

**BRITISH COLUMBIA
MINISTRY OF FORESTS, MINES AND LANDS**

Merritt Timber Supply Area

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

Effective December 2, 2010

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Chief Forester**

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Objective of this Document

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

Acknowledgement

For preparation of the information I have considered in this determination, I thank staff of the BC Ministries of Forests, Mines and Lands (MFML) and Natural Resources Operations (MNRO) in the Cascades Forest District, the Southern Interior Forest Region and the Forest Analysis and Inventory Branch (FAIB). I am also grateful to the Nicola-Similkameen Innovative Forestry Society and their contractors who contributed to the technical information and to the First Nations, the public, and the licensees who have provided input.

Description of the Merritt Timber Supply Area

The Merritt TSA encompasses the mountainous terrain and steep river valleys of the Cascade Mountains in the west, the relatively dry, flat Thompson Plateau in the east and two major river systems: the Similkameen and the Nicola. To the north of the Merritt TSA is the Kamloops TSA, to the west are the Lillooet and Fraser TSAs, and to the east is the Okanagan TSA. Manning Provincial Park, Cathedral Provincial Park and the Canada-United States border lie to the south. The total area of the TSA is 1.13 million hectares.

A description of the environment of the TSA including its tree species and biogeoclimatic zones is given in the *Merritt TSA Timber Supply Analysis Report* ('the analysis report').

The diverse landscapes of the Merritt TSA provide a variety of wildlife habitats including grasslands, lakes and wetlands, forested slopes, and alpine areas. Over 20 species of wildlife and fish identified in the provincial Identified Wildlife Management Strategy are present.

A socio-economic profile of the area was completed with the analysis report. In brief, the TSA is sparsely populated, with approximately 61 percent of the 16,777 residents in 2009, living in the towns of Merritt and Princeton. About one-quarter of the personal income in the TSA is derived from the forest industry.

First Nations from the Okanagan, Nlaka'pamux, Secwepemc, and Stó:lō have interests within the Merritt TSA and account for about 20 percent of the TSA population. Of the 24 bands with asserted interests, 7 bands have communities within the TSA. First Nations have a strong history of traditional use on lands within the Merritt TSA and, given their interests, a strong involvement in forestry.

History of the AAC

In 1996, the AAC for the Merritt TSA was determined to be 1 454 250 cubic metres of which 250 000 cubic metres was partitioned to small-diameter pine types. In 1999, the AAC was set at 2 004 250 cubic metres, which reflected a two-year uplift of 550 000 cubic metres per year to address the recovery of fire-damaged wood and a mountain pine beetle infestation in the southern portion of the TSA and maintained the 250 000 cubic metres small-diameter pine partition. In 2001, the uplift was removed and the AAC was set at 1 508 050 cubic metres, which represented the pre-uplift AAC and a 62 500 cubic metres increase in the small-diameter pine partition from 250 000 cubic metres to 312 500 cubic metres. In 2005, the AAC was increased to the present

level of 2 814 171 cubic metres reflecting new inventory and site productivity information collected under Innovative Forestry Practices Agreements and a temporary uplift of 1 000 000 cubic metres to address mountain pine beetle infestation. The small-diameter pine type partition of 312 500 cubic metres was maintained.

The harvestable volume for the area is currently apportioned as shown in Table 1.

Table 1. Apportionment of 2005 AAC

Apportionment	Cubic metres per year	Percentage
Forest licences – replaceable	920 605	32.71
Forest licences – non-replaceable	1 309 607	46.54
BCTS Timber Sale Licence	421 870	14.99
BCTS Forest Licence non-replaceable	35 000	1.24
Community Forest Agreement	20 000	0.71
Woodlot Licences	11 700	0.42
Forest Service Reserve	95 389	3.39
Total	2 814 171	100

New AAC determination

Effective December 2, 2010, the new AAC for the Merritt TSA will be 2 400 000 cubic metres including a partition of 720 000 cubic metres attributable to non-pine species volume, as identified in the Harvest Billing System.

It is not my intention in establishing this partition to encourage the harvest of healthy stands, rather the partition is intended to maximize the conservation of non-pine species for harvest in the mid-term, while allowing for the salvage of beetle-infested stands. To this end, it is my expectation that of the 720 000 cubic metre partition attributable to non-pine species volume, about two-thirds is for the incidental non-pine volume resulting from the salvage of mountain pine beetle infested, pine-leading stands. The remaining one-third is for the volume resulting from the focused harvesting of spruce bark beetle infested stands.

This AAC and partition will remain in effect until a new AAC is determined, which is required to take place within 10 years of this determination. As discussed under **‘Implementation’**, I request that district and licensee staff continue to monitor the extent of beetle infestation and salvage in the Merritt TSA and report the results to me on an annual basis. In the event that there are significant changes in beetle infestation or management, I am prepared to revisit this AAC earlier than the 10-year maximum required under the *Forest Act*.

Information sources used in the AAC determination

In making this determination I have considered many sources of information and input. Below I list sources that I have specifically referenced within this rationale or legislation that I have considered. Other sources of information and input that I do not specifically reference below but have been part of my considerations or the technical information presented are identified in the data package, the analysis report, or the First Nations consultation summary.

- Technical review and evaluation of current and expected operating conditions through comprehensive discussions with Ministry of Forests, Mines and Lands and Ministry of Natural Resources Operations staff, including the AAC determination meeting held in Merritt on May 31 and June 1, 2010 and a conference call on July 8, 2010;
- Information received at a meeting in Merritt on June 1, 2010 with First Nation representatives;
- Information received at a meeting in Merritt on May 31, 2010 with licensee representatives;
- *First Nations Consultation Summary Cascades Forest District, Decision on the Allowable Annual Cut (AAC) for Merritt TSA – Timber Supply Review IV*, May 2010, Ministry of Forests and Range (now Ministry of Natural Resources Operations);
- *Timber Supply Analysis Report, Merritt TSA Timber Supply Review #4*, April 28, 2010 and additional harvest forecasts provided May 2010, Forsite Consultants Ltd.;
- *Decision to retire the Merritt Areas of Interest (AOI) effective April 7, 2010*, April 2010, Thompson-Okanagan Managers Committee;
- *Merritt TSA TSR 4 Data Package*, September 2009, Timberline Natural Resource Group;
- *Integration of GIS Analysis and Field Evaluation to Identify Young Lodgepole Pine at Risk to Mountain Pine Beetle. Phase 3: Impact and Severity Projections (Draft)*, 2009, Hodges, J. And Maclauchlan, L., Ministry of Forests and Range;
- *Merritt Timber Supply Area Change Monitoring Inventory: First Measurement*, 2008, Timberline Natural Resource Group Ltd;
- *Smallwood Population Site Index Audit. Merritt Timber Supply Area*, 2008, Timberline Natural Resource Group Ltd;
- *Rationale for Increase in (IFPA) Allowable Annual Cut (AAC)*. Effective August 2, 2007, T.P. (Phil) Zacharatos, Southern Interior Forest Region;
- *Merritt TSA Rationale for AAC Determination Effective July 1, 2005*, July 2005, Ministry of Forests;
- *Letter from the Minister of Forests and Range to the Chief Forester stating the economic and social objectives of the Crown*, July 4, 2006;
- *Guidance on Landscape and Stand level Structural Retention on Large-scale Mountain Pine Beetle Salvage Operations*, December 2005, J. Snetsinger, Ministry of Forests and Range;
- *Identified Wildlife Management Strategy, Procedures for Managing Identified Wildlife, Version 2004*, Ministry of Water, Land, and Air Protection;
- *Site Index Adjustment for the Merritt IFPA Area Final Report*, (report prepared for the Nicola-Similkameen Innovative Forestry Society), 2003, J.S. Thrower and Associates;

- *Riparian Management Area Guidebook*, 1995, BC Ministry of Forests;
- *Upper Nicola Band Sux^wtxtem Action Plan*, undated, Upper Nicola Indian Band, Merritt BC;
- *Forest Act*, 2006, and amendments, consolidated to November 17, 2010;
- *Forest and Range Practices Regulations*, 2004 and amendments;
- *Forest and Range Practices Act (FRPA)*, 2002 and amendments;
- *Heritage Conservation Act*, 1996, consolidate to November 17, 2010;
- *Land Act*, 1996, and amendments consolidated to November 17, 2010; and
- *Ministry of Forests and Range Act*, consolidated to November 17, 2010).

Role and limitations of the technical information used

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

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

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

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

Guiding principles for AAC determinations

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

Two important ways of dealing with uncertainty are:

- (i) minimizing risk, in respect of which in making AAC determinations I consider particular uncertainties associated with the information before me and attempt to assess and address the

various potential current and future, social, economic and environmental risks associated with a range of possible AACs; and

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

In considering the various factors that Section 8 of the *Forest Act* requires the chief forester to take into account in determining AACs, I intend to reflect, as closely as possible, those forest management factors that are a reasonable extrapolation from current practices. It is not appropriate to base my decision on unsupported speculation with respect to factors that could affect the timber supply that are not substantiated by demonstrated performance or are beyond current legal requirements.

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

It is my practice not to speculate on timber supply impacts that may eventually result from land-use decisions not yet finalized by government. However, where specific protected areas, conservancies, or similar areas have been designated by legislation or by order in council, these areas are deducted from the timber harvesting land base (THLB) and are not considered to contribute any harvestable volume to the timber supply in AAC determinations, although they may contribute indirectly by providing forest cover to help in meeting resource management objectives, such as for biodiversity.

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

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 persons 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 incomplete, but this will always be true where information is constantly evolving and management issues are changing. The requirement for regular AAC reviews will ensure that future determinations incorporate improved information.

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 obligation resulting from recent court decisions to consult with First Nations regarding asserted rights and title (aboriginal interests) in a manner proportional to the strength of their aboriginal interests and the degree to which the decision may impact these interests. In this regard, I will consider the information provided to First Nations to explain the timber supply review (TSR) process and any information brought forward respecting First Nations' aboriginal interests including how these interests may be impacted, and any operational plans and actions that describe forest practices to address First Nations' interests, before I make my decision. As I am able, within the scope of my authority under Section 8 of the *Forest Act*, where appropriate I will seek to address aboriginal interests that will be impacted by my proposed decision. When aboriginal interests are raised that are outside my jurisdiction, I will endeavour to forward these interests for consideration by appropriate decision makers. Specific concerns identified by First Nations in relation to their aboriginal interests within the TSA are addressed in various sections of this rationale.

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

Overall, in making AAC determinations, I am mindful of my obligation as steward of the forest land of British Columbia, of the mandate of the Ministry of Forests and Range (now the Ministry of Forests, Mines and Lands and Ministry of Natural Resources Operations) as set out in Section 4 of the *Ministry of Forests and Range Act*, and of my responsibilities under the *Forest and Range Practices Act (FRPA)*.

The role of the base case

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

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

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

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

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

Such adjustments are made on the basis of informed judgement using current, available information about forest management that may well have changed since the original data package was assembled. Forest management data are particularly subject to revision during periods of legislative or regulatory change, or during the implementation of new policies, procedures, guidelines or plans. Thus it is important to remember that while the timber supply analysis with which I am provided is integral to the considerations leading to the AAC determination, the AAC is not determined by calculation but by a synthesis of judgement and analysis in which numerous risks and uncertainties must be weighed. Depending upon the outcome of these considerations, the resulting AAC may or may not coincide with the base case forecast. Moreover, because some of the risks and uncertainties considered are qualitative in nature, once an AAC has been determined, further computer analysis of the combined considerations may not confirm or add precision to the AAC.

Base case for the Merritt TSA

The 2009 timber supply analysis (“the analysis”) was completed by Forsite Consulting Limited (Forsite) on behalf of the Nicola Similkameen Innovative Forestry Society (NSIFS), using the forest estate model Forest Planning Studio (FPS) Version 6.0.2.0. The initial data package was completed by Timberline Natural Resource Group for NSIFS. The Nicola Similkameen Innovative Forestry Society includes Weyerhaeuser Company Limited, Tolko Forest Products Ltd., Ardeu Wood Products Ltd., Stuwix Resources Ltd., Aspen Planers Ltd., BC Timber Sales, Upper Similkameen Indian Band, Lower Similkameen Indian Band, Shackan and the Nicola Tribal Association, consisting of Siska Indian Band, Cook’s Ferry Indian Band, Coldwater Indian Band, Nicomen Indian Band, Nooaitch Indian Band, Upper Nicola Indian Band, Lower Nicola Indian Band.

The base case harvest projection was guided by provincial policy objectives of capturing long-term productivity and minimizing significant shortages of timber supply in the mid-term. Specifically, the base case harvest flow objectives were: to maintain the existing AAC level to address the MPB infestation; to minimize shortfalls of mid-term timber supply; and to sustain a long-term harvest level that reflects managed stand yield projections and non-timber management objectives.

The resulting base case indicated that an initial harvest of 2 810 000 cubic metres per year could be maintained until 2015, when it declined to 1 810 000 cubic metres per year for four decades and 1 580 000 cubic metres per year for seven decades, before increasing to a long-term level of 1 650 000 cubic metres per year.

The initial gross volume of stands growing on the timber harvesting land base (THLB) —the land base estimated to be economically and biologically available for timber harvesting—is around 80 million cubic metres. As the oldest stands are harvested this inventory decreases by half after the first five decades to where it stabilizes. The merchantable volume (from stands older than a minimum harvestable age) is initially 70 million cubic metres and declines to between 10 and 20 million cubic metres over the forecast period. The most constrained timber supply occurs in decades 7 and 11 and appears to be correlated with low points of the merchantable volume rather than constraints for non-timber management objectives.

Both clearcut and single tree selection harvest were modelled. The base case identified 12 000 hectares per year were initially clearcut, decreasing to a low of 4150 hectares per year in decade four before levelling off to around 6800 hectares per year over the long-term. Harvest within the single tree selection zone, due to harvest priorities, first occurred in decade four when a high of 1700 hectares per year are harvested. In the remainder of the forecast period the single tree selection zone averaged 618 hectares per year.

The average periodic volume of clearcut stands over the entire planning horizon is 250 cubic metres per hectare with a high in early decades of 310 cubic metres per hectare. Single tree selection stands average about 94 cubic metres per hectare of volume harvested.

The average periodic age of harvested stands is about 176 years in decades one through four as existing natural stands are cut and after decade five the average age falls to 78 years when the transition from natural to managed stands has occurred.

In the analysis, which supported the 2005 AAC determination, which was presented in 2003 to the regional manager for a decision under Section 59.1 of the *Forest Act* (i.e., Innovative Forestry Practices Agreements), the base case harvest level started at 2 130 000 cubic metres. The forecasted harvest declined after one decade to 2 000 000 cubic metres before decreasing to 1 610 000 cubic metres in decade seven. The harvest level is projected to increase slightly to 1 660 000 cubic metres in decade 23. Relative to the previous base case, the present base case, beyond the higher initial harvest level, was about 9.5 percent lower until decade seven after which the harvest level was approximately similar.

The base case in the current analysis incorporates a number of changes to input data and methodology from the base case used in the 2005 determination. These differences include:

- eight percent smaller THLB, which is mostly due to the mapping of old growth management areas;
- implications of the mountain pine beetle infestation were incorporated with considerations for harvest priority, shelf life and adjacency requirements;
- recently approved ungulate winter range mapping and guidelines were used;
- modelling changes were made to wildlife tree patches, future roads, community watersheds, elk winter range, visual landscape management, and disturbance in the inoperable;
- recently identified archaeological sites were explicitly buffered and removed; and
- updated vegetation resource inventory adjustment information was available for sensitivity analysis.

I have reviewed in detail the assumptions and methodology incorporated in the base case; as well as the total growing stock, the harvest contributions from managed and unmanaged stands, the average volumes per hectare, the total area harvested annually, and the average ages of the forest stands harvested. Based on my review, I am satisfied, subject to the qualifications accounted for in this document that the information presented to me provides a suitable basis from which I can assess the timber supply for the Merritt TSA.

In addition to the base case forecast, I was provided with alternative harvest flows, a number of sensitivity analyses carried out using the base case as a reference, and supplemental analysis work. This and other information noted below have been helpful in the considerations and reasoning leading to my determination.

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

Where I have concluded that an assumption was appropriately modelled in the base case, I will not discuss my considerations of it in this document, other than to note my agreement with the approach that is already documented in the analysis report or data package. These factors have been listed in Table 2, grouped according to the section of the *Forest Act* to which they apply. Conversely, I will explain my consideration of any assumption that concerns me, such as lack of information or clarity in the analysis report, apparent divergence from current management practice, or a high level of public or First Nations input.

Table 2. List of factors for which base case modelling assumptions have been accepted

<i>Forest Act</i> section and description	Factors accepted as modelled
8(8)(a)(i) Land base contributing to timber harvesting	Crown forested land base Economic and physical operability Unmerchantable forest types Roads, trails, and landings Woodlot licences
8(8)(a)(i) Composition of the forest and expected rate of growth	Biogeoclimatic subzones Tree improvement Managed stand yield modelling Site productivity estimates
8(8)(a)(ii) Expected time for the forest to be re-established following denudation	Regeneration delay Impediments to prompt Regeneration Not satisfactorily restocked (NSR)
8(8)(a)(iii) Silvicultural treatments to be applied	Silvicultural systems Incremental silviculture
8(8)(a)(iv) Standard of timber utilization and allowance for decay, waste, and breakage	Decay, waste, and breakage Minimum harvestable age
8(8)(a)(v) Constraints on the amount of timber produced by use of the area for other purposes	Cutblock adjacency Landscape-level biodiversity Ungulate winter range Community watersheds Grassland conversion Ecosystem restoration Recreation Community fire interface
8(8)(a)(vi) Other information	
8(8)(b) Short and long-term implications of alternative rates of timber harvesting from the area	
8(8)(d) Economic and social objectives of the government	
8(8)(e) Abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area	Forest health other than bark beetles

Section 8 (8)

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

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

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

Land base contributing to timber harvest

- general comments

The total area of the Merritt timber supply area, as reported in the analysis report, is 1 129 086 hectares. Of the total TSA area, 803 558 hectares—about 71 percent—is classified as productive Crown forest land.

As part of the process used to define the timber harvesting land base (THLB), a series of deductions was made from the productive Crown forest land base. These deductions account for economic or ecological factors that operate to reduce the forest area available for harvesting.

For the Merritt TSA, I acknowledge that appropriate deductions were made for lands from an administrative perspective (private lands, federal lands, miscellaneous Crown leases, and woodlots licences) and biophysical perspective (non-forest, non-commercial forest, non-productive forest, and current roads, trails and landings) that I do not consider available for harvesting in my decision. These deductions resulted in a THLB of 625 080 hectares.

- protected areas

Existing provincial parks were excluded from the THLB but areas of interest (AOI) proposed under the Protected Areas Strategy were included in the THLB. The Thompson Okanagan Managers Committee has identified that only portions of the Kentucky-Alleyne Approved Study Area (1052 hectares) and Paradise Lake Approved Study Area (84 hectares) should still be considered as AOI within the Merritt TSA.

District staff indicate that although these areas have not been formally established as protected areas, current practice is to consider them, at least temporarily, as no-harvest zones. In view of the relatively small size of these areas—about 0.2 percent of the THLB—I am not concerned that their inclusion in the THLB poses any significant risk to timber supply; therefore, will make no adjustment to the base case on this account.

- community forests

In current legislation, once a community forest is established the associated area is no longer considered to contribute to the AAC of the timber supply area and in accordance with Section 8 (7) of the *Forest Act*, it becomes the responsibility of the regional manager to determine a separate AAC for the area.

District staff inform me that the planning and approval processes to establish the Vermillion Forks Community Forest near Princeton are underway and that an offer of a community forest agreement has been made. As the community forest was not established at the time of the timber supply analysis, the 10 655 hectares of THLB associated with the area were assumed to contribute to the harvest levels projected in the base case.

For this determination, I note that while the Vermillion Forks Community Forest has not been finalized, the offer of a community forest agreement indicates that there is clear intent to

complete its establishment. Once established, the area associated with the Vermillion Forks Community Forest will no longer be considered part of the Merritt TSA. Therefore, I conclude that the THLB used in the analysis for this determination has been overestimated by 10 655 hectares resulting in an overestimation of 1.7 percent in the harvest levels projected in the base case and I will account for this in my determination as discussed in **‘Reasons for Decision’**.

- environmentally sensitive areas

The base case identified environmentally sensitive areas, where no harvesting occurs, based primarily on forest inventory classification of such areas for soil stability.

Newer terrain stability mapping provides information that better reflects the land base unsuitable for harvesting due to soil stability. A comparison between the existing environmentally sensitive area inventory and the terrain stability mapping indicates that the newer information results in about a 0.5 percent increase in the area available for harvesting.

I conclude that the assumptions used in the base case for environmentally sensitive areas based on the forest inventory result in a 0.5 percent underestimation in the size of the THLB. Therefore, I will account for a small underestimation in the base case harvest levels as discussed in **‘Reasons for Decision.’**

For future determinations, I encourage work on terrain stability mapping in order to improve estimates of the land base available for timber harvesting and for other operational and strategic planning purposes.

Expected rate of growth

- forest inventory and natural stand yield projections

The analysis used an inventory data set obtained from the Land and Resource Data Warehouse (LRDW) in 1999. The data set was not modified to address missing age and species information (related to harvesting blocks) and disturbance depletions. Forest Analysis and Inventory (FAIB) staff would have preferred the use of the most current LRDW data set but a general comparison indicated that the 1999 data set was sufficient for this timber supply review.

The age, height and volume data in the inventory used in the base case were adjusted based on Vegetation Resource Inventory (VRI) phase 2 field sampling data. Existing stand volume estimates were projected using the MFML Variable Density Yield Prediction model (VDYP) version 6.6d.

After the base case was prepared, the VRI phase 2 inventory information, including previously unavailable net volume adjustment factors, was reanalysed and new volume estimates were created using VDYP version 7. Using the net volume adjustment factors in a sensitivity analysis resulted in a five percent decrease in the base case mid-term (5 to 10 decades from the present) harvest levels.

After the timber supply analysis was completed, a review of the inventory used in the analysis indicated that a large number of harvest depletions, potentially the equivalent of up to seven million cubic metres, were missing. Some of these depletions are recent and others are for proposed harvesting. Assuming that the seven million cubic metres is harvested during the initial forecast period (starting in 2008) results in a 2.5 year adjustment in the origin of the harvest flows, for example harvest levels projected for 2008 would now occur in the second half of 2011.

To assist with my AAC determination, three supplemental analyses were provided based on updated information sources including the inventory depletions, small-diameter pine types, and

natural stand volume projections based on VDYP version 7. In one of these forecasts it was possible to maintain the base case initial harvest level for seven years before a step-wise decline to a mid-term level 16 percent lower than in the base case at year 26. Starting in decade five, the harvest level in the alternative harvest forecast is five percent less than in the base case and this difference continues until a long-term harvest level similar to that in the base case is reached in decade 11.

Based on my review of natural stand yield sensitivity analysis and the alternative analysis results, I conclude that the base case overestimates the available inventory and natural stand yield projections in the Merritt TSA. On this basis, I conclude that the short-term harvest level projected in the base case can be maintained if the decline to a mid-term harvest level five percent less than in the base case occurs earlier in the harvest projection and I will account for this as discussed in **‘Reasons for Decision’**.

For the next determination, I expect the timber supply analysis to use the most recent forest inventory data set available and that this information will incorporate appropriate adjustments for natural stand yields and harvest depletion.

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

- silviculture regimes

The silviculture regimes of recent and future harvested stands were based on a 2003 report that derived the species composition and planting density expectations for predictive ecosystem mapping entities. These expectations were obtained from a questionnaire of the major licensees and modified for expectations around survival and ingress. The volume of regenerating stands is projected on the basis of the expected species composition and planting density for each stand type. These expectations were subsequently adjusted to account for expected survival and ingress based on the licensee survey. The resultant species composition and stand densities were then assigned to stands based on the site series identified in predictive ecosystem mapping.

Forest district staff summarized recent regeneration, free-growing survey and planting density information from the RESULTS data base. This information suggests that realized planting densities are lower than those assumed in the base case and when modelled would result in a three to five percent lower volume projections.

Predicting the actual species composition and planting density that result from future regeneration will always be subject to some degree of uncertainty. However, one of the ways to deal with this uncertainty is to incorporate the best available information, such as actual planting density and regeneration survey information, in the timber supply analyses prepared for AAC determinations. In this way, the regular redetermination of AACs over time will help to reduce this uncertainty.

As the RESULTS database information represents the actual species composition and planting densities of stands currently being established, I conclude that the base case likely overestimates the long-term timber supply by at least three percent and I will account for this in **‘Reasons for Decision’**.

For the next determination, I expect that the most recent planting density and silviculture survey information will be incorporated into the analysis and the timber supply review.

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

As noted in Table 2, I accept as modelled the factors usually considered under this section, and I will not discuss them further.

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

- utilization standards

In the analysis, the utilization standard assumed for most species was a minimum 17.5-centimetre diameter at breast height (dbh) with a 30-centimetre maximum stump height and a 10-centimetre minimum top diameter inside bark. For pine stands, the standard was 12.5 centimetres for minimum dbh.

District staff indicate that these standards reflect current licence requirements and current performance in the TSA.

In 1996, in order to encourage the utilization of small-diameter pine (pine diameter less than the standard 12.5centimetres minimum dbh), the chief forester established a 250 000 cubic metres AAC partition for this stand type. The small-diameter pine partition was maintained at this level until 2001, when it was increased to the current level of 312 500 cubic metres. District staff inform me that since the establishment of this partition, performance in this stand type has been good and they indicate that such performance is likely to continue.

Based on the continued performance in small-diameter stands, I have decided not to continue a partition in this determination. While I recognize that there is some chance of lower performance and subsequent increase in non-recoverable losses due to the mountain pine beetle infestation, I believe that the existing disposition tools are sufficient to encourage harvest of these stands.

Regional staff in 2010 assessed cruise data compiled at small diameter pine and regular pine utilization standards and they reviewed how current scaling and waste and residue policy is capturing the small diameter component. A comparison of this information with the volume of small-diameter pine stand types in the inventory, indicate that the inventory volume underestimates the amount of small-diameter pine in the range of 7 to 16 percent. As small-diameter pine types represent about 10 percent of the short-term total harvest, it is likely that the base case short-term harvest levels have been underestimated by about 0.7 percent to 1.6 percent.

I concur with the recent estimates around the higher utilization of small-diameter pine types and conclude that the short-term harvest levels projected in the base case have been underestimated by about one percent, the mid-point of the above range and I will account for this in my determination, as discussed in **‘Reasons for Decision’**.

With regard to the small-diameter pine partition, I note that this partition has been in place since 1996 and that there has been consistent performance in this stand typed. Therefore, while I encourage the continued utilization of small-diameter pine, I conclude that a partition for this stand type is no longer required to encourage utilization.

- log grades

In April 2006 new log grades were implemented for the BC Interior. Previously, a log was assessed according to whether the tree it came from was alive or dead at the time of harvest. Prior to April 2006, grade 3 endemic (the ‘normal’ mortality observed in a mature stand) and grade 5 (dead tree with less than 50 percent firmwood and/or less than 50 percent of lumber produced is merchantable) were not charged to the AAC if harvested. Under the new system, grades are based on the log’s size and quality at the time it is scaled, not simply 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 are now charged to the AAC. Therefore, this volume should now be taken into account in an AAC determination. Data obtained from forest inventory audits show that dead wood that could potentially be used as sawlogs (grade 3 and 5) in the Merritt TSA amounts to approximately four percent of the green volume.

The base case did not account for grade 3 endemic or grade 5 logs. Therefore, for this determination, I conclude that the base case timber supply has been underestimated by four percent throughout the forecast period and I will account for this in my determination, as discussed in **‘Reasons for Decision’**.

- minimum harvestable volume

The base case limits harvesting to stands that obtain 150 cubic metres per hectare before the age where the culmination of mean annual volume increment is reached. Due to the mountain pine beetle infestation modelling methodology, which imposes a simple volume reduction for shelf life, the THLB used in the base case includes stands that will not meet this minimum volume requirement over the forecast period and therefore, do not contribute to the harvest levels projected in the base case. District staff indicated that it is likely that most of these stands will either be harvested, rehabilitated through programs such as Forests for Tomorrow, or will regenerate naturally and grow into usable stands.

A sensitivity analysis in which the minimum harvestable volume was decreased to 100 cubic metres per hectare resulted in a long-term harvest level that is 10 percent higher than in the base case. This result is due, in part, to the inclusion of some of the stands mentioned above; however, the inclusion of stands that would otherwise not be harvested due to economic or operational considerations would also have occurred.

I agree with district staff that the THLB used in the base case was likely underestimated due to the exclusion of mountain pine beetle infested stands that will ultimately be regenerated. However, in order to discount the inclusion of stands that were excluded in the base case due to economic or operability considerations, I find it reasonable to reduce the observed increase in the long-term harvest level in the sensitivity analysis by half. On this basis, I conclude that the base case long-term harvest level has been underestimated by about five percent and I will account for this in my determination as discussed in **‘Reasons for Decision’**.

(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 (now the Ministries of Forests, Mines and Lands and the Natural Resource Operations) 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. Accordingly, the extent to which integrated resource management (IRM) objectives for various forest resources objectives for various forest resources and values affect timber supply must be considered in AAC determinations.

- stand-level biodiversity

Stand-level biodiversity considerations in the Merritt TSA include legal requirements for wildlife tree retention, coarse woody debris retention and a 15 cubic metres per hectare on-block

Douglas-fir retention. The base case reflected the timber supply implications of these requirements.

District staff determined through Forest and Range Evaluation Program (FREP) monitoring that gross wildlife tree retention averages about two percent higher than legal requirements. This increased retention results in about a one percent overestimation in the size of the THLB.

First Nations expressed concern that insufficient wildlife tree retention is occurring on harvest blocks and that retention strategies, such as those expressed in the Upper Nicola Indian Band Sux^wtxtem Action Plan are more appropriate. I share similar concerns regarding the extent of stand-level retention, particularly in areas affected by MPB. Consequently, in a 2005 provincial guidance document to address stewardship needs on large scale MPB harvest operations, I indicated that retention levels should be increased by 10 percent for harvest blocks less than 50 hectares to over 25 percent on blocks greater than 1000 hectares. However, these increased retention guidelines are meant to inform best practices and are not legally binding requirements.

I note that the wildlife tree assumptions used in the base case do not reflect current practice and that this results in about a one percent overestimation in the size of the THLB. Therefore, I am accounting for a one percent overestimation in the base case harvest levels over the entire forecast period, as discussed in **‘Reasons for Decision’**.

For the next determination, I encourage district staff to continue to monitor the retention of merchantable forest for non-timber objectives and to identify the implications of such for future timber supply reviews. I also encourage district staff and licensees to work with First Nations with respect to their concerns about wildlife tree retention.

- identified wildlife

The Identified Wildlife Management Strategy (IWMS) Version 2004 indicates that twenty-three species of identified wildlife occur or may occur in the Merritt TSA. Government has established 60 wildlife habitat areas (WHAs) for particular identified wildlife species in the Merritt TSA covering a gross area of 6992 hectares. Further wildlife habitat areas are expected to be established.

In the base case analysis, no specific accounting was made for WHAs or for management and policy considerations respecting the IWMS or any species at risk. Provincially, policy direction is that the THLB impact from IWMS be limited to one percent.

Given the presence of identified wildlife species, established wildlife habitat areas not accounted for in the analysis and the likelihood that additional wildlife habitat areas will be established, I conclude that the base case harvest levels have been overestimated by one percent across the entire forecast period and I will account for this in my determination, as discussed in **‘Reasons for Decision’**.

- riparian management

The riparian management assumptions used in the base case were based on licensee forest stewardship plans that reflect existing *Forest and Range Practices Act* (FRPA) and former Forest Practice Code riparian management guidelines. Monitoring of actual riparian management practices in the TSA indicates that retention levels are higher than those in the licensees’ forest stewardship plans. However, the monitoring results do not account for the possible overlap with areas excluded for other management objectives.

In the Nicola watershed, a number of fish-bearing streams have been designated as “temperature sensitive streams”. The base case did not model the extra retention requirements of these streams, which are estimated to be about 1000 hectares or about 0.15 percent of the THLB.

Based on the available information regarding riparian management, I am not able to conclusively determine if the current retention practices for riparian management, other than those for temperature sensitive streams, are significantly greater than those identified in licensees’ forest stewardship plans. With regard to temperature-sensitive streams, I note that the increased retention requirement results in a 0.15 percent overestimation in the size of the THLB. Therefore, I am accounting for a 0.15 percent overestimation in the base case harvest levels throughout the entire forecast period, as discussed under ‘**Reasons for Decision**’. As with stand-level biodiversity, I encourage district staff to continue to improve estimates of the retention of merchantable forest for non-timber objectives, such as riparian management.

- visually sensitive areas

Careful management of scenic areas along travel corridors and near recreational sites is an important integrated resource management objective requiring that visible evidence of harvesting be kept within acceptable limits in specified areas. Within the Merritt TSA, scenic areas and visual quality objectives have been established, although the immediate application of disturbance requirements has been relaxed for MPB-impacted stands.

The base case included the maximum legal disturbance limit for the visual quality objectives, as identified within licensee stewardship plans for the entire forecast period. The regional visual landscape forester indicated that operationally the level of disturbance will have to decrease over time in order to maintain the visual quality objects established for visually-sensitive areas. In a sensitivity analysis, reducing the disturbance limits over time had no immediate effect on the timber supply projected in the base case.

I find that the assumptions used in the base case for visually sensitive areas adequately reflect current practice and are sufficient for this determination. However, in subsequent timber supply reviews, I request that the visual quality requirements used for the timber supply review consider the cumulative effect of harvesting over the entire forecast period and reflect the advice provided by visual management experts.

- archaeological resources

Over 700 archaeological sites protected under the *Heritage Conservation Act* have been identified in the TSA. The majority of these sites are either located outside of the productive Crown forest land base or are in areas deducted from the THLB for other reasons such as riparian management.

A variety of archaeological tools are used in the Merritt TSA and new sites continue to be identified. The base case modelled sites currently registered in the Remote Access to Archaeological Database system but did not account for the continued discovery of sites.

I conclude that archaeological resources have been appropriately accounted for in the base case. As more sites are identified there may be more pressure on the THLB that might affect the long-term timber supply. However, due to the 10-year requirement for timber supply reviews required in legislation, any new information can be considered in subsequent AAC determinations.

- First Nations cultural use and sensitive sites

First Nations have a strong history of traditional use on the lands within the Merritt TSA. Cultural use sites can be found throughout the TSA and include areas of spiritual importance as well as traditional use of fish, wildlife, and plants.

Local First Nations are extensively involved at the operational level of forest planning in the Merritt TSA, including the Nicola Similkameen Innovative Forestry Society, who in conjunction with ministry staff prepared the analysis for this determination (see 'base case for the Merritt TSA'). Through this involvement, forest licensees are able to work with First Nations to accommodate known aboriginal interests with minimal timber supply impacts. However, during the consultation for this AAC decision, First Nations raised broad concerns about the impacts of the current harvest levels on a spectrum of aboriginal interests and stewardship concerns, including water resources, wildlife and botanical products.

As members of Nicola-Similkameen Innovative Forestry Society, many of the First Nations have collaborated with licensees in developing tools that assist in the identification of specific cultural and wildlife values on the landscape. During consultation First Nations questioned why these predictive tools have not been assessed or linked with the timber supply analysis. Ministry staff indicate that these predictive models are operationally focused and cannot be linked with the strategic, landscape-level timber supply models.

I am aware of two spiritually significant areas, Stoyoma Mountain and XeXe (near Missezula Mountain). Timber supply implications with respect to Stoyoma Mountain appear to have been minimized through a high degree of First Nations involvement in the planning and harvest monitoring in this area. However, at present the XeXe area is not fully addressed within current operational planning. Based on the limited spatial description available to the ministry, the XeXe site includes about 600 hectares of THLB that may be unavailable for harvesting.

I conclude that First Nations cultural use values can generally be managed within current forest operations with minimal timber supply impacts. However, for the XeXe area, where operational planning has not been addressed, the best available information indicates that the THLB may be overestimated by about 600 hectares. This corresponds to a 0.1 percent overestimation in the harvest levels projected in the base case across the entire forecast period and I will account for this in my determination, as discussed in '**Reasons for Decision**'.

Prior to the next determination, I encourage ministry staff to work with licensees and First Nations to better understand the relationship between harvest levels and resource values important to First Nations, including the investigation of the available predictive models and how these might be used in conjunction with strategic-level timber supply models.

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

As noted in Table 2, I accept that the factors related to this section of the *Forest Act*, were appropriately addressed in the analysis, and I will not discuss them further in this document.

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

- small-diameter pine types

In the previous AAC determinations the chief forester established a partition of 312 500 cubic metres for small-diameter pine types (i.e., small wood) to encourage harvesting in what at one time had been an unmerchantable forest type. Under the partition, the uptake of harvesting in these types by smaller post and rail operations has been good. District staff want to continue to encourage these smaller operations and suggest that while the maintenance of a partition highlights this stratum such a partition is not necessary to ensure continued performance.

In view of the sustained utilization of small diameter pine, I have determined that a partition in the AAC for this stratum is no longer required.

In the base case, application of a broader definition of small-diameter pine types resulted in a larger area being classified than is administered as such by the district. This issue is discussed in this document under '*harvest priorities*' and '*forest inventory and natural stand yield projections*'.

- harvest priority

Certain forest types or locations are likely to be harvested before others for reasons of economics, forest health, or logistics. Such choices can influence timber availability at future time periods.

In the base case, assumptions were made about current harvest priorities and practices for MPB-infested stands, spruce bark beetle-infested stands, small-diameter pine types, and harvesting the oldest stands first. However, the harvest priority assigned to small diameter pine stands was not limited to the expected actual harvest of 312 000 cubic metres per year. In addition to harvest priority, the amount of area modelled as small-diameter pine was larger than the area that is administered as such operationally.

In order to examine the effect of correcting the harvest priority rule and the contribution of small diameter pine, an alternative harvest forecast was prepared to examine the combined effect of correcting the small pine harvest priority rule and contribution. This analysis also incorporated updated harvest depletions and VDYP 7 to project natural stand yields. The result of these changes is described under '*inventory and natural stand yields*'.

I expect that the harvest priorities reflected in the supplemental analysis are likely a better representation of current and projected harvesting than those used in the base case. For this determination, I will account for the combined effect of revised harvest priorities, contribution of small pine, updated inventory and use of VDYP version 7, as discussed under '*forest inventory and natural stand yield projections*' and in '**Reasons for Decision**'.

- alternative harvest flows

The initial and supplemental analyses have provided several scenarios that look at different initial harvest levels and how these influence projected harvest levels. These analyses demonstrate that initial harvest level and transition to the mid-term harvest level have a significant effect on mid-term (20 to 60 years from now) timber availability and I will account for this in my determination as discussed in '**Reasons for Decision**'.

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

Economic and Social Objectives

- First Nations consultation

The following First Nations from the Okanagan, Nlaka'pamux, Secwepemc, and Stó:lō Nations have asserted traditional territories overlapping the Merritt TSA: Ashcroft Indian Band, Boston Bar First Nation, Lytton First Nation, Oregon Jack Creek Indian Band, Kanaka Bar Indian Band, Skuppah Indian Band, Spuzzum Indian Band, Boothroyd Indian Band, Nicomen Indian Band, Siska Indian Band, Coldwater Indian Band, Cook's Ferry Indian Band, Lower Nicola Indian Band, Nooaitch Indian Band, Shackan Indian Band, Okanagan Indian Band, Osoyoos Indian Band, Penticton Indian Band, Westbank Indian Band, Lower Similkameen Indian Band, Upper Nicola Indian Band, Upper Similkameen Indian Band, Kamloops Indian Band, and Chawathil First Nation.

Consultation with First Nations on the AAC determination for the Merritt TSA was initiated by the Cascades Forest District in February 2009 and concluded in June 2010. The consultation process also involved information sharing by the NSIFS, which includes a number of local FNs as active participants (see *'base case for the Merritt TSA'*), who made available to First Nations the draft data package and the timber supply analysis report.

The Cascades Forest District sent a letter on February 16, 2009 to initiate consultation with First Nations (or representative organizations) with asserted traditional territory in the Merritt TSA. Further correspondence was sent to First Nations providing the draft data package on April 15, 2009 and the draft analysis report on February 10, 2010. In the latter correspondence, each First Nation was provided a high-level preliminary assessment of their interests in the Merritt TSA based on ministry knowledge. I also invited all First Nations to meet directly with me on June 1, 2010. Representatives from five First Nations participated in this meeting. Additionally, individual meetings as requested by Westbank First Nation and Upper Nicola Indian Band were held with ministry staff.

The First Nations consultation process for this allowable annual cut determination was based upon government direction received from the Ministry of Attorney General. After the start of the consultation process, direction was given to conduct preliminary assessments. An assessment helps determine an appropriate level of consultation based on the strength of claimed aboriginal interests and the seriousness of potential impacts that the proposed decision may have on these aboriginal interests. Although results of the preliminary assessment were not available at the beginning of the timber supply review and thus could not initially be shared with First Nations, the findings from the assessment were referenced in a subsequent consultation letter within a reasonable time frame for consideration.

Written submissions, as well as direct communication during meetings and by phone, were received from First Nations. These submissions have been compiled for me in a consultation summary.

From this information, I highlight several concerns and desires that First Nations identified:

- more meaningful consultation and accommodation;
- reduce impacts on traditional uses and cultural values pertaining to fish, wildlife and plants, caused by harvesting and road access;
- need by First Nation communities of appropriate tools (e.g., renewable tenure) to derive stable economic benefits from the forest industry;

- a land use planning process in the Merritt TSA that has appropriate First Nation input and shared decision making;
- the current harvest level negatively impacts water, wildlife, medicines berries and First Nations rights' and interests; and
- direct financial compensation.

I have considered the information received from First Nations and, where appropriate, I have addressed these concerns in my decision. Many of the concerns identified, such as renewable tenure and financial compensation, are not within the scope of my authority under Section 8 of the *Forest Act*. Other concerns need to be addressed operationally as directed under the *Forest and Range Practices Act*. In accordance with my guiding principles, I will not anticipate the impact of decisions by other decision makers that have not yet been made, such as treaty settlements or land use decisions. I will however endeavour to bring the specific concerns to the attention of appropriate government authorities.

From my review of the consultation summary, I conclude that reasonable efforts were made by the Cascades Forest District to inform First Nations about the timber supply review and engage them in consultation regarding their aboriginal interests and how these interests may be affected by this AAC determination. The scope of the consultation reflected was commensurate with MNRO's assessment of the aboriginal interests asserted by the relevant First Nations within the Merritt TSA.

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

- Minister's letter

The Minister of Forests and Range (now the Minister of Forests, Mines and Lands) has expressed the economic and social objectives of the Crown for the province in a letter to the chief forester, dated July 4, 2006 (attached as Appendix 3). The letter stresses the importance of a stable timber supply to maintain a competitive and sustainable forest industry while being mindful of other forest values. In respect of this, in the base case projection and in all of the alternative harvest flow projections with which I have been provided for reference in this determination, a primary objective in the harvest flow has been to attain a stable, long-term harvest level where the growing stock also stabilizes. In my determination, I have been mindful of the need for the allowable harvest in the short term to remain consistent with maintaining the integrity of the timber supply projection throughout the planning horizon. I have also considered with care the adequacy of the provisions made both in current practice, and assumed in the analyses, for maintaining a range of forest values.

I am therefore satisfied that this determination accords with the objectives of government as expressed by the Minister.

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

- non-recoverable losses

The modelling of non-recoverable losses is to address merchantable volume losses that occur due to natural processes such as fire, wind, and forest health but are not considered within the volume projections used in the timber supply analysis. The base case approached non-recoverable losses by two methods: a constant volume deduction for non-recoverable losses and specific modelling of losses for the MPB infestation.

A constant volume deduction was applied for losses from wind, fire, and spruce bark beetle across all forecast periods. District staff indicate that the non-recoverable loss information for windthrow (based on a survey in 2000) and fire (based on average loss for period 1989 to 1999) represents the best available information and that the spruce bark beetle losses are uncertain as they were developed before the current infestation.

For non-recoverable volume loss due to MPB, the base case used shelf life for the first 40 years and then applied a constant volume loss for the remainder of the forecast period. District staff indicate that non-recoverable losses related to MPB are difficult to quantify at this time given that the understanding of shelf life and alternate fibre uses is evolving. They conclude that the constant volume loss derived prior to the current infestation will likely be high given the young age structure of pine-leading stands following the current infestation.

I am mindful of the uncertainty around non-recoverable losses both from the cause of mortality and from the ability to salvage such losses. For the purposes of this determination, I accept the non-recoverable losses as identified as the best available information for the short-term forecast period.

For the next determination, I would like to see further monitoring and analysis work to understand the implications of non-recoverable losses on the mid-term timber supply in the Merritt TSA.

- bark beetle infestation

mountain pine beetle

The cumulative percentage of pine projected to be killed in the Merritt TSA has decreased from 79 percent by 2017 to 65 percent by 2019. This difference is likely due to both a real slowing of the infestation due to decreased beetle survival during the winter of 2008 to 2009, aggressive forest health harvesting and use of model parameters not reflecting conditions in the Merritt TSA.

The base case considered the mountain pine beetle infestation and subsequent shelf life of timber within infested stands. I am generally satisfied that the model demonstrates the implications of the mountain pine beetle infestation, except as I have discussed above for minimum harvestable volumes and non-recoverable losses.

In the analysis and in the BC Mountain Pine Beetle model, young pine stands are assumed not to be attacked by MPB. District staff indicate that the results of a study completed in the Merritt TSA, which examined the impact of MPB on young stands, indicate that the base case mid-term timber supply may have been overestimated by about 0.4 percent.

I am mindful of the implication of the MPB infestation and how aggressive harvesting has assisted in capturing volumes that if not captured may have become non-recoverable. I conclude that in general the MPB has been adequately reflected in the base case but that the district's concern with respect to young pine stands is appropriate. Therefore, I will account for a 0.4 percent overestimation in the mid-term timber supply, as discussed in **'Reasons for Decision'**.

For the next determination, I encourage FAIB staff to provide further analyses that investigates the sensitivity of the assumptions around the modelling of the MPB infestation.

spruce bark beetle

District staff indicate that mixed species stands, some of which are infested with spruce bark beetle, account for about 2.7 million cubic metres of merchantable timber. In order to manage spruce beetle populations, it is important that infested trees be harvested expeditiously. Unless

this occurs, the resultant increases in mortality could result in increased non-recoverable losses and adversely impact the mid-term timber supply.

The extent to which spruce bark beetle-infested stands are harvested in the base case reflects current conditions and assumes that this volume is sufficient to maintain the non-recoverable losses at the base case level. Although there is uncertainty regarding the extent to which non-pine leading stand harvesting will be required to manage bark beetle populations, I accept that the assumptions used in the base case are adequate for this timber supply review.

In the base case, an initial harvest level of 2 810 000 cubic metres per year, which is about the level of the current AAC, can only be maintained until 2015 before decreasing by 1 000 000 cubic metres to a mid-term level of 1 810 000 cubic metres per year for 40 years and 1 580 000 cubic metres for 70 years. The results of the timber supply analyses for the Merritt TSA indicate that mid-term timber supply is sensitive to the amount of non-pine volume that is harvested in the short term. Consequently, it is important that harvesting continue to focus on beetle-infested stands, principally MPB infested pine-leading stands, in an effort to conserve non-pine volume for harvesting during the mid-term.

Therefore, in order to encourage bark beetle management in the Merritt TSA, while conserving non-pine volume to support mid-term timber supply, I am establishing a partition of 720 000 cubic metres in the AAC attributable to non-pine volume as recorded in the ministry's Harvest Billing System.

The intent of this partition is not to encourage the harvest of healthy stands, rather the partition is intended to maximize the conservation of non-pine species for harvest in the mid-term, while allowing for the salvage of beetle-infested stands. To this end, it is my expectation that of the 720 000 cubic metre-partition attributable to non-pine volume, about two-thirds will be incidental non-pine volume resulting from the salvage of mountain pine beetle infested, pine-leading stands. The remaining one-third will be volume resulting from the focused harvesting of spruce bark beetle infested stands.

I request that district and licensee staff continue to monitor beetle populations and management in the Merritt TSA and report this information to me on an annual basis, as discussed under **'Implementation'**. In the event that there are significant changes in the extent of the infestations or beetle management, I am prepared to re-visit this determination earlier than the 10-year maximum provided in the *Forest Act*.

Reasons for Decision

In reaching my AAC determination for the Merritt TSA I have considered all of the factors required under Section 8 of the *Forest Act* and I have reasoned as follows.

I am satisfied that the assumptions applied in the base case forecast for the majority of the factors applicable to the Merritt TSA were appropriate. However, I have identified a number of factors which, considered separately, indicate that the timber supply may be either greater or less than that projected in the base case. Some of these factors can be readily quantified and their impact on the harvest level assessed with reliability. Others may influence timber supply by adding an element of risk or uncertainty to the decision, but cannot be reliably quantified at this time. Following is my consideration of those factors for which I consider it necessary to further account for their implications to the timber supply.

I have identified the following factors in my considerations as indicating that the timber supply projected in the base case may have been overestimated:

- *Community forests*: The base case included the land base associated with the Vermillion Forks Community Forest. I concluded that the intention to establish this community forest is

clear and that this resulted in a 1.7 percent overestimation of the timber supply projected for the entire forecast period;

- *Forest Inventory*: In the analysis, the forest inventory data set was not updated for depletion prior to use in the analysis. I concluded that while it was possible to maintain the short-term base case harvest level, the mid-term harvest timber supply was overestimated by about five percent overall. I also concluded some of the mid-term overestimation likely resulted from errors in modelling the harvest priority and extent of small-pine diameter types;
- *Silviculture regimes*: The procedures used to develop initial species composition and densities differed slightly from currently reported silviculture information. I concluded that this resulted in a three percent overestimation of the long-term timber supply;
- *Stand-level biodiversity*: Current practices with respect to stand-level biodiversity were found to result in higher levels of retention than the requirements modelled. I concluded that this resulted in about one percent overestimation of the timber supply projected for the entire forecast period;
- *Identified wildlife*: Wildlife habitat areas that constrain timber availability have and are likely to continue to be established within the Merritt TSA. I concluded that this resulted in a one percent overestimation of timber supply over all forecast periods;
- *Temperature sensitive streams*: I concluded that increased stand retention for temperature sensitive streams resulted in a 0.15 percent overestimation of the timber supply projected throughout the entire forecast period;
- *First Nations Cultural Use and Sensitive Sites*: Current operational planning is unlikely to address the interests around a significant spiritually important area to First Nations. I concluded that this resulted in a 0.1 percent overestimation of the timber supply projected for the entire forecast period; and
- *Mountain pine beetle infestation*: Young pine plantations are suffering mortality to an extent that will likely impact future yields. I concluded that this resulted in a 0.4 percent overestimation of the mid-term timber supply.

I have identified the following factors in my considerations as indicating that the timber supply projected in the base case may have been underestimated:

- *Environmentally sensitive areas*: The use of forest inventory defined environmentally sensitive areas likely overestimated the land base unavailable for harvesting. I concluded that, based on comparisons with terrain stability mapping, an unknown but likely small underestimation of the timber supply occurs throughout all forecast periods;
- *Utilization standards*: Assumptions applied in the base case for utilization standards did not reflect the actual merchantable harvest under current utilization standards. I concluded that this resulted in a one percent underestimation in the short- to mid-term timber supply related to small-diameter pine types utilization standards;
- *Log grades*: The base case did not account for grade 3 endemic or grade 5 logs. I concluded that this resulted in a four percent underestimation in the short-term timber supply; and
- *Minimum harvestable volume*: Assumptions applied in the base case prevented many productive stands with low volume from being selected for harvest in the model, even though many of these stands would likely contribute to actual harvest volumes. I concluded that the modelled exclusion of these stands resulted in a five percent underestimation in the mid- to long-term timber supply.

In consideration of the above-mentioned conclusions, I note that on balance the quantified factors result in about a one percent underestimation of the projected base case short-term timber supply but in about a two to three percent overestimation in the mid- to long-term timber supply.

However, even after accounting for these underestimations in the harvest levels projected in the base case, there is still a need to reduce the current AAC, which was increased to address MPB salvage, in order to minimize the impact on mid-term timber supply. Without reducing the AAC in the near future, timber supply in the mid-term will be severely impacted.

Given the information presented to me, which indicates that the MPB infestation may be slowing and the current stewardship concerns identified by First Nations, government staff, and some licensees, I believe it would be imprudent to maintain the current harvest level that was set five years ago to address the infestation. Based on the alternative harvest forecasts provided, I note that there are a number of approaches to transitioning from the current harvest level to a lower mid-term level. In view of the letter from the Minister of Forests and Range (now Minister of Forests, Mines and Lands) that asks me to consider the socio-economic impacts associated with reducing the AAC, I must set an AAC that reflects appropriate forest management while minimizing the impacts on local communities.

Therefore, taking into account the base case, over- and under-estimation of harvest levels, sensitivity analyses, uncertainties, and risks, I conclude that it is appropriate for me to set the AAC of the Merritt TSA to 2 400 000 cubic metres, which represents a decrease of 400 000 cubic metres. Given the risk to mid-term timber supply and the high degree of uncertainty associated with forest health, the shelf life of dead pine and uncertain product demands, I request that FAIB staff assess the risk associated with significant changes in the factors that affect timber supply to assess the need for a determination earlier than the 10 years allowed under the *Forest Act*.

In an AAC determination, I can also specify portions of the ACC attributable to different types of timber, terrain or location. Such partitions, while seen as restricting or encouraging harvest in specific stratum, can help to ensure that actual harvest practices reflect the assumptions that I have used in this decision.

In past determinations, a partition was identified to encourage the harvest of small-diameter pine type stands. Since the establishment of this partition, performance in small-diameter pine type stands has been good and district staff indicate that such performance is likely to be maintained. While I recognize that there is some chance of lower performance and subsequent increase in non-recoverable losses due to the mountain pine beetle infestation, I do not feel the need to maintain a partition on small-diameter pine types and that existing disposition tools are sufficient to encourage harvest of these stands.

As discussed in '*bark beetle infestation*', I am establishing a partition of 720 000 cubic metres attributable to non-pine species volume, as recorded in the ministry's Harvest Billing System. The intent of this partition is not to encourage the harvest of healthy stands, rather the partition is intended to maximize the conservation of non-pine species for harvest in the mid-term, while allowing for the salvage of beetle-infested stands. To this end, it is my expectation that of the 720 000 cubic metre-partition attributable to non-pine volume, about two-thirds will be incidental non-pine volume resulting from the salvage of mountain pine beetle infested, pine-leading stands. The remaining one-third will be volume resulting from the focused harvesting of spruce bark beetle infested stands.

Determination

I have considered and reviewed all the factors as documented above, including the risks and uncertainties of the information provided. It is my determination that a timber harvest level that accommodates objectives for all forest resources and that reflects current management practices

as well as the socio-economic objectives of the Crown, can be best achieved in the TSA by establishing an AAC of 2 400 000 cubic metres of which 720 000 cubic metres, as identified in the Ministry of Forests, Mines and Lands Harvest Billing System, is attributable to non-pine species.

Given my concerns around mid-term timber supply, I also determine that the Merritt TSA will remain as an area that will contain targeted pine-leading stands as per Section 43.2 of the *Forest Planning and Practices Regulation*.

This determination is effective December 2, 2010, and will remain in effect until a new AAC is determined, which must take place within 10 years of the effective date of this determination.

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

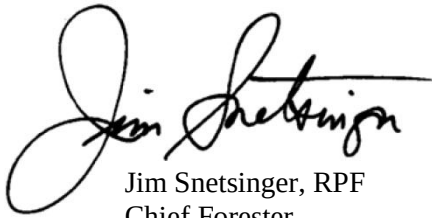
Implementation

In the period following this decision and leading to the subsequent determination, I encourage MNRO staff and licensees to undertake the tasks and studies noted below that I have also mentioned in above sections of this document. I recognize that the ability of staff to undertake these projects is dependent on available time and funding. These projects are, however, important to help reduce the risk and uncertainty associated with key factors that affect the timber supply in the TSA:

- *Bark beetle infestation:* In order to ensure that bark beetle infestations are being appropriately addressed in the Merritt TSA, I expect district and licensee staff to monitor the extent of beetle infestation and salvage and report the results to me on an annual basis.
- *Monitoring retention:* I encourage the MNRO and MFML to continue monitoring and improving the quantification of the retention level of merchantable timber for non-timber objectives such as stand-level biodiversity and riparian management and to incorporate the results into the next timber supply review.
- *Non-recoverable losses:* I request for the next timber supply review that the MNRO and MFML revisit the estimate of non-recoverable losses and the implications of such losses on the mid-term timber supply through appropriate sensitivity analysis.
- *Mountain pine beetle modelling:* For the next determination, I encourage FAIB staff to provide further analysis that investigates the sensitivity of the modelled assumptions around the mountain pine beetle infestation.
- *Young stand performance:* I request that MNRO and MFML district staff, where resources are available and in conjunction with any provincial initiatives, monitor stands past free-to-grow obligations in order to better understand their performance relative to modelled expectations.
- *Log grade:* I request that FAIB develop estimates of merchantable dead volumes that can be incorporated in volume tables for future timber supply reviews.
- *Environmentally sensitive areas:* I encourage the MNRO and MFML and licensees to continue to improve our understanding and inventory on sensitive areas that will not be harvested due to terrain stability or regeneration difficulties.
- *Douglas-fir forest types:* Dry-belt Douglas-fir forest types will play a significant mid-term role. I encourage the MNRO, MFML and licensees to monitor and research the dry-belt

Douglas-fir forest types so their level of contribution to timber supply can be more accurately assessed.

- *Timing of next TSR:* The dynamics of the forest health issues in the Merritt TSA create uncertainty and potential risk for the mid-term timber supply about maintaining the current AAC for over five to seven years. I request that FAIB staff assess at an appropriate time the need for revisiting the current AAC determination prior to the required 10 year period.
- *First Nations Consideration:* Concerns were expressed by First Nations around land use planning decisions, forest tenures, forest practices, particularly retention strategies and road access, as well as the incorporation of cultural values into the timber supply review. Specific to the AAC determination, I encourage that licensees, First Nations, and ministry staff share information about cultural heritage resources, archaeological sites, and spiritual areas such as the XeXe site in order that appropriate operational decisions can be made to protect these values and minimize timber supply impacts. I also request that licensees, First Nations, and ministry staff investigate how to better incorporate cultural heritage values into subsequent timber supply analysis.



Jim Snetsinger, RPF
Chief Forester

December 2, 2010



Appendix 1: Section 8 of the *Forest Act*

Section 8 of the *Forest Act*, Revised Statutes of British Columbia 1996, c. 157, Consolidated to December 30, 2009, reads as follows:

Allowable annual cut

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

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

(2) If the minister

- (a) makes an order under section 7 (b) respecting a timber supply area, or
- (b) amends or enters into a tree farm licence to accomplish a result set out under section 39 (2) or (3),

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

- (c) within 10 years after the order under paragraph (a) or the amendment or entering into under paragraph (b), and
- (d) after the determination under paragraph (c), at least once every 10 years after the date of the last determination.

(3) If

- (a) the allowable annual cut for the tree farm licence area is reduced under section 9 (3), and
- (b) the chief forester subsequently determines, under subsection (1) of this section, the allowable annual cut for the tree farm licence area,

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

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

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

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

- (b) must give written reasons for the postponement.

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

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

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

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

(5) In determining an allowable annual cut under subsection (1) the chief forester may specify 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,

- (a.1) different areas 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 an allowable annual cut for each community forest agreement area, in accordance with

(a) the community forest agreement, and

(b) any directions of the chief forester.

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

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

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

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

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

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

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

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

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

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

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

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

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

Section 4 of the *Ministry of Forests and Range Act* (consolidated to March 30, 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 do the following:

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

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



JUL 04 2006

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

Dear Jim:

Re: Economic and Social Objectives of the Crown

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

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

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

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Minister of
Forests and Range
and Minister Responsible
for Housing

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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