of the IFPA holders was limited to 500 000 cubic metres. As noted in the earlier IFPA section, the regional manager is the independent decision maker who may approve the IFPA SFMP and may determine any appropriate increases in licence AACs.

In public input to my determination, several comments of a similar nature were received from two of the participating IPFA licensees. The comments were related to their analysis for the IFPA uplift request and their interest in presenting the IFPA MCS to me prior to my decision, and identifying the higher yields generated from the IFPA MCS analysis compared to those in the MFR analysis. In response, as factors were discussed at the determination meeting, district staff presented at the same time, a comparison of the IFPA analyses and the analysis prepared for the scenarios presented to me for this determination. I am aware of the technical aspects related to the IFPA analyses and how they differed from the scenario analysis for this determination. I have commented on several of these in various sections of this rationale.

In conclusion, the overview flight of the Morice TSA supports my perspective that there is good forest management occurring on the ground. The licensees are harvesting the MPB affected stands, using appropriate harvesting methodology, and although there is some MPB invasion into some of the younger stands, most plantations are vigorous. I recognize that the work that the licensees are doing now will bode well in the future.

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

The mid-term timber supply

As noted in ‘*Scenarios – analysis results*’ section above, the analysis assumptions for all scenarios indicate that the mid-term timber supply could be 885 000 cubic metres per year from the non-pine stands, which are those stands with less than 70 percent pine volume. Under the assumptions of Scenario 1, a mid-term timber supply of 10 000 cubic metres per year is available from the pine population. In comparison, in Scenario 3 assumptions, the mid-term contribution from the pine population could be as high as 200 000 cubic metres per year.

This mid-term projection of 885 000 cubic metres per year, could be higher or lower, depending on the assumptions used in the model. For instance, the mid-term could be higher if the criterion for minimum stand merchantability was lower than modelled which, as noted earlier, was 150 cubic metres per hectare; the beetle infestation was slower than projected by BCMPB model; the sawlog shelf-life of beetle-killed trees was

longer than the assumed 2 to 3 years; harvesting in the non-pine population is less than modelled, that is less than 885 000 cubic metres per year; and / or the AAC included volume for non-sawlog uses.

On the other hand, the mid-term projection could be lower if the infestation kills more trees than assumed at 73 percent of the pine greater than 60 years old; mortality in pine less than 60 years old is greater than assumed, which was 0 percent; harvesting in the non-pine population is greater than modelled; and / or non-recoverable losses from other sources such as other insects, wind, fire are greater than assumed.

I note that there is mortality in pine stands less than 60 years old in the Morice TSA. Any level of mortality in young stands is a concern as those stands are the future timber supply. From the overview flight of Morice TSA, I estimate that the impact on young stands is approximately 10 percent.

As part of a regional initiative, the district and the major forest licensees are collaborating in developing a strategy to mitigate the impact the MPB on the mid term. I am aware of the targets that are being discussed as forest management guidelines under a draft Memorandum of Understanding (MOU). I support and encourage the completion of these guidelines in the form of a MOU as soon as possible.

From public input, a Canadian Forest Service staff reviewer wondered how the mid-term would react if only 400 000 cubic metres of non-pine were harvested during the uplift period. A similar query from a licensee regarding why 885 000 cubic metres per year of non-pine is scheduled for harvest in the next 10 years, and they felt that sensitivity analyses should examine the mid-term timber supply benefits of deferring or decreasing the proportion of non-pine harvest during the next 10-year period.

In response to both of these queries, the 885 000 cubic metres per year was the analyst's choice based on the analysis concept of finding the highest even-flow long-term harvest level. This is not management direction. A sensitivity analysis for any level of reduction in non-pine harvest in the first 10 years was not done as there are too many potential choices/options. However, as noted above, any change in the projection of non-pine harvested such as a decrease to the modelled level, would increase the mid-term harvest level.

In conclusion, there are a number of factors or elements that could influence the mid-term harvest supply either upwards or downwards. It is difficult to predict without the science and data to confirm or negate the assumptions used in a modelling process. For instance, as noted earlier in 'shelf-life', a longer shelf-life than modelled could increase the timber supply in the mid-term that was modelled for this analysis. Then again, significant mortality in young pine stands could reduce the mid-term projection. It is disconcerting anytime there is mortality in young stands and field data is needed to confirm how mortality in young stands is progressing over time. I have discussed this element of uncertainty in the '*mountain pine beetle infestation*' section below.

Overall, I am satisfied that a mid-term harvest level of at least 885 000 cubic metres per

year for all scenarios presented to me, was helpful while I contemplated my AAC decision.

### Harvest Partitioning

In deliberating my decision, I have put my mind to whether I should partition the AAC for the Morice TSA or not; and if so, what type of partition and amount to include in a partition. I note that under Section 8 (5) (a) of the *Forest Act*, the chief forester may specify portions of the AAC attributable to different types of timber and terrain in different parts of Crown land within a TSA. In the following two sections, I will discuss my thoughts on this issue, specifically the pine/non-pine harvest contributions and sawlog/non-sawlog considerations.

### Pine/non-pine considerations

Analysis carried out by the MFR and licensees confirm that mid-term timber supply is highly sensitive to the amount of non-pine harvested in the short term while pine remains usable. As such I must ensure that harvesting in the short-term does not unduly impact mid-term timber supply.

To explore the impact to mid-term timber supply of harvesting non-pine stands types in the short term, a sensitivity analysis was conducted reflecting all the assumptions of scenario 1, with the exception that there was no pine/non-pine partition.

In the sensitivity analysis the projected mid-term timber supply was 800 000 cubic metres per year compared to the 895 000 cubic metres per year depicted in scenario 1. The analysis shows that mid-term timber supply declines as more harvest is shifted from pine to non-pine stand types.

If the no-partition sensitivity analysis was compared to Scenarios 2 or 3, the difference in the mid-term would be much greater since these scenarios projected higher mid-term timber supply than Scenario 1.

The most significant forest management objective in beetle-impacted TSAs is to manage both pine and non-pine stands in such a way as to protect the mid-term timber supply. If there is no stand type or species partition that restricts the amount of non-pine harvest in the short-term, mid-term harvest levels can be impacted if licensees choose to harvest significant non-pine volumes.

From public input, one licensee suggested that the IFPA harvest rule strategy of highest pine volume first per hectare should be employed rather than targeting stands with greater than 70 percent pine, and that this harvest rule generates higher yields than the MFR analysis. A similar comment was also received from another licensee, suggesting that targeting stands with greater than 70 percent pine will result in a lower mid-term timber supply than applying the MCS rule.

In response, I note that the harvest rule in the MFR analysis is not that different to that proposed by the IFPA analysis. The MFR analysis harvest rule prioritized harvest based on absolute highest stand volume, regardless of species, being harvested first, whereas the IFPA analysis harvest rule prioritized harvest based on the highest pine volume

being harvested first. The MFR analysis maintained the pine harvest focus by restricting or partitioning the amount of harvest in pine and non-pine stand types. I also note that the different assumptions that went into the IFPA MCS analysis also lead to higher analysis yields, such as genetic gains, making direct comparisons difficult. As noted earlier, I have discussed differences under various factors within this rationale.

From public input, one licensee indicated that stands with greater than 70 percent pine from the inventory would not show this level once cruised. Therefore, implementing that strategy would increase fieldwork costs and may not meet criteria related to harvesting chance, log cost, and mill profile. The licensee also had concerns with directing harvest in stands with greater than 70 percent pine as piece size in these stands is smaller, and that affects the mill viability. Further, the licensee suggested that using scale volume may be more appropriate than directing harvest in stands with greater than 70 percent pine.

In response, using the forest inventory in analyses is more of a strategic, higher level look at the landscape, whereas using cruise or scale data is more stand level; to compare these methods is not practical. The intent is not to add more costs to the licensees. As I have noted earlier, the district and licensees are working on guidelines under a MOU. This MOU should also be considered as strategic level planning and could consider new markets or products for the timber, such as bioenergy products. Once in place, the licensees should harvest to those guidelines, and monitoring of provisions should occur to ensure practices manage the timber supply over the next 10 years.

Having considered the pine/non-pine partition extensively, I am most concerned with what will happen to the mid-term harvest levels and non-pine profile if a partition is not set at this time in terms of either stand type or species. The latest harvest monitoring figures the MFR has available for the Morice TSA indicate that in 2005, approximately 76 percent of harvest occurred in pine stand types containing more than 70 percent pine. I note that in 2006, the Harvest Billing System reports that 75 percent of licensees harvesting was directed at pine species.

From both a stand type and species perspective, I also note that licensees are performing well at focusing harvest into dead and dying pine relative to the species profile and I want to see this continue for the next five years. This will not be easy as pine stands will become less attractive to harvest over time as more pine stands are impacted by the MPB. To facilitate this continued performance, and help ensure mid-term timber supply is protected, I will partition the harvest contribution from non-pine. Given that harvest in stands types of less than 70 percent pine has been approximately 24 percent, I will allow up-to 25 percent of the harvest to occur in non-pine species or stand types depending on District and Regional staff preference. I will further discuss this below in my **'Reasons for Decision'**.

#### Non-sawlog considerations

In reviewing the timber supply analysis and making my determination, I also considered the possibility of including a non-sawlog partition to provide opportunities for the non-sawlog industry.

I have reviewed the analysis information provided regarding the non-sawlog component of the pine and non-pine volume as well as the results of the various timber supply scenarios described previously. I also considered the opportunities for using non-sawlog fibre such as bioenergy. I note that there is currently no established demand for in the Morice TSA and I therefore see no reason to implement a partition at this time. Should demand be demonstrated in the future, I may consider implementing a non-sawlog partition in a subsequent determination.

#### Alternate harvest flows

I have reviewed and discussed extensively with district staff the implications of an AAC uplift within the Morice TSA. During my review I was also informed by the various harvest forecasts in the timber supply analysis for the TSA. In determining an appropriate harvest level I carefully considered such issues as the potential impacts of increasing the AAC on surrounding TSAs and communities; the potential increase in the number of licence transfer requests from licensees in the Lakes TSA to the Morice TSA; possible adjustments to licensee operating areas; and, continued mill viability.

In addition, I reviewed the implications of raising the AAC on wood supply, the associated impact on log prices and provincial stumpage revenue, and the viability of First Nations licensees. I also considered current licensee performance in the Morice TSA noting the current and significant undercut in the TSA.

In conclusion, I recognize that in this analysis there is a potential to increase the harvest level by at least one million cubic metres for either the next 5 or 10 year period. Having reviewed and considered all the information that would influence and impact the social, economic and environment values, I have concluded that a significant AAC uplift is not appropriate at this time. With a timber supply review imminent for the adjacent Lakes TSA, I may be prepared to review my decision for the Morice TSA in less than 5 years. I will further discuss this in my '**Reasons for Decision**' below.

**(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

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).

The letter stresses the importance of a stable timber supply while being mindful of other forest values. The letter also highlights the significant change and transition experienced by the coast forest industry; however, this has no bearing within the Morice

TSA.

There are two applicable points for the Morice TSA for me to consider. The first relates to Government's objectives of encouraging long-term economic sustainability for communities affected by the MPB epidemic; to recover the greatest value from dead timber before it burns or decays, while respecting other forest values; and to conserve the long-term forest values identified in land-use plans.

The second is to assist the province and affected communities in planning their responses to the beetle infestation, by having 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 am asked to examine factors that affect the demand for such timber products manufactured from it, the time period over which it can be utilized, and to consider ways to maintain or enhance the mid-term timber supply.

To that end, I will consider a timber supply that is sustainable, while considering the land-use decisions made and ensuring local social and economic objectives expressed by the public are consistent with government's broader objectives and relevant First Nations information. I believe that the timber supply review process undertaken within this TSA has aided my consideration of these points while I made this AAC determination.

#### Public review

The Public Discussion Paper (PDP) for the Urgent Timber Supply Review for the Morice TSA was released on June 7, 2007. The Public Review Period was from June 7, 2007 to August 7, 2007. A letter inviting the public to review the PDP was sent to local governments, First Nations, and to the local MLA. An invitation to review the PDP was also sent electronically to other agencies and forest licensees. There were also advertisements placed in the local newspapers.

I note that no requests for presentations on the PDP were made. However, one licensee and one First Nation requested to meet to discuss a potential AAC uplift. Both meetings occurred in mid-September 2007.

A list of all the public submissions is provided in Appendix 4 of this document. Several of the comments received have been covered in various factors throughout this rationale document. Those not covered under any of the factors are addressed below.

A Canadian Forest Service staff reviewer noted that the text did not match graphs in PDP and that they like the split between pine and non-pine populations. A guide outfitter opposed an AAC uplift for a period of 10 years, and expressed a concern that too many mixed stands with spruce and balsam are being harvested. I acknowledge this concerns and believe that my decision will facilitate the continued harvest focus in pine and limit harvest in non-pine species as we address the MPB epidemic.

After the September 2007 meeting, a First Nations group wondered why 30 percent of the total harvest was occurring in non-pine stands today rather than being reserved for the mid-term. In response, I note that this was an assumption used in the analysis and is not intended to reflect forest management direction. MFR is encouraging licensees to maintain focus on pine stands and not harvest the non-pine stands to support the mid-term harvest level for as long as possible.

In addition, the First Nations group wondered why a stand with 65 percent of its volume in pine would not be considered as part of the pine population. In response, the analysis considered anything with a 30 percent non-pine component as a viable economic harvest opportunity in the future.

### Socio-economic implications

I have reviewed information on local wood supply and markets for the time period of September 2006 to August 2007. The mills included in this information are the five closest large mills to the Morice TSA and include West Fraser Mills (Pacific Inland Resources (PIR)), Canfor in Houston, West Fraser Mills (Houston Forest Products), Babine Forest Products / Decker Lakes Forest Products, and West Fraser Mills (Fraser Lake Sawmills).

I note that a significant portion of the wood supply is derived from sources other than those associated with the AAC of the Morice TSA. These include sources such as occupant license to cuts, Indian Reserves, and woodlots. This trend is expected to continue over the next five years as the Houston Community Forest begins operations and harvest levels in woodlots increase in response to the MPB. This trend and market conditions contributed to a considerable undercut situation in the Morice and Lakes timber supply areas or equivalently an oversupply of logs in the district. In the 2005 and 2007 time period, there was approximately 2.8 million cubic metres of undercut in both TSAs, although I note that not all of the undercut was allocated.

Contributing to this under cut situation is that not all of the current AAC in the Lakes TSA, that is 3.162 million cubic metres, was allocated. Transfers were accepted, but only approximately 750 000 cubic metres were committed to licences. Additionally, a First Nation Group told the province that their 100 000 cubic metre per year non-recoverable forest licence in the Morice TSA is uneconomic to harvest in the current economic conditions and stumpage rate regime, therefore they have failed to harvest since issuance on January 1, 2005.

The wood profile in the Morice TSA supplies logs to the aforementioned mills that are, in general, larger and more economic than the Lakes TSA. A re-concentration of harvesting from the Lakes to the Morice TSA will increase the economic viability of the mills involved due to the increase in log quality such as larger piece size and less checking and beetle damage. In addition, the pine trees in the Lakes TSA are more rapidly deteriorating in quality as compared to the pine trees in the Morice TSA because of the earlier incidence of beetle attack. I note that as a consequence, any uplift in AAC in the Morice TSA is expected to be utilized before uplift AAC in the Lakes TSA.

It is estimated that a one million cubic metre uplift in the Morice TSA AAC will reduce the harvest level in the Lakes TSA by one million cubic metres per year. Therefore, any uplift in the Morice TSA will require the immediate re-evaluation of the AAC determination in the Lakes TSA.

From public input, there were general comments around shifting tenures to the Morice TSA and changing policy/legislation to allow a reciprocation of hauling cost differential. In response, existing policy and legislation in the *Forest Act* allows for Section 18 transfers and certain tests that need to be met under the appraisal manual. Should those tests be met, harvest transfers can be facilitated. This is a regional manager decision, not a chief forester decision.

I also received general comments around support of an AAC uplift; combining the Lakes and Morice TSAs; and that an analysis for the combined TSAs should be completed prior to a new AAC determination in the Morice. In response, at this particular point in time, the consolidation of the Lakes and Morice TSAs is not contemplated. While not considering this for this timber supply review, further analysis is being done to consider with the Lakes timber supply review.

Other comments from licensees included a request that the MFR consider the sourcing requirements and dependency of sawmills, as purchases of wood will become increasingly important; that the opportunity to utilize the significant non-pine stock in the Morice should not be limited to existing FL within the Morice TSA, but extended to those with sawmills located within the entire District; and that at least one mill is designed for the profile that was traditionally available in the Morice TSA and any government-induced changes that affects the profile will affect the viability of the mill. In response, these comments I considered while making my decision on the AAC for the Morice TSA.

In conclusion, I am aware that the decision I make on the Morice AAC may impact harvest levels in the Bulkley and Lakes TSA. In making my determination, I carefully considered all comments and potential impacts to licensees and communities.

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

Unsalvaged losses

Unsalvaged losses are timber volumes destroyed or damaged by agents such as fire or disease and not recovered through salvage operations. Estimates for unsalvaged losses account for epidemic (abnormal) infestations; as well as for factors that result in losses that are not recovered through salvage harvest programs and that are not recognized in yield estimates. Timber volume losses due to insects and diseases that normally affect stands (endemic losses) are accounted for in inventory sampling for existing timber yield estimation or through other methods. Endemic losses associated with second-growth stands are addressed by application of operational adjustment factors.

Mountain pine beetle infestation

Based on extensive observations in the neighbouring Lakes TSA and in some areas of the Morice TSA, there is concern that the 30 - 60 year age class stands will experience the same level of mortality as the mature pine. It appears that the MPB attack these stands about 1 or 2 years after the initial attack in neighbouring mature stands. It is difficult to predict if these observations constitute a trend. Based on the overview flight I took of the Morice TSA, there seems to be no pattern of infestation in the younger pine as some younger stands are hit hard, but the adjacent stand appears to be only slightly affected, if at all. Overall, I would estimate that the mortality rate in younger pine stands is currently less than 10 percent.

From the public input, one licensee believed the mortality rates were conservative and “more volume could be salvaged in the next decade”. In response, the BCMPB model was used to predict the progression. The model was calibrated using provincial infestation maps from 1999 to 2005. Observations made in 2006 for the 2007 Emergency Bark Beetle Management Area (EBBMA) maps and strategic planning confirms the predictions of the BCMPB model. The analysis considers that only stands greater than 60 years are susceptible to the MPB.

It is unknown how many younger aged stands, if any, will be affected in the future. Due to this uncertainty, as noted in the ‘**Implementation**’ section, I request district staff to continue to monitor MPB mortality in the 30 - 60 age class stands. This information is important as it may be necessary to refine the yield tables for those stands within the Morice TSA. Any new information will be incorporated into the next timber supply analysis.

#### Spruce bark beetle, western balsam bark beetle and spruce budworm

In his 2002 AAC determination rationale, the former chief forester requested district and licensees staff to continue to monitor bark beetle activity to further quantify unsalvaged losses within the Morice TSA and to report any significant change in activity. This work was completed.

Since the 2002 timber supply review, the amount of spruce bark beetle modelled in this analysis showed a significant decrease from 23 500 cubic metres per year in the previous timber supply review to 800 cubic metres per year. Through a combination of harvest activities and beetle biology, the spruce bark beetle outbreak that peaked in 2000-2001 has been successfully repressed. In 2005, approximately 1800 hectares in the Morice TSA were classified as having a trace amount of spruce bark beetle attack. I note that suppression activities to date have been successful, and since spruce is a desirable species to harvest, it is reasonable to assume that suppression activities will continue to be effective and future unsalvaged losses due to spruce bark beetle will continue to be minimal.

Western balsam bark beetle, on the other hand, is widespread throughout the Morice TSA, having increased in the mid-1990s, and remaining high between the years 2000-2005. Western balsam bark beetle losses are considered to be included in the VDYP yield predictions for natural stands due to their endemic nature of attack. In

response to the former chief forester's request to monitor bark beetle activity, the regional staff initiated a study in the summer of 2000 to compare the net merchantable volume derived from timber cruises in higher elevation balsam stands with VDYP yield predictions to determine if those mortality estimates caused by this beetle are sufficiently accounted for. The results of the first year of the study indicate that significant losses due to western balsam bark beetle are accounted for in the VDYP yield curves. However, further information regarding ongoing mortality in these plots is needed, and re-measurements of plots are planned for the near future.

I acknowledge that although significant losses are likely accounted for in the VDYP curves, it is anticipated that there may be unsalvaged losses over and above this amount. I note that Research staff continues to study the losses and compare their observations with VDYP. As harvest operations shift away from non-pine species and becomes more focused on pine due to the MPB epidemic, it is anticipated that losses due to western balsam bark beetle will continue to increase because there likely will not be a lot of salvage harvesting in balsam stands in the near future. To estimate this amount, grade 3 volumes for the years 2000-2005 were analyzed and resulted in a 45 630 cubic metres per year loss, which is comparable to the previous timber supply review assumption.

Spruce budworm is also present in the Morice TSA, but is more concentrated in areas north of Babine Lake. As recorded in the 2003 Provincial Overview Survey, spruce budworm outbreak reached a peak of 2800 hectares, most of which was harvested. In 2007, an estimated 250 hectares of recent infestation was noted in the Tochcha Lake area. District staff informed me that the infested areas will be salvaged.

Having reviewed the information and in discussions with staff, I am satisfied that the analysis assumptions for losses due to balsam bark beetle and spruce budworm adequately reflects current knowledge. I note though, that the analysis may overestimate the losses from spruce bark beetle by approximately 22 700 cubic metres per year. As discussed above, suppression activities will continue to successfully bring spruce bark beetle infestation to manageable levels. I acknowledged that there will continue to be minimal pressure on the timber supply of the non-pine throughout the planning horizon. I will not be making any further adjustments to account for balsam bark beetle and spruce budworm in this determination. I have however, taken into consideration in this determination, the overestimation of the timber supply due to spruce bark beetle losses, of approximately one percent.

#### Fire and wind

For this analysis, staff reviewed fire losses from 2001-2005 to estimate unsalvaged fire losses. Approximately 1100 hectares were damaged by fire, and most of the damaged timber was salvaged. As harvesting activities provide increased access to forested areas, the risk for man-made fire increases but the ability to suppress fire due to better access combined with improved protection activities decreases the overall fire risk and associated losses due to fires. I note that for this period, unsalvaged fire losses were modelled at approximately 3 percent or 11 000 cubic metres per year, and that this is a reasonable assumption based on actual fire incidences.

I am aware that there is the potential for stands to become less wind firm in the future as the MPB epidemic kills the pine trees in a stand, leaving other species more vulnerable to wind events. In addition, the rising water table as a result of the MBP epidemic may contribute to less wind firm trees. I note that after the first 50 years in the planning horizon, the analysis modelled damage by wind at 50 percent of the loss in the first 50 years. Due to the increased vulnerability of remaining trees to wind events, it would have been preferable if the analysis had kept the losses due to wind at the same rate, 8000 cubic metres per year, for the entire planning horizon. This unquantified loss is relatively small and for the purposes of this determination, I accept the assumptions as modelled. However, as noted in the **'Implementation'** section, I request district staff to continue to monitor effects of wind damage events. Any new information can be incorporated into the next timber supply analysis.

### **Reasons for decision**

In reaching my AAC determination for the Morice 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 focused on providing an assessment of short-term timber supply and mid-term risk given the impacts of the MPB epidemic in the Morice TSA. The consideration that weighed heavily in my determination was the 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 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 three scenarios, to make a determination about an AAC for the next five years and informed me of the potential consequences and impacts that the decision could have in the mid-term.

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

As the majority of factors are not quantifiable, I have discussed, in general terms, the impact some of these factors had on my decision. For those factors that are quantifiable, I have discussed them near the end of this section. As mentioned in the appropriate factor section above, factors that had very little to no impact on my determination, I will not be discussing further. A fundamental consideration in my determination was the impact on timber supply the MBP infestation would have on the short-term harvest level. The rate of harvest and, more importantly, the implementation of a harvest strategy associated with the new AAC, will impact the mid-term timber supply.

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

There are a number of elements that can affect the mid-term timber supply either positively or negatively. The amount of pine projected to be salvaged is very sensitive to shelf-life. There are several factors such as stumpage rates, lumber price, sawmill configuration and technology, moisture regime at the harvest site, and Canadian currency exchange rates that can also influence shelf-life. If shelf-life is longer, there is more time to recover value from affected pine. I note that a longer shelf-life could potentially result in an increase to mid-term timber supply.

I noted earlier that the mid-term timber supply could be higher than the projected 885 000 cubic metres per year if the criterion for minimum stand merchantability was lower than the 150 cubic metres per hectare assumed in the analysis. As well, mid-term timber supply could also be higher than that projected, if the sawlog shelf-life of beetle-killed trees was longer than the assumed 2 to 3 years, or if the MPB infestation proceeds slower than projected.

Conversely, I noted that the mid-term timber supply could be lower than that projected in the analysis if the infestation kills more trees than was assumed in the BCMPB projection model or if mortality in pine less than 60 years old is greater than what was assumed in that the model. Additionally, if harvesting in the non-pine population was greater than that analysed or if non-recoverable losses from other sources such as other insects, wind, and fire are greater than was assumed in the analysis, the mid-term timber supply would be lower than that projected.

From my overview flight and discussions with staff, I note that there is approximately 10 percent mortality in pine stands less than 60 years old in the Morice TSA. While there currently appears to be no pattern of infestation in the younger pine, I am concerned that any significant mortality in young pine stands could reduce the mid-term projection.

In making my determination, I considered that the industry is constrained by milling capacity, market demand, the Canada-US softwood lumber agreement, and current forest management practices. I also considered the impacts to surrounding TSAs and communities; the impacts of licence transfer requests; potential adjustments to operating areas; continued mill viability; increased wood on the market; impacts of stumpage adjustment requests; hydrologic impacts; and current licensee performance.

Regarding the impact to surrounding TSAs, in particular, the Lakes TSA, I also considered the implications of potentially increasing harvest levels in the Morice TSA. The timber in the Morice TSA is typically of better quality and size meaning there potentially could be unsustainable amount of licence transfer requests to gain access to the better quality wood. In addition to adding more licensees operating in the confined

area of the Morice TSA, there are concerns with heightened opposing views and values as competition for marketable share of the land base and sawlog market increase, and potential impacts of shifting social and economic interests between the communities within the District.

I am mindful that the matter of licence transfers is the decision of the regional manager. If the regional manager deems that Section 18 transfers are appropriate, I would capture those deletions at the next timber supply review.

Regarding hydrologic concerns, extensive salvage harvesting has an unknown cumulative impact on how the hydrology of the Morice TSA will change over time. Hydrologic change impacts to the other resources and surrounding landscape must have a high profile when considering management practices. Although there has been hydrologic research carried out in various areas of the province, I acknowledge that there is still an unknown impact at a local level. This unquantified impact is a risk to timber supply, other resources and surrounding landscape; consequently I have given hydrologic concerns considerable consideration when making my final determination.

Therefore, although the analysis shows a potential for an AAC uplift of at least one million cubic metres per year for either the next 5 or 10 year period, I have determined not to consider an AAC uplift within the Morice TSA at this time. However, I will be prepared to review this decision in less than 5 years should circumstances change.

In order to protect the mid-term timber supply and protect the non-pine profile in the Morice TSA, I considered implementing two types of partitions – a pine/non-pine partition and a non-sawlog partition.

I am most concerned with what will happen to the non-pine mid-term timber supply if a partition, in terms of either stand type or species, is not set in this determination. Currently, approximately 75 percent of licensees harvesting is directed at pine species and harvest is focused in the dead and dying pine relative to the species profile. I would like to see this harvest performance continue in the short term and recognize that may become increasingly difficult as stands become less attractive to harvest overtime given the continued MPB infestation. To ensure this continued performance and to protect the mid-term timber supply, I have determined that a partition from the non-pine harvest profile that reflects the recent past licensee performance is appropriate. Therefore, based on the district and region staff preference, and given that harvest of non-pine species has been approximately 25 percent in the recent past, I have determined that up to 25 percent of the harvest will occur in non-pine species, amounting to 550 000 cubic metres per year.

When assessing short- and mid-term timber supply in the analysis, various assumptions were made. As noted, these assumptions differed from that used in the IFPA analyses, and where this was the case, I noted the difference in the specific applicable factor. 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.

While the exact nature of the combined mid-term result of these factors is difficult to predict with accuracy, it is apparent there will be some degree of mutual offset between upward and downward pressure on the timber supply. In my considerations, the following factors were identified where the assumptions used *underestimated* the timber supply over the entire planning horizon to a degree that may be quantified:

- *non-recoverable losses due to spruce bark beetle*: the analysis may have overestimated the losses from spruce bark beetle in the mid- and long-term by approximately 22 700 cubic metres per year or one percent, consequently the timber supply in the analysis is underestimated by the same amount. Suppression activities will continue to successfully bring spruce bark beetle infestation to manageable levels; however, there will continue to be minimal pressure on the timber supply of the non-pine throughout the planning horizon. I have taken the adjustment for the THLB underestimation from spruce bark beetle into account in this determination.
- *interior log grade changes*: the model used to estimate existing stand volume does not report the volume of dead, but potentially useful, timber that exists in a stand at a given time. The data indicated that approximately 12 percent of the green volume for the forested land base over 60 years of age that could be classified as dead potential volume is not reflected in the analysis and therefore not taken into account. For this determination, I have taken this underestimation on timber supply directly into consideration across the full forecast horizon.

In my considerations, the following factors were identified as potential *overestimates* of the timber supply over the entire planning horizon to a degree that may be quantified:

- *community forest licence*: an area covering 14 213 hectares, of which approximately 13 000 hectares is within the THLB, would support an AAC of approximately 20 000 cubic metres. The THLB is overestimated by approximately 2 percent. I have accounted for this overestimation in my determination.
- *woodlot licences*: under the woodlot expansion program, two woodlot licences have had Schedule B land increases resulting in an overestimation of the timber supply projected in the analysis by approximately 1500 cubic metres.
- *THLB (ESAs, Terrain Stability Mapping, R/T/Ls)*: overestimations to the THLB as a result of ESAs, terrain stability mapping, and roads, trails, and landings amounts to approximately 0.5 percent. I have taken this overestimation into consideration in this determination.

To summarize, the *overestimations* of timber supply which equate to approximately 2.5 percent are offset by the *underestimations* of the timber supply which amount to approximately 13 percent. The difference is an approximate 10 percent *underestimation* of the timber supply which includes the endemic dead potential volume. I then removed 1500 cubic metres for woodlot expansions. I consider the final determination of 2 165 000 cubic metres per year, an administrative adjustment to the previous AAC to account for the inclusion of the endemic dead potential volume that is currently being

harvested outside the AAC. Further, this determination includes a non-pine species partition of 550 000 cubic metres per year to protect the mid-term timber supply and ensure continued current management in the short term.

I note that the resulting mid-term timber supply is uncertain and will depend on the implementation of a harvest strategy to address the MPB, and on maintaining control programs for other forest health factors. As noted earlier in the **‘Implementation’** section below, I encourage the district and the major forest licensees to continue their efforts in developing a strategy to mitigate the impact the MPB on the mid-term timber supply as soon as possible. The targets that result as forest management guidelines under a draft Memorandum of Understanding (MOU) will assist in the implementation of this AAC determination.

### **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, that reflects current management practices as well as the socio-economic objectives of the Crown, and that considers First Nations’ issues, can be best achieved in the Morice TSA by establishing an AAC of 2 165 000 cubic metres per year. The new AAC represents an administrative adjustment of approximately 10 percent to the previous AAC to account for the inclusion of the endemic dead potential volume, and includes a non-pine species partition, equating to 550 000 cubic metres per year.

This determination is effective February 1, 2008 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.

### **Implementation**

In the period following this decision and leading to the subsequent determination, I request MFR staff, MOE staff and licensees to undertake the tasks and studies noted below, which are also described in appropriate sections of this rationale document. I recognize that the ability of staff and licensees to undertake these projects is dependent on available resources including funding. These projects are important to help reduce the risk and uncertainty associated with key factors that affect the timber supply in the Morice TSA.

- Request region and district staff to obtain the PEM data from the IFPA holders and if need be, complete an acceptable PEM to confirm the future use of SIBEC in yields.
- Request district staff to report out on the performance within the visual quality class areas for the next timber supply review.
- Request district staff to monitor retention of old growth biodiversity relative to targets and report out for the next timber supply review.
- Urge district staff and licensees to work together to develop pine harvesting

guidelines and adapt an interim policy to focus harvesting outside deer winter ranges.

- Urge MOE to complete IWMS, WHAs, and deer winter ranges for the Morice TSA.
- Request range staff to develop a range strategy which can be taken into consideration at the next timber supply review.
- Request district staff to continue to monitor MPB mortality in the 30 – 60 age class stands.
- Request district staff to continue to monitor effects of wind damage events.



Jim Snetsinger  
Chief Forester  
January 31, 2008



## **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.

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



JUL 04 2006

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

Dear Jim:

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

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

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

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

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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:

Skin Tye First Nations  
Burns Lake Native Development Corporation

### Licensees:

Canadian Forest Products  
Babine Forest Products (Hampton Affiliates)  
Houston Forest Products (West Fraser Mills)

### Local Government:

Village of Houston  
Village of Burns Lake

### Other Government:

Canadian Forest Service

Guide/Outfitter: 1 submission