

**BRITISH COLUMBIA
MINISTRY OF FORESTS AND RANGE**

Kootenay Lake Timber Supply Area

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

Effective August 12, 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 (BC) in making my determination, under Section 8 of the *Forest Act*, of the allowable annual cut (AAC) for the Kootenay Lake Timber Supply Area (TSA). This document also identifies where new or better information is needed for incorporation in future determinations.

Statutory framework

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

Acknowledgement

I am indebted to staff of the BC Ministry of Forests and Range (MFR) in the Kootenay Lake Forest District, the Southern Interior Forest Region, and the Forest Analysis and Inventory Branch for compilation and preparation of the information I have considered in this determination. I am also grateful to the First Nations, licensees and government and non-governmental organizations who have contributed information for my consideration during the Timber Supply Review (TSR) process.

Overview of the Kootenay Lake Timber Supply Area

Created in 1980, the Kootenay Lake TSA is located in south-eastern BC, extending from the U.S. border in the south to Glacier National Park in the north. The TSA falls within the Kootenay Lake Forest District and is administered from its main office just north of Nelson.

The timber supply analysis report identifies the total area of the TSA as 1 240 843 hectares, of which 569 620 hectares are Crown forested land, and 199 282 hectares are considered to be available for timber harvesting and are referred to as the timber harvesting land base (THLB).

The AAC prior to this determination, which was determined in 2001, for the Kootenay Lake TSA under Section 8 of the *Forest Act* was 681 300 cubic metres.

Apportionment of the Kootenay Lake TSA AAC

The AAC for the Kootenay Lake TSA is currently apportioned as shown in Table 1.

Table 1: Apportionment of the 2001 AAC (cubic metres per year)

Forest Licences, Replaceable	424 613
Forest Licences, Non-replaceable	6 135
BC Timber Sale (BCTS), Timber Sale Licence/Licence	182 203
Community Forest Agreements	50 000
Woodlot Licences	11 000
Forest Service Reserve – small scale salvage	247
Forest Service Reserve	7 102
Total	681 300

New AAC determination

Effective August 12, 2010, the new AAC for the Kootenay Lake TSA under Section 8 of the *Forest Act* will be 640 000 cubic metres per year. This new AAC represents a reduction of 6.1 percent from the previous AAC. The new AAC excludes all volumes in issued woodlot licences and community forest agreements, and will remain in effect until the next AAC is determined.

Information sources used in the AAC determination

Information considered in determining the AAC for the Kootenay Lake TSA includes but is not limited to the following:

- *Biodiversity Guidebook*, 1995, British Columbia (BC) Ministry of Forests and Ministry of Environment, Land and Parks;
- *Community Watershed Guidebook*, 1996, BC Ministry of Forests;
- *Forest and Range Practices Act*, 2002 and amendments;
- *Forest and Range Practices Regulations*, 2004 and amendments;
- *Forest Practices Code of British Columbia Act*, 1995, and amendments;
- *Forest Practices Code of British Columbia Act Regulations*, 1995, and amendments;
- *Identified Wildlife Management Strategy*, BC Ministry of Environment, 2004;
- *Interior Watershed Assessment Procedure Guidebook; Second Edition Version 2.1*, 1999, Government of BC;
- *Kootenay-Boundary Higher Level Plan Order*, 2002, Government of BC;
- *Kootenay Lake Timber Supply Area Technical Summary of Timber Supply Analysis*, September 2009, BC Ministry of Forests and Range;
- *Kootenay Lake TSA Timber Supply Analysis Discussion Paper*, September 2009, BC Ministry of Forests and Range;
- *Kootenay Lake Timber Supply Area Timber Supply Data Package*, July 2008, BC Ministry of Forests and Range;
- *Kootenay Lake TSA Operability Review*, 2007, Greg Rowe & Associates;

- *Landscape Unit Planning Guide*, 2000, BC Ministry of Forests and Ministry of Environment, Lands & Parks;
- Letter from the Minister of Forests and Range to the chief forester stating the economic and social objectives of the Crown, July 4, 2006;
- *MFR Discussion paper: Harvest Flow Considerations for the Timber Supply Review* (draft working paper), 2003, BC Ministry of Forests and Range;
- *Modeling Options for Disturbance of Areas Outside of the Timber Harvesting Land Base* (draft working paper), March 2004, BC Ministry of Forests and Range;
- *Riparian Management Area Guidebook*, 1995, BC Ministry of Forests;
- *Assessment of Roads, Trails and Landing in Support of the Timber Supply Review: Kootenay Lake TSA*. Forsite Forest Management Specialists, March 31, 2008);
- *Summary of Forest Health Conditions in British Columbia*, 2008, J. Westfall and T. Ebata, BC Ministry of Forests and Range;
- Technical review and evaluation of current and expected operating conditions through comprehensive discussions with Ministry of Forests and Range and Ministry of Environment staff, including the AAC determination meeting held in Nelson on November 24 and 25, 2009;
- Input received from First Nations through the consultation process;
- Input received by public and forest licensees through the review process.

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 of inventory and growth and yield data. These are concerned primarily with biophysical factors—such as the rate of timber growth and the definition of the land base considered available for timber harvesting—and with management practices.

The analytical techniques used to assess timber supply 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 Kootenay Lake TSA I have considered 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 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 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 analyze and account for the consequent timber supply impacts in a current AAC determination. Many government land-use decisions must be followed by detailed implementation decisions requiring for instance 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 determinations address ongoing plan-implementation decisions.

Management of the many uses of the TSA land base is addressed by the 1995 West Kootenay-Boundary Land Use Plan and the 2002 Kootenay-Boundary Higher Level Plan Order (KB HLPO). Caribou habitat areas identified in the KB HLPO were replaced by new areas under *Government Actions Regulation* (GAR) Orders #U-4-012, U-4-013 and U-4-014. I have taken this information into account in my determination.

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 review 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 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 Kootenay Lake TSA. It is also independent of any decisions by the Minister of Forests and Range with respect to subsequent allocation of wood supply.

Overall, in making AAC determinations, I am mindful of my obligation as steward of the forest land of British Columbia, of the mandate of the Ministry of Forests and Range as set out in Section 4 of the *Ministry of Forests and Range Act*, and of my responsibilities under the *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 an information package including data and information from three categories—land base inventory, timber growth and yield, and management practices. Using this set of data and a computer simulation model, a series of timber supply forecasts can be produced, reflecting different 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 which reflects current management as closely as possible and avoids 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.

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, the validity of which—as with all the other forecasts provided—depends on the validity of the data and assumptions incorporated into the computer model used to generate it.

Therefore, much of what follows in the considerations outlined below is an examination of the degree to which all the assumptions made in generating the base case 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 information 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 Kootenay Lake TSA

Modelling was completed with a timber supply algorithm created with the tool SELES (Spatially Explicit Landscape Event Simulator). MFR analysts made modifications to the original algorithm and the modified version was used to develop the base case for the Kootenay Lake TSA.

The 2009 base case indicated an initial harvest level of 645 000 cubic metres per year, which could be sustained for 20 years before declining to 600 000 cubic metres per year in years 20-30 and to a long-term harvest level of 544 000 cubic metres per year from 30 years on. This harvest forecast differed from the 2001 TSR 2 base case, which indicated an initial harvest level of 691 000 cubic metres per year could be maintained for 50 years before declining to a long-term harvest level of 605 000 cubic metres per year.

The decrease in the initial harvest level projected in this analysis is primarily the result of a smaller land base due to removal of newly established community forests, woodlot licence area additions, and designated no-harvest mountain caribou habitat. In the 2001 analysis, the THLB was estimated to be 250 570 hectares; whereas, in the 2009 analysis the base case is supported by a smaller 199 282-hectare THLB.

During the TSR process, two modelling discrepancies were identified in the base case assumptions:

- It was possible to increase the initial harvest level to 655 000 cubic metres per year without affecting the long-term harvest.
- The model had unintentionally restricted volume tables to a maximum of 550 cubic metres per hectare. When this constraint was removed, an initial harvest level of 660 000 cubic metres per year was possible.

I am aware that inadvertent errors such as the above are not uncommon when complex analyses are undertaken, and that due to the review process these mistakes were identified and addressed. For this determination, I am satisfied that in spite of these discrepancies, the base case still provides an adequate informative basis of reference for my considerations in this determination. In addition to the base case, I have reviewed sensitivity and alternative analyses which have also been helpful in my considerations as documented in the following sections.

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

Available data and modelling assumptions are described in two earlier Timber Supply Review documents: the July 2008 "*Data Package*", and the September 2009 "*Technical Summary of*

Timber Supply Analysis". These documents are available for those who wish to examine the assumptions and inputs in detail on the MFR Forest Analysis and Inventory Branch website. All these factors were examined and discussed in detail with staff during the AAC Determination Meeting on November 24-25, 2009 in the Kootenay Lake Forest District.

I have reviewed the information for all of the factors required under Section 8 of the *Forest Act*. Where I have concluded that the modelling of a factor in the base case appropriately represents current management or the best available information and uncertainties about the factor have little influence on the timber supply projected in the base case, no discussion is included in this rationale. These factors are listed in Table 2 (see below).

Table 2: List of factors for which modelling assumptions in the base case have been accepted

<i>Forest Act</i> section and description	Factors accepted as modelled
8(8)(a)(i) Composition of the forest and its expected rate of growth	Timber harvesting land base definition where the following areas were deducted: <ul style="list-style-type: none"> • Administrative exclusions (e.g. woodlots, community forests) • Non-forest/non-productive forest • Parks and protected areas • Uneconomic areas • Low timber productivity stands • Riparian areas • Railways and transmission lines Existing forest inventory existing natural stand yields
8(8)(a)(ii) Expected time for the forest to be re-established following denudation	Regeneration Not-satisfactorily-restocked areas
8(8)(a)(iii) Silvicultural treatments to be applied	Incremental silviculture Commercial thinning
8(8)(a)(iv) Standard of timber utilization and allowance for decay, waste, and breakage	Utilization standards Decay, waste and breakage
8(8)(a)(v) Constraints on the amount of timber produced by use of the area for other purposes	Cutblock adjacency and green-up Riparian management Recreation Wildlife – Deer, Elk and Moose Winter Range Wildlife Management Areas Range Community Fire Interface Archaeological resources Carbon sequestration
8(8)(a)(vi) Any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber	Land use planning

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

Section 8 (8)

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

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

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

Land base contributing to timber harvesting

- general comments

The area of the Kootenay Lake TSA, as estimated from inventory data and reported in the 2009 timber supply analysis, is 1 240 843 hectares, of which 569 620 hectares are Crown forested land base. After accounting for parks and protected areas; old growth management areas; inoperable areas, uneconomic areas, low timber productivity sites; problem forest types; caribou no-harvest habitat; sensitive terrain areas; riparian areas; roads and trails; and railways and transmission lines, the timber harvesting land base (THLB) – the area of productive forest land available for timber harvesting – derived in the base case was 199 282 hectares.

- inoperable areas

Based on a review of operability line work completed by district and licensee staff, the operable land base was about 12 000 hectares larger than was assumed in the 2001 analysis. However, following completion of the operability review, district staff identified additional areas as being uneconomic to access under current market conditions and excluded these areas from the THLB.

As with any operability line, some areas identified as operable forest may only be economic to harvest during peak market conditions. However, operability assessments are always subject to some degree of uncertainty as they rely on uncertain economic information. For this determination, I am satisfied that the operability assumptions used in the analysis have been reviewed by qualified experts and represent the best available information and are therefore appropriate for use in making my determination.

- problem forest types

Problem forest types are physically operable stands that exceed low site criteria but are not utilized or have marginal merchantability. In the timber supply analysis, all problem forest types were completely excluded from the THLB.

However, for one category of problem forest types – white pine-leading stands – district staff and licensees believe that a 50 percent reduction would have been appropriate. White pine-leading stands are problematic due to blister rust mortality, but some of these stands do have significant volume in other species that are considered harvestable. If 50 percent of the white pine stands were considered harvestable, this would increase the size of the THLB by 700 hectares.

Based on this information, it seems reasonable to assume that half of the white pine-leading stands could contribute to timber supply. A 700-hectare underestimation in the size of the THLB equates to about a 0.4 percent underestimation in the harvest levels projected in the base case and I will account for this in my determination, as discussed in 'Reasons for Decision'.

- sensitive terrain areas

Unstable terrain (class V) was modelled as a 100-percent exclusion from the THLB rather than 90 percent as intended. However, since there are only about 2000 hectares of class V terrain that do no overlap with other areas that have already been excluded from the THLB, this represents a negligible, about 200 hectares, or 0.1 percent underestimation in the base case harvest level projections. Given the magnitude of this uncertainty, I am prepared to accept that the assumptions for sensitive terrain are adequate for use in my determination and I will not explicitly account for this factor in my decision.

- existing and future roads, trails and landings

In this analysis 2541 hectares were excluded from the THLB to account for existing roads, and trails.

Existing landings were not accounted for in the base case. According to a report entitled *Assessment of Roads, Trails and Landing in Support of the Timber Supply Review: Kootenay Lake TSA* (Forsite Forest Management Specialists, March 31, 2008) existing landings account for 1.94 percent of logged areas, existing roads, trails and landings occupy 5.86 percent of logged areas and 1.74 percent of unlogged areas within the THLB. Applying the 1.94 percent reduction factor to the previously logged areas in the TSA results in the need to exclude an additional 1202 hectares (0.6 percent) from the THLB to account for existing landings.

Future roads, trails and landings were not accounted for in the base case. Assuming that unlogged areas have already been reduced by 1.74 percent and that unlogged stands will need to be reduced by a total of 5.86 percent to account for permanent access structures, the unlogged areas of the THLB should have been reduced by $(5.86 - 1.74)$ 4.12 percent. This represents a 2.84 percent overestimation in the size of the THLB.

Based on a review of RESULTS data for the five-year period from December 1, 2002 to December 1, 2007, district staff confirmed the reduction factors reported by Forsite.

A sensitivity analysis showed that decreasing the size of the THLB by 10 percent results in 10 percent and 6 percent decreases in the short- and mid- to long-term timber supply projected in the base case.

On the basis of this information, I conclude that the size of the THLB used in the analysis has been overestimated by about 0.6 percent in the short term, and by 2.84 percent in the mid- to long-term. Based on the results of the land base sensitivity analysis, this corresponds to a 0.6 percent overestimation of timber supply in the short term and a two percent overestimation in the mid- to long-term supply and I will account for this in my determination, as discussed in '**Reasons for Decision**'.

Expected rate of growth

- site productivity

The productivity of a site largely determines how quickly trees grow. This in turn affects the time seedlings will take to reach green-up conditions, the volume of timber that can be produced, and the ages at which a stand will satisfy mature forest cover requirements and reach a merchantable size.

The site productivity estimates used in the base case were derived from forest cover inventory estimates of height and age. However, provincial studies (e.g. Old-Growth Site Index or OGSi) indicate that the most accurate estimates of site productivity come from stands between 30 and 140 years of age. The growth history of stands less than 30 years of age is often not long enough to give accurate measurements of site productivity. Estimates derived from older stands underestimate site productivity as these stands are often well past the age of maximum height

growth and have often been affected by disease, insects and top damage as they reach advanced age.

A sensitivity analysis in which OGSi derived site indices were used in place of the forest cover based estimates, showed a five percent, 15 percent and 11 percent increase in the short-, mid-, and long-term harvest levels projected in the base case, respectively. However, staff informed me that in this sensitivity analysis the OGSi site indices were applied to all stands instead of limiting their application to stands less than 30 years of age and older than 140 years of age. Therefore, I expect that the harvest levels projected in the base case were likely underestimated, but not to the extent indicated in the sensitivity analysis.

Based on the above information, I conclude that the site indices used in the base case likely underestimate the timber supply. However, given the misapplication of the OGSi site indices in the sensitivity analysis, I am not prepared to adjust the base case to the extent indicated in the sensitivity analysis. Therefore, for this determination, I will account for a significant, unquantified underestimation in the harvest levels projected in the base case as discussed in my **'Reasons for Decision'**.

I note that a new forest inventory and biogeoclimatic ecosystem and predictive ecosystem mapping project is being undertaken in the Kootenay Lake TSA. The information provided by these projects will greatly assist the next TSR in several ways including providing the improved ecosystem framework needed to better assess site productivity (e.g. by applying Site Index Biogeoclimatic Ecosystem Classification – or SIBEC). As noted under **'Implementation'**, I encourage district staff to continue this work, so that it will be available for use in the next timber supply analysis.

- managed stand yields

In the analysis, all forest stands established after 1987 were considered to be managed stands. For these stands, volume estimates were based on MFR's BatchTIPSY projections using the standard provincial operational adjustment factors (OAF) of 15 percent for OAF 1 and five percent for OAF 2. OAF 1 accounts for factors, such as small stand openings, uneven tree distribution, and endemic pests and diseases that affect yield curves across all ages; whereas, OAF 2 accounts for factors whose impacts increase over time such as decay, waste and breakage.

In 2008, district staff evaluated 60 free-growing stands in the Kootenay Lake TSA and found that for 70 percent of these stands the growth rate was impeded to some degree.

In order to examine the impact on timber supply of either over- or underestimating the growth rate of managed stands, a sensitivity analysis was prepared in which managed stand yields were varied by 10 percent. The results indicate that decreasing the stand yields by 10 percent impacted the long-term harvest levels projected in the base case by a proportionate amount. However, the harvest levels projected during the first 50 years of the analysis were unaffected.

While I acknowledge the inherent uncertainty in predicting the growth of managed stands and the findings of district staff, in the absence of localized OAF studies, I conclude that the productivity of managed stands assumed in the base case used the best available information. Any new information regarding the growth of managed stands can be used during the next timber supply review. In the interim, I note that decreasing the productivity of managed stands had no impact on the harvest levels projected for the first 50 years of the analysis.

- partially-harvested stands

District staff estimate that about 30 percent of the stands harvested in the TSA in the last 10 years were subject to some form of partial harvesting in which, on average, 60 percent of the original stand volume was removed in the first pass. However, in the analysis, all harvesting was assumed to be clearcut or clearcut with reserves followed by planting.

Not all partially-harvested areas were recorded in the forest cover information used in the analysis. For these stands, harvesting has significantly depleted the volume still available for harvesting and results in an overestimation in the volume available for harvesting in the model.

In order to quantify the extent of the overestimation, district staff compared the RESULTS data for uneven-aged stands with previously harvested areas in the inventory. After accounting for overlap, a total of 2200 hectares of partially-harvested stands – or about one percent of the THLB – were unaccounted for in the forest cover inventory.

In addition to the overestimation in available volume, residual trees in uneven-aged stands often suppress understorey tree growth due to shading. In the Kootenay Lake TSA, staff estimate that tree growth is impeded on about half of the area in uneven-aged stands. As the stand productivity assumptions were based either on natural stand or managed stand yields, the regenerating stand volumes for about 13 000 hectares of partially-harvested stands used in the analysis were likely overestimated.

For this determination, I note that the forest cover inventory used in the analysis did not account for about 2200 hectares of partially harvested stands and that this results in about a one percent overestimation in the short-term timber supply projected in the base case. Suppression of understorey tree growth due to shading on about half of the 13 000 hectares of partially-harvested areas in the TSA has likely resulted in an additional overestimation of the productivity of these stands. Therefore, as discussed in my ‘**Reasons for Decision**’, I am accounting for about a two percent overestimation in the base case short-term timber supply and, in the absence of localized information regarding uneven-aged stand productivity, a small, unquantified overestimation in the mid- to long-term timber supply in the base case.

For the next determination, I request that the forest cover inventory information used in the analysis appropriately reflect the extent of partial harvesting in the TSA and, to the extent that resources allow, that uneven-aged stand productivity be reviewed and the results incorporated in subsequent timber supply analyses.

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

As noted in Table 2, I accept the information provided to me in support of the base case as it relates to regeneration and not-satisfactorily-restocked areas.

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

As noted in Table 2, I accept the information provided to me in support of the base case as it relates to incremental silviculture and commercial thinning.

Silvicultural treatments

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

Timber harvesting

- 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 the 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 Kootenay Lake TSA amounts to approximately 6.7 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 6.7 percent throughout the forecast period and I will account for this in my determination, as discussed in my '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

- scenic areas

Current visual quality management is based on visual quality objectives (VQOs) originally established for the Kootenay Lake TSA in 1999 and subsequently grandparented under the *Forest and Range Practices Act*. Within the Kootenay Lake TSA, scenic areas with VQOs cover 292 791 hectares or about 21 percent of the TSA.

District staff have found a poor correlation between disturbance in a scenic area and the maintenance of visual quality over time. They indicated that cutblock design is better at ensuring that VQOs are met. Visual impact assessments are routinely done by all licensees, and visual design has been successfully implemented in numerous areas.

In the timber supply analysis, in order to account for good visual design the upper limits of acceptable alteration were applied by landscape unit/VQO zone. These limits permit a maximum disturbance of five percent, 15 percent and 25 percent for retention, partial retention and modification zones, respectively. Minimum visually-effective green-up heights were based on the average slope of a polygon.

In the analysis, the disturbance limits were applied to the total area within each VQO category (retention, partial retention and modification) within a landscape unit. However, in practice disturbance limits are applied to individual VQO polygons.

In order to account for the misapplication of disturbance limits on a total area per category basis in the analysis, I am guided by the results of a sensitivity analysis in which lowering the maximum disturbance levels for modification and partial retention zones by 20 percent and 10 percent, respectively, resulted in a seven percent decrease in the short-term harvest level and a small decrease in the long-term harvest level. However, I am also mindful that successful implementation of visual design increases operational flexibility, which to some degree would offset these timber supply impacts. Therefore, for this determination I will account for up to a five percent overestimation in the base case harvest levels, as discussed in 'Reasons for Decision'.

- community and domestic watersheds

Drainage areas that provide water for human consumption occupy about 39 percent of the THLB in the Kootenay Lake TSA. The Kootenay-Boundary Higher Level Plan Order requires 30-metre management zones around streams in domestic watersheds. The 30-metre management zone is not considered a reserve from harvesting, rather, general measures (such as machine free areas) are prescribed to protect water quality.

In order to reflect these requirements in the analysis, no more than 25 percent of the Crown forest land base within each domestic watershed was allowed to be less than six metres in height at any

one time during the forecast period. District staff reviewing this approach indicate that this maximum disturbance represents the application of watershed constraints that have typically followed watershed assessments and reasonably reflects current practice.

Based on the information regarding domestic watersheds, I am satisfied that the assumptions used in the analysis represent current practice and are therefore appropriate for use in this determination.

- lakeshore management zones

Lakeshore management zones have not been established for the Kootenay Lake TSA and no additional constraints were applied to lakeshore areas in the base case. District staff indicate that the lack of constraints in the model for this area would have little, if any affect on the base case harvest levels, as many lakeshore areas are either on private property, in parks or protected areas, or in inoperable areas and were, therefore, excluded from the THLB. Where lakeshore management zones are within the THLB and when harvesting is proposed adjacent to lakes, a workable prescription has generally been produced that addresses key concerns such as human access and visual quality.

Based on the information received from district staff, I accept that the assumptions used in the analysis for lakeshore management areas adequately reflect current practice and I will make no further adjustment to the base case projection on this account.

- landscape-level biodiversity

The retention of an appropriate area of old forest is a key consideration to conserving landscape-level biodiversity. The Kootenay-Boundary Higher Level Plan Order (KBHLPO) identifies old and mature seral forest objectives by biogeoclimatic sub-zone and landscape unit for the Kootenay Lake TSA. Draft old growth management areas (OGMAs) have been spatially delineated within the TSA that meet the requirements of KBHLPO and excluding these areas from the THLB reflects current operational practices.

The timber supply analysis excluded the draft OGMAs from the THLB and also applied the old and mature seral forest objectives in the KBHLPO. This was a duplication since the draft OGMAs reflect current management and meet KBHLPO old seral requirements. In a sensitivity analysis, maintaining the draft OGMAs but removing the seral stage requirements had no impact on the short-term timber supply. On this basis, I am satisfied that the base case adequately reflects the timber supply impacts of old seral requirements in the TSA.

- stand-level biodiversity

The retention of an appropriate amount of wildlife trees is the primary method used to address stand-level biodiversity by forest licensees in the Kootenay Lake TSA. Forest licensees identify their wildlife tree retention objectives in their Forest Stewardship Plans (FSPs). An assessment of FSPs by district staff indicated on average about 5.1 percent of the volume on a site was retained for wildlife and accordingly, all of the volume tables used in the analysis were reduced by 5.1 percent.

Work undertaken by district staff under the Forest and Range Evaluation Program (FREP) indicated that licensees were generally leaving more residual forest cover within cutblocks than the wildlife tree requirements modelled (5.1 percent volume table reduction) in the base case. However, staff indicated that some of this residual cover may be intended for other purposes, such as scenic area management, and may be available for harvest in 10-20 years. Consequently, it is difficult to say with certainty if there is greater retention on the ground than was modelled to support the base case.

Ministry of Environment (MOE) staff are concerned about the quality of the wildlife trees that are being retained in cutblocks. They stated that the quality of the retained cover is equally important as the amount that is left on the site.

For the purposes of this determination, I accept that the assumptions for stand-level biodiversity used in analysis adequately reflect current management. However, prior to the next determination, in conjunction with a review of tree retention in partially-harvested stands, I request that district staff review wildlife tree retention volumes. I also encourage district staff to work with MOE staff to address their concerns regarding wildlife tree quality: an issue that can also be addressed through the FREP stand-level monitoring process.

- identified wildlife

As of April 1, 2009, 26 Wildlife Habitat Areas (WHA) have been established in the Kootenay Lake TSA, covering a total area 188 hectares of land of which 16 hectares were included in the THLB. However, in deriving the THLB for the analysis, these areas were not excluded. Government's timber supply budget for implementation of the Identified Wildlife Management Strategy (IWMS) is up to one percent of the provincial THLB. Where required in other management units, I have accounted for up to a one percent timber supply impact attributable to established WHAs.

Ministry of Environment staff informed me that in the near future there may be a need to account for up to a one percent THLB impact in the Kootenay Lake TSA; however, currently no new WHAs have been established. Any WHAs that may eventually be established can be incorporated into the assumptions used in the next timber supply analysis.

In keeping with my guiding principles, I will not speculate on land use requirements that have not been formally established. Therefore, for this determination I accept that the THLB used in the base case was overestimated by 16 hectares. However, as an overestimation of this size has a negligible impact, if any, on timber supply, I accept that the assumptions used in the base case reasonably reflect current management and I will make no adjustments on this account. In the event that new WHAs are established, these areas can be accounted for at the time of the next determination.

- mountain caribou

The provincial government endorsed the Mountain Caribou Recovery Implementation Plan in October, 2007. Implementation of the plan in 2009 resulted in the issuance of three *Government Actions Regulation* (GAR) orders establishing ungulate winter ranges (UWR) for caribou. These orders include general wildlife measures, which either exclude or restrict harvesting, for the established UWRs. Prior to the 2009 orders, forest management requirements for mountain caribou were addressed in the Kootenay-Boundary Higher Level Plan Order (KBHLPO).

In the base case, no harvesting was permitted in the no-harvest UWRs. For those UWRs in which harvesting is permitted, a minimum forest cover retention requirement was set that enabled harvesting to occur up to the expected levels and within the time period identified in the GAR orders.

In a sensitivity analysis, the 2009 mountain caribou requirements were replaced with the KBHLPO caribou requirements. The results indicate that the analysis assumptions used in the base case, i.e. application of the 2009 Mountain Caribou GAR orders, resulted in a three percent and eight percent decrease in the short- and mid- to long-term timber supply compared to the KBHLPO requirements. However, within the KBHLPO there was considerable overlap between the areas subject to caribou requirements and OGMAs. Therefore, the incremental effect of caribou management was not very significant.

Based on my review of the information regarding mountain caribou, I am satisfied that the assumptions used in the base case appropriately reflect current management and will make no adjustments to the base case on this account.

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

Harvest sequencing

In the timber supply analysis, a 'relative oldest first' harvest rule was modelled where stands that have the largest difference between their minimum harvest age and their current age are scheduled first for harvesting. This harvest pattern attempts to optimize yields over time. However, due to the many complex and overlapping resource values and issues in the Kootenay Lake TSA, implementing this harvest pattern is not always operationally feasible.

A 2006 Spatial Operating Analysis conducted by district and licensee staff indicated that licensees were having difficulty accessing the oldest stands and were forced to operate in other areas and; therefore, the 'relative oldest first' pattern was not being consistently achieved. District staff suggested that the harvest rule that occurs operationally might be closer to 'random'.

A sensitivity analysis in which available stands were scheduled for harvest on a 'random' basis rather than 'relative oldest first' resulted in an initial harvest level of 570 000 cubic metres per year or about 12 percent lower than in the base case.

Based on the information provided, I do not believe that it is possible to determine what harvest schedule best reflects current practice. It appears that the actual harvest schedule will be somewhere between a 'random' and a 'relative oldest first' pattern. Therefore, I conclude that use of a 'relative oldest first' harvest rule has resulted in a small, unquantified overestimation in base case short-term harvest levels, and I will account for this in my determination, as discussed under '**Reasons for Decision**'.

In order to improve the harvest sequencing assumptions used in the analysis, district staff indicated that following this timber supply review, they intend to conduct a new spatial analysis. I encourage district staff to complete this work and to ensure that the results are incorporated in the next timber supply analysis, as discussed under '**Implementation**'.

First Nations considerations

Five First Nation groups, consisting of three tribal councils and two bands were consulted with regard to the timber supply review process. They include the Lower Kootenay Band, Shuswap Indian Band, Ktunaxa Nation Council, Okanagan Nation Alliance and Shuswap Nation Tribal Council. Of these First Nations, the Lower Kootenay Band and Shuswap Indian Band have Forest and Range Agreements with the Province. These agreements provide annual economic benefits and tenure opportunities in the form of non-replaceable forest licences and/or woodlot licences, and contain provisions for consultation, which were followed by Ministry of Forests and Range (MFR) staff for this timber supply review. The Okanagan Nation Alliance, Shuswap Tribal Council, and the Ktunaxa Nation Council do not have agreements with the MFR, and therefore the consultation principles that resulted from the *Haida Decision* were followed for these groups.

The Ktunaxa Nation is currently involved in the B.C. Commission Treaty process. The area currently being negotiated as part of their treaty extends into the Kootenay Lake Forest District. The selection for the Areas of Interests (AOI) has been completed and signed by government and an offer has been made to the Ktunaxa Nation. However, to date a formal response to the offer has not been provided. In keeping with my guiding principles, I will not anticipate the impact of decisions that have not yet been made by government, such as treaty settlements. However, once these decisions are made, they can be factored into subsequent timber supply reviews and accounted for in future AAC determinations. In the event that these decisions result in significant

changes in the timber supply of the Kootenay Lake TSA, I am prepared to revisit this determination prior to the 10-year period provided in legislation.

Consultation with the five First Nation groups on the timber supply review for the Kootenay Lake TSA was initiated by the Kootenay Lake Forest District in September 2008 and concluded in December 2009. This included consultation letters sent to the First Nations requesting their review and comment on the following documents:

- *Kootenay Lake Timber Supply Area Timber Supply Data Package* (September, 2008); and
- *Kootenay Lake TSA Timber Supply Analysis Discussion Paper* and *Kootenay Lake Timber Supply Area Technical Summary of Timber Supply Analysis* (September, 2009).

In the base case, Englishman Creek, Wilson Creek and the Upper Goat River areas were assumed to contribute to timber supply. However, these areas are known to be of interest to the Ktunaxa Nation and Lower Kootenay Band. According to district staff, Englishman Creek is presently being developed for timber harvesting with support from the Lower Kootenay Band. Another area, Wilson Creek, is expected to provide some timber once the current treaty process with the Ktunaxa Nation is concluded. The Upper Goat River area, which includes about 3700 hectares of THLB or 1.8 percent of the total THLB, continues to be an area of interest for the Lower Kootenay Band and the Ktunaxa Nation. District staff are of the opinion that harvesting is unlikely to occur in this area in the foreseeable future.

Based on my discussions with district staff, I conclude that the Upper Goat River area is unlikely to contribute to timber supply in the foreseeable future. Inclusion of this area in the THLB results in about a 3700-hectare overestimation in the size of the THLB or an overestimation of about 1.8 percent in the base case short-term timber supply and I will account for this in my determination, as discussed in '**Reasons for Decision**'.

From my review of the consultation summary prepared for this determination, I conclude that reasonable efforts were made by the Kootenay Lake 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. A preliminary assessment was completed and included a review of the information regarding First Nations' aboriginal interests that is available to MFR, and an assessment of the potential impacts my AAC decision may have on these interests. The information, however, did not identify specific areas of interests or cultural use.

Based on this, I conclude that the scope of consultation reflected and was commensurate with MFR's assessment of aboriginal interests asserted by the relevant First Nations within the Kootenay Lake TSA. Furthermore, opportunities were provided to First Nations to share their concerns related to specific aboriginal interests that may be impacted by this decision.

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

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

Alternative harvest rates

As part of the timber supply analysis, several alternative harvest flows were prepared. I have considered the information provided in the various alternative flows. I note that a slightly higher initial harvest level of 655 000 cubic metres per year is achievable without impacting mid- and long-term timber supply. An even-flow forecast indicates that a harvest level of 546 000 cubic metres per year, which is essentially the same as the long-term harvest level projected in the base

case, could be maintained throughout the forecast period; however, this results in a significantly decreased short-term harvest level.

- (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**

Economic and social objectives

- Minister's letter

The Minister of Forests and Range has expressed the economic and social objectives of the Crown for the province in a letter, dated July 4, 2006, attached here 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 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 becomes stable, neither increasing or decreasing over time. Consequently, in my determination I have remained 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 carefully considered the adequacy of the provisions, both as made in current practice and as assumed in the analysis, for maintaining a range of forest values.

The letter also highlights objectives in the BC's Mountain Pine Beetle (MPB) Action Plan, that are applicable for areas of the interior including the Kootenay Lake TSA, such as encouraging long term economic sustainability for communities affected by the epidemic; recovering the greatest value from dead timber before it burns or decays, while respecting other forest values; and conserving the long-term forest values identified in land use plans. The Minister also asks in the letter that a realistic assessment of timber volumes that can be utilized economically in MPB affected areas is needed and that I examine factors that affect the demand for timber and products manufactured from it, the time period over which it can be utilized, and consider ways to maintain or enhance the mid-term timber supply.

With respect to conserving forest values as stated in land use plans, the direction provided by the Kootenay-Boundary Higher Level Plan Order and orders issued under the *Government Actions Regulation* were used in the analysis when accounting for values in the Kootenay Lake TSA, such as landscape-level biodiversity and mountain caribou. Also regarding the MPB, several sensitivity analyses were examined that considered both the existing and projected levels of infestation as well as the potential ensuing losses. I address this factor further under *mountain pine beetle*.

From applying careful attention to all of these considerations throughout, I am satisfied that my determination is in accordance with the objectives of government as expressed by the Minister.

- local objectives

The Minister's letter of July 4, 2006 suggests that the chief forester should consider important social and economic objectives that may be derived from the public input in the timber supply review where these are consistent with the government's broader objectives. To this end, and to ensure appropriate opportunities for both public input and to support information sharing and consultation with First Nations, public and First Nations input was invited on the data package prepared in 2008 and on the discussion paper prepared in 2009.

The consultation process for First Nations and known First Nations' concerns that affect timber supply are addressed above under *First Nations considerations*.

There was relatively little formal public input during the TSR process (see Appendix 4), but the importance of all forest values to local residents is well recognized in the Kootenay Lake TSA.

The forest industry in this area is unique in many ways – for the most part they are relatively small operations which trade logs between themselves and have sought out specialty markets. They are still operating, which is noteworthy during these difficult economic times.

Through the Interior Lumber Manufacturing Association (ILMA), licensees submitted a single formal response to the Timber Supply Review process. Of particular concern was the ongoing reduction of the TSA due to various government initiatives such as land use plans, protected areas, area-based tenures, and mountain caribou habitat. They felt that one of the commitments in the Kootenay-Boundary Land Use Plan – a stable forest land base – had not been adhered to. The ILMA indicated that an AAC reduction at this time, in light of the difficult economic conditions and recent mountain caribou impacts, could be devastating to member companies.

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

Unsalvaged losses

Based on a review of historic data the base case harvest levels were reduced by 48 266 cubic metres per year to account for unsalvaged losses due to fire, insects and windthrow. Of this volume, 25 272 cubic metres per year and 16 954 cubic metres per year were attributable to fire and endemic MPB infestation, respectively.

The wildfire losses assumed in the base case did not include the effects of the severe 2003 fire season. Including the data from this season increases the 10-year unsalvaged fire loss average from 25 272 cubic metres per year to 65 325 cubic metres per year. The large variability in fire losses from season to season makes it difficult to accurately predict the timber supply implications of future fires. However, given the effect that climate change may have on fire frequency and intensity, as discussed under ‘**Implementation**’, I request that staff continue to monitor unsalvaged losses due to fire for use in the next timber supply review.

Due to the increase in the 10-year average unsalvaged fire losses attributable to the 2003 fire season and the uncertainty regarding the impact of climate change on fire intensity and frequency, I conclude that the mid- to long-term harvest levels projected in the base case may have been overestimated by a small, unquantified amount and I will account for this in my determination as discussed in my ‘**Reasons for Decision**’.

Mountain pine beetle

Mountain pine beetle populations (MPB) normally occur at endemic levels in the Kootenay Lake TSA. Based on historic data unsalvaged losses due to MPB were estimated to be 16 954 cubic metres per year and this volume was excluded from the harvest levels projected in the base case. However, the 2008 aerial overview survey, in which 52 percent of pine stands on the THLB were found to have endemic infestations, and the results of the *British Columbia Mountain Pine Beetle model* (BCMPBv6) indicate that actual MPB losses may be higher.

In order to assess the potential impact of higher levels of MPB infestation several sensitivity analyses were prepared. For two of these analyses it was assumed that no pine salvage would occur and projected volumes were reduced based on the cumulative volume losses identified in the BCMPBv6. In the first analysis, basing MPB assumptions on the 2008 aerial overview survey resulted in a decrease in the initial harvest level to 500 000 cubic metres per year. In the second analysis, basing MPB assumptions on the projected 2026 infestation level, i.e. the year by which the maximum MPB impact is assumed to have occurred, resulted in a decrease in the initial harvest level to 410 000 cubic metres per year.

The difference between the initial harvest levels in these two sensitivity analyses and the base case represent the lowest harvest levels that could occur in the TSA in the absence of salvage harvesting. However, as salvage harvesting is taking place in the TSA, the licensee and district

staff conducted a comprehensive review of the location and operability of susceptible pine stands. They concluded that under current conditions only about 20 percent or 2.5 million cubic metres of lodgepole pine would not be salvaged.

District staff indicate that the spread of the infestation appears to be slower than projected in the BCMPBv6 model, especially in the southeast part of the district. This may be due to the collapse of beetle populations at the core of the provincial epidemic, which reduces the influx of beetles; the high proportion of mixed-species stands in the TSA; and topographic barriers between the TSA and heavily infested areas. This suggests that the sensitivity analysis based on the 2008 aerial overview information may be more realistic than either the harvest level impacts based on the 2026 model projection or projected in the base case.

I conclude that the assumptions used in the base case neither accounted for all of the current volume losses due to MPB nor the salvage of impacted or susceptible pine. Although the exact volume that will go unsalvaged is uncertain, it is likely that it will be higher than the 2008 BCMPBv6 projection and lower than cumulative losses based on the 2008 BCMPBv6. The actual magnitude of the timber supply impact due to MPB will depend on the extent to which the endemic MPB populations increase over time and the ability of licensees to salvage infested and susceptible pine. On this basis, I am accounting for an unquantified overestimation in the mid-term harvest levels projected in the base case, as discussed under '**Reasons for decision**'.

In order to continue the effective management of MPB in the TSA, I request that district and licensee staff continue to monitor the extent of the MPB infestation and to prioritize the harvest of infested and susceptible pine. In the event that the infestation level increases significantly or the capacity of licensees to salvage pine is significantly reduced, I am prepared to revisit this determination earlier than the 10-years outlined in the *Forest Act*.

Reasons for decision

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

The 2009 base case indicated an initial harvest level of 645 000 cubic metres per year could be sustained for 20 years before declining to 600 000 cubic metres per year for one decade. The long-term harvest level of 544 000 cubic metres per year was reached after 30 years. The short-term harvest forecast in the 2009 base case is lower than the previous AAC, which was 681 300 cubic metres. The reduced timber supply is primarily the result of a smaller land base that is due to the establishment of new community forests, woodlot licence area increases, and designated no-harvest mountain caribou habitat.

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

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

- *Roads, trails and landings*: inclusion of the area occupied by existing landings in the base case THLB results in a 0.6 percent overestimation in the short- to mid-term timber supply. Inclusion of the area that will be required for future trails and landings results in a two percent overestimation in the long-term harvest level.

- *Partial harvesting*: accounting for the effect of partially-harvested stands not reflected in the forest inventory and future partial harvesting results in about a two percent overestimation across the entire base case forecast period.
- *Scenic areas*: fully accounting for current visual management practices, results in up to a five percent overestimation in the short- to long-term base case harvest levels.
- *Harvest sequencing*: use of the ‘relative oldest first’ harvest rule does not accurately reflect current practice and results in an unquantified overestimation across the entire forecast horizon, particularly in the short term.
- *First Nations considerations*: accounting for First Nations cultural use of the Goat River area results in 1.8 percent overestimation across the entire base case forecast period.
- *Unsalvaged losses– wildfire*: underestimation of wildfire losses due to recent fires and the high probability that fire intensity and frequency will be higher in the future due to the effects of global warming results in an unquantified overestimation in mid- to long-term harvest levels.
- *Mountain pine beetle losses*: accounting for the unsalvaged losses attributable to higher levels of MPB infestation results in an unquantified overestimation in the mid-term.

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

- *Problem forest types*: exclusion of some stands that include commercial tree species results in a 0.4 percent underestimation in harvest levels throughout the entire forecast period.
- *Log grades*: not accounting for BC Interior log grades results in a 6.7 percent underestimation in harvest levels throughout the forecast.
- *Site productivity*: underestimation of site productivity, particularly for stands older than 140 years of age results in an unquantified but significant underestimation in timber supply, particularly in the long term.

In consideration of the above-mentioned conclusions, I note that the quantified factors— roads, trails and landings, partial harvesting, scenic areas, First Nations’ cultural uses, problem forest types, and log grades—in combination result in about a 2.3 percent overestimation of the harvest levels projected in the base case. Two unquantified factors—higher unsalvaged losses due to recent wildfire severity and higher endemic levels of MPB infestation—likely result in an additional overestimation of the mid- and long-term timber supply. However, the site productivity of stands older than 140 years is higher than was assumed in the base case and this should offset, to some extent, the downward pressure on timber supply.

In making this determination for the Kootenay Lake TSA, I am aware of the need to balance any reduction in AAC against the need to provide licensees and district staff with the flexibility required to continue salvaging MPB-affected pine. At this time, under current conditions, district staff and licensees have indicated that the current AAC is sufficient to allow for salvage and have not requested a temporary uplift in AAC for this purpose.

On this basis I have reasoned as follows. The net effect of the over- and underestimations in the harvest levels projected in the base case indicate that the timber supply of the Kootenay Lake TSA has likely been overestimated by a small, unquantified amount, particularly in the mid- to long-term. However, in view of the need to support the salvage of at-risk or dead pine stands, I will maintain the current level of harvesting on those areas remaining in the Kootenay Lake TSA following the establishment of new community forests and expansion of woodlots. This will result in an overall decrease in the AAC due to the smaller size of the remaining THLB, but will maintain about the same level of harvesting on the areas remaining in the TSA.

Determination

Having considered and reasoned from all of the factors as documented above, including evaluating the risks and uncertainties in the information provided, it is my determination for the Kootenay Lake TSA that a timber harvest level that accommodates as far as possible the objectives for all forest resources, that reflects current management practices as well as the socio-economic objectives expressed for government by the Minister of Forests and Range, that accounts for First Nations' expressed interests in forest lands, that provides sufficient flexibility to continue the salvage on MPB-affected stands and that represents an essential step in a manageable transition toward the mid-term levels forecast for the TSA, can be best achieved at this time by establishing an AAC of 640 000 cubic metres per year. This new AAC excludes all volumes in issued woodlot licences and community forest tenures and will remain in effect until the next AAC is determined. The new AAC will become effective on August 12, 2010.

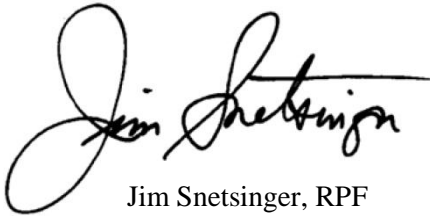
The new AAC represents an overall reduction of 6.1 percent from the previous AAC of 681 300 cubic metres per year. However, after accounting for new area-based tenures, the harvest level associated with the remaining area of the TSA is relatively unchanged since the previous determination. In reaching this determination, my reason for maintaining the current harvest intensity on the area remaining in the Kootenay Lake TSA is to allow for the continued management and salvage of MPB-infested or susceptible stands. As a consequence, it is my expectation that licensees will continue to prioritize the harvest of pine stands. Given the excellent licensee performance to date in this regard, I will not establish a partition in the AAC. However, if necessary, I am prepared to revisit this determination earlier than the 10-year maximum established under the *Forest Act*.

Implementation

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

1. Monitor the level of mountain pine beetle infestation and report any significant increases to me.
2. Evaluate historical and projected unsalvaged losses due to wildfire and mountain pine beetle in preparation for the next determination.
3. Monitor performance of second-growth stands so that this factor can be appropriately modelled in support of the next determination.
4. To the extent possible, attempt to quantify the effects of *Armillaria* root disease, particularly with respect to performance of second-growth stands.
5. Complete the Vegetation Resource Inventory, Predictive Ecosystem Mapping, and Biogeoclimatic Ecosystem Mapping projects prior to the next timber supply review.
6. Quantify amount and effects of partial harvesting on yields in the Kootenay Lake TSA, and ensure residual volumes from partially harvested stands are appropriately captured in harvesting and silvicultural records.

7. Evaluate volumes left for wildlife tree retention so that this factor can be appropriately modelled in support of the next determination. This work might be done concurrently with the partial harvesting study noted above.
8. Evaluate the harvest sequencing operational practices in the TSA so an appropriate method of modelling harvest sequence can be applied in the next timber supply review.



Jim Snetsinger, RPF
Chief Forester

August 12, 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 Act*

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

Purposes and functions of ministry

4. The purposes and functions of the ministry are, under the direction of the minister, to 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 co-ordinated and integrated, in consultation and co-operation 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

Appendix 4: Responses from First Nations, Licensees and General Public

Records of all related communications are maintained in the Kootenay Lake Forest District Office.

First Nations:

No formal written submissions were received from First Nations.

Licensees:

A letter was received from the Interior Lumber Manufacturers Association (ILMA), on behalf of Kootenay Lake TSA licensees.

General Public:

Numerous telephone conversations and office visits with individuals, but no formal responses.