

**BRITISH COLUMBIA
MINISTRY OF FORESTS AND RANGE**

Golden Timber Supply Area

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

Effective June 3, 2010

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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 Golden 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 am indebted to staff of the BC Ministry of Forests and Range (MFR) in the Columbia Forest District, the Southern Interior Forest Region, and the ministry's Forest Analysis and Inventory Branch. I am also grateful to the individuals and companies who contributed to this process.

Description of the Golden Timber Supply Area

The Golden TSA straddles the Rocky Mountain Trench and the upper Columbia River Valley northward to the Big Bend area near Mica Dam; and is bounded to the west by the Selkirk and Purcell Mountains and the Revelstoke TSA, to the north by the Robson Valley TSA, to the south by the Invermere TSA, and to the east by the Rocky Mountains and the province of Alberta. Five national parks—Yoho, Banff, Jasper, Kootenay, and Glacier—and the Hamber provincial park, border the TSA, and the Cummins Provincial Park lies within its borders.

The total area of the TSA is 1 310 865 hectares including 417 171 hectares of adjacent park area. Only 290 917 hectares of the included park area is located within landscape units that contribute to the management of biodiversity in the TSA while the remainder falls in landscape units contributing to the adjacent TSA. These Golden TSA landscape units, totalling 1 184 611 hectares, are known as the 'Golden analysis area' and coincide with the Golden Resource Management Zone of the Kootenay-Boundary Higher Level Plan Order (the 'KBHLP Order'). The TSA area outside of parks covers a total of 893 694 hectares.

A description of the environment of the TSA including its tree species; biogeoclimatic zones; and vulnerable, endangered, threatened, and regionally significant wildlife species is given in the *Golden Timber Supply Analysis Report* ('the analysis report'). In brief, most of the TSA lies within the interior wet belt of the province; the mountainous environment has a varied climate and growing conditions, resulting in diverse forests. In wetter parts of the TSA, lower elevations are mostly occupied with western redcedar, western hemlock, and spruce species; with stands of spruce and subalpine fir occupying most of the higher elevations. Some southern portions of the TSA experience a drier climate, with Douglas-fir forests in valley bottoms and lodgepole pine at higher elevations. In these drier areas, especially in the Rocky Mountain Trench south of Donald, the mountain pine beetle has damaged and killed large amounts of lodgepole pine in recent years.

The diverse forest environments in the area provide habitats for a wide variety of wildlife species, including approximately 274 bird, 63 mammal, 9 amphibian and 8 reptile

species. Some of the more well-known large mammal species include black bear, grizzly bear, moose, elk, mule deer, bighorn sheep, mountain goat, and mountain caribou. Throughout the TSA, mountain peaks are covered by large areas of alpine tundra, rock, and ice. Because of the rugged, mountainous landscape, a relatively small portion of the TSA consists of productive forest land suitable for harvesting timber.

A description of the socio-economic profile of the area, with which I am familiar, is also provided in the analysis report. In brief, the TSA is sparsely populated, with approximately 7500 residents in 2009, of which about 50 percent live in the town of Golden. The town's population fell by about 2.5 percent from 1996 to 2006, as gains in employment in the ski resort industry were more than offset by losses in forestry and railway employment.

The Trans-Canada Highway and major railways pass through the south-central part of the TSA, providing relatively easy access to an area of outstanding mountain scenery. Tourism, forestry, and the public sector are the major local employment sectors, with forestry and related industry providing 24 percent of basic income in 2001. Sixty to seventy percent of the timber harvested in the Golden TSA is processed within the TSA; most of the remainder is processed in the adjacent Revelstoke TSA.

Seven First Nations have asserted that their traditional territory includes all or a portion of Golden TSA: the Ktunaxa Nation Council, the Akisq'nuk First Nation, the Shuswap Indian Band, the Shuswap Nation Tribal Council, the Simpcw First Nation, the Okanagan Nation Alliance, and the Okanagan Indian Band. The Ktunaxa Nation (Ktunaxa Kinbasket Treaty Council) has submitted a comprehensive land claim that covers the southeast corner of the province and includes the Golden TSA.

There are no First Nations reserves or communities within the Golden TSA.

History of the AAC

In 1981, the AAC for the Golden TSA was determined to be 650 000 cubic metres. Effective January 1, 1995, the AAC was reduced by 17 percent to 540 000 cubic metres. Effective January 1, 2000, the AAC was reduced by 10 000 cubic metres to 530 000 cubic metres, to account for issued woodlot licences. Effective June 3, 2004, the AAC was further reduced by 45,000 cubic metres to 485,000 cubic metres.

The harvestable volume for the area is currently apportioned as follows:

Table 1. Apportionment of current AAC

Apportionment	Cubic metres per year	Percentage
Forest licences – replaceable	354 781	73
BCTS Timber Sale Licence	105 912	22
Community Forest Agreement	20 000	4
Forest Service Reserve	4 307	1
Total	485 000	100

New AAC determination

Effective June 3, 2010, the new AAC for the Golden TSA will be 485 000 cubic metres. This AAC will remain in effect until a new AAC is determined, which may take place within 10 years of this determination.

Information sources used in the AAC determination

Sources of data and information referenced for this AAC determination include references listed in the analysis report and the following:

- *Forest Practices Code of British Columbia Act*, 1995, and amendments;
- *Forest Practices Code of British Columbia Act Regulations*, 1995, and amendments;
- *Forest Practices Code of British Columbia, Guidebooks*, BC Forest Service and Ministry of Environment, Lands and Parks;
- *Heritage Conservation Act*, 1996;
- Letter from the Deputy Ministers of Forests and Environment, Lands and Parks, dated August 25, 1997, conveying government's objectives regarding the achievement of acceptable impacts on timber supply from biodiversity management;
- *Landscape Unit Planning Guide*, BC Forest Service and Ministry of Environment, Lands and Parks, March 1999;
- *Identified Wildlife Management Strategy, Volume 1*, Ministry of Environment, Lands and Parks and Ministry of Forests, February 1999;
- *Forest and Range Practices Act (FRPA)*, 2002 and amendments;
- *Kootenay-Boundary Higher Level Plan Order*, October 26, 2002;
- Defined Forest Area Management (DFAM) interim standards for data package preparation and timber supply analyses, Ministry of Forests, Timber Supply Branch, 2003;
- DFAM interim standards for public and First Nations review, Ministry of Forests, Timber Supply Branch, 2003;
- *Forest and Range Practices Regulations*, 2004 and amendments;

- *Identified Wildlife Management Strategy, Procedures for Managing Identified Wildlife, Version 2004*, Ministry of Water, Land, and Air Protection;
- *Golden TSA Rationale for AAC determination effective June 1, 2004*, Ministry of Forests;
- *Ministry of Forests and Range Act*, (consolidated to March 30, 2006);
- Letter from the Assistant Deputy Minister, Tenures and Revenue Division, MFR to all licensees concerning cut control changes resulting from new log grades, February 24, 2006;
- Letter from the Minister of Forests and Range to the Chief Forester stating the economic and social objectives of the Crown, July 4, 2006;
- Letter from the Assistant Deputy Minister, Tenures and Revenue Division, MFR to all Interior licensees concerning MFR's strategy for terminating the interim species adjustment factors for timber supply areas in the Interior, May 7, 2008;
- *Timber Supply Analysis Data Package, Golden TSA Timber Supply Review #4*, Golden DFAM Group, November 2008;
- *Timber Supply Analysis Report, Golden TSA Timber Supply Review #4*, Golden DFAM Group, February 2009;
- Technical review and evaluation of current and expected operating conditions through comprehensive discussions with MFR staff, including the AAC determination meeting held in Revelstoke on June 24 and 25, 2009;
- First Nations Consultation Summary review, including input received from First Nations through the consultation process and comprehensive discussions with MFR staff, including the AAC determination meeting held in Revelstoke on June 24 and 25, 2009;
- Information received at a meeting in Revelstoke on June 24, 2009 with licensee representatives; and
- Information received from the major licensees through the referral 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 Golden 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 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 determinations address ongoing plan-implementation decisions.

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 Golden 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 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 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 Golden TSA

The 2009 timber supply analysis (“the analysis”) was completed by Forsite Consulting Limited (Forsite) on behalf of the Golden DFAM group under MFR oversight, using proprietary forest estate model Forest Planning Studio (FPS) Version 6.0.2.0. FPS was previously used for TFL 14 (2008), TFL 56 (2001) and the Lillooet TSA (2005).

The base case harvest projection was guided by provincial policy objectives of a sustained harvest flow and the smallest possible reductions or increases to the mid-term or long-term harvest. The modelled harvesting priority rules included use of the ‘relative oldest first’ rule; ensuring all forest cover constraints were met at all times; and prioritizing pine-leading stands first (up to a maximum of 70 percent of the harvest), then fir/larch-leading stands, followed by other species last. The base case objectives were to: 1) maintain the current AAC of 485 000 cubic metres for as long as possible; 2) not reduce the mid-term harvest level below the sustainable long-term harvest level; 3) if necessary, reduce the harvest flow at a maximum rate of 10 percent in any one decade; 4) minimize the length of any period in which the harvest rate fell below the sustainable long-term level; 5) when possible, increase the harvest flow at a maximum rate of 10 percent per decade; and 6) reach a stable long-term harvest flow rate associated with a constant (flat line) total inventory.

The resulting projection showed that a harvest rate of 513 000 cubic metres per year could be sustained over the 250-year time horizon. In the harvest projection, the initial volume of stands growing on the THLB—the land base estimated to be economically and biologically available for timber harvesting—is 26.5 million cubic metres, and it decreases to about 18.2 million cubic metres after the first five decades as the oldest stands are harvested. The merchantable volume (from stands older than the minimum harvestable age) is initially 23.3 million cubic metres. Merchantable volume declines to 7.5 million cubic metres after 25 decades and was confirmed to stabilize slightly below this in a scenario run over a 300-year time horizon. The most constrained timber supply occurs in decades 13 and 14, when the merchantable volume is between 6.7 and 7.0 million cubic metres.

The transition from harvesting natural stands to harvesting managed stands begins in the fourth decade and by the seventh decade most of the harvested volume originates from managed stands. Some natural stands are not harvested until late in the forecast period, because they are required to meet old forest retention targets.

The average area harvested is relatively stable, ranging from approximately 1200 hectares to 1700 hectares per year with a mean of 1547 hectares per year over the entire forecast period. The average volume of harvested stands over the entire planning horizon is also relatively stable around a mean of 339 cubic metres per hectare, in spite of the transition from old-growth to managed-stand harvesting.

The average age of harvested stands is about 120 years in decades one and two as mainly pine and Douglas-fir and larch stands are cut. It then rises sharply to about 250 years in decade three as old redcedar, hemlock, spruce, and fir stands are harvested. By decade seven the average age falls to about 100 years as the existing stock of old timber available for harvesting is reduced, after which it remains relatively stable throughout the forecast period.

In the 2003 analysis, which supported the last AAC determination in 2004, the base case harvest level started at the then-current AAC of 530 000 cubic metres. It declined over two decades and stabilized at 440 000 cubic metres for nine decades, followed by a small increase after the eleventh decade. Relative to the current base case, the previous base case was 14.2 percent lower in the mid-term and 9.7 percent lower in the long term.

The base case in the current analysis incorporates a number of changes in input data and methodology from the base case generated in the 2003 analysis. These differences include:

- the size of the current THLB is smaller by eight percent (141 530 hectares vs. 153 870 hectares in the 2003 analysis). This is mostly due to the spatially-explicit mapping of caribou and biodiversity reserves;
- road losses were better defined spatially and removed from the THLB;
- new riparian buffer mapping was completed for the whole TSA, which incorporated all the available stream inventory information;
- a composite of all the existing terrain stability mapping was completed and replaced almost all (94 percent) of the mapping of environmentally sensitive areas that was used in the analysis for the 2004 determination;
- archaeological sites and permanent sample plots were explicitly identified, buffered, and removed;
- domestic watershed streams identified in the Kootenay-Boundary Higher Level Plan (KBHLP) Order were buffered and removed;
- existing forest inventory age and height values were adjusted based on a Volume Adjustment Factor Development report;
- reserves for biodiversity (old seral and mature-plus-old seral) were spatially mapped and were used to reduce the THLB;
- reserves for caribou habitat were spatially mapped, both for the KBHLP Order requirements and for the recent incremental caribou reserves established under the Species at Risk Coordination Office. These reserves also reduce the THLB;
- ownership data was updated to reflect new boundaries of woodlots and the Golden ski hill reserve. The net result is a decrease of 47 hectares in the reductions to the THLB compared to the analysis for the 2004 determination;
- existing forest inventory volume estimates were adjusted to reflect Vegetation Resources Inventory (VRI) ground plot data, producing an average volume decrease of 1.1 percent across the THLB. Managed stands volumes were indirectly impacted because the age and height adjustment also impacted site index values on many polygons. The result is a net decrease in average site index;
- higher volume gains were associated with the use of select seed;
- different cover constraints were modelled for ungulate winter range;
- forest cover constraints for caribou management were modelled as no-harvest reserves rather than as partial-harvest constraints as in 2004;
- spatially explicit Old Growth Management Areas (OGMAs) were implemented in this analysis, rather than the seral stage constraints modelled in 2004; and
- the model disturbed the non-THLB areas at a rate of 930 hectares per year compared to 370 hectares per year in 2004.

Due to these changes, the current and previous base case projections are not directly comparable in some respects.

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 various sections of this document, that the information presented to me provides a suitable basis from which I can assess the timber supply for the Golden 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.

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 licensee's analysis. Conversely, I will explain my consideration of any assumption that concerns me for any reason, such as lack of new information or clarity in the analysis report, apparent divergence from current management practice, or a high level of public or First Nations input.

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

As previously noted, in this document I will not discuss numerous factors for which I accept the modelling assumptions applied in the base case. Those factors are listed in Table 2, grouped according to the section of the *Forest Act* to which they apply. The licensee's information package and analysis report contains more information on each of these factors.

Where I believe a factor warrants discussion, it is described in the following sections of this rationale.

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	Economic and physical operability Low productivity sites Unmerchantable forest types Roads, trails, and landings Community Forest Agreements Archaeological sites
8(8)(a)(i) Composition of the forest and expected rate of growth	Current forest inventory Age class distribution Species profile Volume estimates for existing stands Minimum harvestable age
8(8)(a)(ii) Expected time for the forest to be re-established following denudation	Regeneration delay Impediments to prompt regeneration Not sufficiently 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
8(8)(a)(v) Constraints on the amount of timber produced by use of the area for other purposes	Riparian management Community and domestic watersheds Columbia Wetland Management Area Grizzly Bears Caribou Stand-level biodiversity Landscape-level biodiversity First Nations cultural heritage resources and traditional use
8(8)(a)(vi) Other information	Harvest sequencing Public review
8(8)(b) Short and long-term implications of alternative rates of timber harvesting from the area	Alternative rates of harvest
8(8)(d) Economic and social objectives of the government	Community dependence on the forest industry
8(8)(e) Abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area	Forest health Unsalvaged losses

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 Golden analysis area, as reported in the analysis report, is 1 184 611 hectares. Of the total TSA area, 432 677 hectares (36.5 percent) are classified as productive Crown forest land.

As part of the process used to define the THLB, a series of deductions was made from the productive forest land base. These deductions account for economic or ecological factors that operate to reduce the forest area available for harvesting. In reviewing these deductions, I am aware that some areas may have more than one classification. To ensure accuracy in defining the THLB, care must be taken to avoid any potential double-counting associated with overlapping objectives. Hence, a specific deduction for a given factor reported in the analysis or the AAC rationale does not necessarily reflect the total area with that classification; some portion of it may have been deducted earlier under another classification.

For the Golden TSA, I acknowledge that the above approach was used in the timber supply analysis, resulting in a long-term THLB of 141 530 hectares, which means that 291 147 hectares of productive forest (67 percent) are unavailable for timber harvesting for a variety of reasons.

The current THLB is eight percent smaller than the land base assumed in the 2003 analysis. Several factors contributed incrementally to cause this decrease in the area considered to be productive and operable, principal among them being the spatially explicit mapping of caribou and biodiversity reserves.

- environmentally sensitive areas

For 97 percent of the productive forest land base, Terrain Stability Inventory Level (TSIL) maps from MFR, Louisana-Pacific Canada Ltd., and others were used to derive the unstable land base netdown. A comparison of TSIL map data and harvesting records for the last 10 years on the TSA showed that there had been no avoidance of the 'potentially unstable' areas, but that harvesting had been avoided on 32 percent of the 'unstable' (U) areas. Thus, a 32 percent netdown of U class terrain was applied in the analysis. This resulted in a reduction of 3376 hectares in the land base available for harvesting. For the remaining three percent of the productive forest land base, environmentally sensitive areas were identified from the forest cover inventory.

In the 2004 AAC rationale for the Golden TSA, the chief forester asked staff in MFR and the then Ministry of Sustainable Resource Management to continue to assess whether more accurate or efficient means of estimating the environmentally sensitive areas of the TSA could be agreed upon and used in the next AAC determination. I am satisfied that

the method used to map unstable terrain in this analysis is significantly better than that used in the 2004 analysis, and I accept that it forms a suitable basis for my determination.

I conclude that the accounting for environmentally sensitive areas and unstable terrain used in the analysis was based on the best available information and will make no adjustments to the base case on this account. I note, however, that land base deduction for environmentally sensitive areas and unstable terrain in this analysis is considerably smaller than the 6238 hectares deducted in the 2003 analysis. For the next analysis, I encourage the MFR and the DFAM group of licensees to confirm the validity of the methodology used for mapping terrain stability, and to consider using more detailed terrain analysis based on updated information.

- woodlot licences

Since the 2004 AAC determination for the Golden TSA, no new woodlot licences have been issued. Three woodlots have received small increases in area, and minor boundary changes have occurred in others. As a result, total woodlot area has increased by 684 hectares since the last determination.

After the timber supply analysis, however, it was noted that the total area identified as woodlots and removed from the Crown forested land base of the TSA in the analysis is approximately 1129 hectares greater than the area of issued woodlot licences shown in the data in the Forest Tenure Administration System (FTAS). District staff advise that all of the area so affected is operable and within the THLB. In view of this, I accept that for the base case projection the THLB was underestimated by 1129 hectares in respect of woodlots. This adds a small upward pressure of about 0.8 percent to the timber supply, which I have taken into consideration in my determination as discussed in **‘Reasons for Decision’**.

Expected rate of growth

- site productivity estimates

In the analysis, site productivity estimates were based on the results of a Vegetation Resources Inventory (VRI) that was completed for the non-park area of the TSA in 2001. The VRI inventory was adjusted for height, age, and volume based on a field sampling project (VRI Phase 2) completed in 2002, which resulted in updates to the site index estimates. No OGSi adjustments were applied in the base case to managed stands.

As I have noted in rationale statements for many AAC determinations, in recent years it has been concluded consistently from studies such as the OGSi project that site productivities in British Columbia have generally been underestimated; in other words, managed forest stands tend to grow faster than projected by inventory site index estimates. In my experience the observed provincial trend is likely to be applicable in a productive TSA such as the Golden TSA. Given the prevalence of the trend, I am prepared to accept that carrying forward the site indices from old stands into regenerated, managed stands has most probably led to underestimation in the site productivities in the TSA, and consequently in the mid-term and long-term harvest levels. For this determination, I conclude that the mid-term and long-term harvest levels are underestimated in the base case forecast by an unquantified amount, and I return to this in **‘Reasons for Decision’**.

- volume estimates for regenerated stands

In the analysis, the standard Table Interpolation Program for Stand Yields (TIPSY) was used to estimate the timber volumes for all future regenerated stands and for all existing managed conifer stands less than 30 years of age. Existing managed stands were modelled with some silvicultural management that resulted in improved growth potential compared to natural stands, but limited gains from the use of genetically-improved seed. Future managed stands were modelled with the full benefits of silvicultural practices, such as better initial stocking and planting of stock with higher genetic gains.

Two operational adjustment factors (OAFs) are applied to yields generated using TIPSY. OAF 1 is designed to account for factors, such as small stand openings, that affect the yield curve across all ages; and OAF 2 is designed to account for factors, such as decay, waste, and breakage, whose impacts tend to increase over time and whose influence on a stand may be reduced through management practices. In the analysis, the standard provincial modelling reductions of 15 percent for OAF 1 and 5 percent for OAF 2 were applied, although the appropriateness of applying these reductions in the TSA has not been tested.

In the analysis, two analysis units were created to account for backlog areas that have not been sufficiently restocked. These stands were modelled with natural regeneration and volume adjustment factor (VAF) reductions of 10 percent and 25 percent.

To allow estimation of the volume gains that will result from the use of genetically-improved seed, data on the historical use of select seed was obtained from MFR's Seed Planning and Registry system. This information was used to derive current practice estimates of net genetic gain at the species level. The resulting estimates of genetic gains in existing managed stands were 2.9 percent for spruce, 0.3 percent for pine, and 1.6 percent for larch; and in future managed stands they were 20.8 percent for spruce, 12.0 percent for pine, 20.0 percent for larch, and 21.1 percent for Douglas-fir. Volume gains to be expected in existing and future managed stands at harvest age were then accounted for by modifying the TIPSY growth curves for all managed stands proportional to the assumed species mixture.

Forsite prepared a sensitivity analysis to assess the effect of assumptions about yield estimates for existing and future managed stands, and of assumptions about gains associated with the use of select seed. Increasing the yields associated with managed stands by 10 percent resulted in a 6.0 percent increase in the mid-term harvest level and a 7.2 percent increase in the long-term level. Decreasing yields by 10 percent resulted in a 1.7 percent decrease in the mid-term harvest level and a 11.3 percent decrease in the long-term harvest level. Removing the genetic gains associated with the use of select seed resulted in a 5.5 percent reduction in the harvest level in the mid-term and the long term.

I conclude that the estimates of genetic gains for spruce, larch, and pine are appropriate based on the availability of select seed for those species and the history of planting seedlings grown from select seed in the Golden TSA. I am not convinced; however, that the genetic gain for Douglas-fir was modelled appropriately in the base case. No Class A Douglas-fir seed is currently available for the Golden TSA, so present practice provides

no evidence that a genetic gain of 21 percent can be achieved for Douglas-fir as early as decade two of the harvest forecast, as was assumed in the analysis.

As noted in my *Guiding principles for AAC determinations*, it is not appropriate to base my decision on unsupported speculation. Consistent with that principle, I conclude that the harvest level has been overestimated for future managed stands of Douglas-fir. Based on the fact that Douglas-fir accounts for approximately 25 percent of the current inventory, the base case appears to have overestimated the timber supply by a factor of 2.9 percent across the forecast period due to the assumption of a significant genetic gain in Douglas-fir yields, and I will account for this in ‘**Reasons for Decision**’.

(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 as modelled the factors usually considered under this section, and I will not discuss them further.

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

MFR district staff indicate that, with four minor exceptions, these standards reflect current utilization standards, licence requirements, and current performance in the TSA. The minor exceptions are that: 1) in current practice, diameter at stump height is used in merchantability specifications, rather than dbh as was assumed in the analysis; 2) for older western redcedar stands (greater than 140 years of age) the minimum top diameter inside bark is actually 15 centimetres, not 10 centimetres as assumed in the analysis; 3) dry grades 04 and Z are not merchantable, contrary to the assumption in the analysis; and 4) deciduous volume is merchantable and is charged against cut control for licence holders in the TSA, contrary to the assumption in the analysis.

Staff from Forest Analysis and Inventory Branch report that the difference between diameter at stump height and dbh and the effect of the five centimetre difference in top height for western redcedar older than 140 years cannot be quantified and are unlikely to have significant effect on the timber supply. Since the inventory does not distinguish volume by log grade, it is not possible to quantify the overestimate of harvest volume due to the utilization of grades 04 and Z. Recent scaling data show very minor levels of deciduous harvest which supports the base case assumption that deciduous volume is not merchantable.

I am also aware that changes in log grades occurred on April 1, 2006, resulting in billing for stumpage calculations of certain log grades that had previously not been billed. The base case analysis used a forest inventory that does not account for volume from these grades. Since 2006, an adjustment factor has been applied to the volume charged to the AAC to account for this dead material that was not recognized in the previous AAC determination. Based on the adjustment factors and the species profile of the historical harvest in the Golden TSA, I conclude that the harvest levels projected in the base case have been underestimated by 7.7 percent due to the dead logs that are now being charged to the AAC, and I account for this 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 MFR is required under the *Ministry of Forests and Range Act* (FRPA) to manage, protect, and conserve the forest and range resources of the Crown; and to plan the use of these resources so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation, and other natural resource values are coordinated and integrated. The FRPA and other legislation provide for, or enable, the legal protection and conservation of timber and non-timber values. Accordingly, the extent to which integrated resource management objectives for various forest resources and values affect timber supply must be considered in AAC determinations.

- cutblock adjacency, forest cover and green-up

Under the Kootenay-Boundary Higher Level Plan (KBHLP) Order, minimum green-up heights are required for regeneration on harvested areas before adjacent areas may be harvested. These green-up requirements help to achieve objectives for water quality, wildlife habitat, soil stability, and aesthetics by guiding harvesting practices to provide for a distribution of harvested areas and retained forest cover in a variety of age classes across the landscape.

For the analysis, in order to represent the KBHLP Order's requirements for different areas of the TSA, the THLB was classified into two broad zones. The Enhanced Resource Development Zones for Timber (ERDZ-T) described in the objective 7 of the KBHLP Order; and all other areas of the THLB, called the Integrated Resource Management Zone (IRMZ) in the analysis. In the KBHLP Order, it is assumed that green-up conditions in the IRMZ are attained when young stands have reached a height of 2.5 metres.

In the analysis, green-up requirements were modelled non-spatially based on the estimated age at which the average stand type in each of the two zones would meet the objectives. In the IRMZ, this equated to limiting the area of stands younger than 23 years (based on a 21-year green-up period following a two-year regeneration delay) to less than 25 percent of the area of the zone. In the ERDZ-T it equated to limiting the area of stands younger than two years (based on a two-year regeneration delay) to less than 33 percent of the area of the zone.

The accuracy of these assumptions in representing operational reality in this TSA is difficult to assess because the non-spatial modelling does not reflect an operationally-feasible pattern of cutblocks. Therefore, I conclude that this factor introduces an unquantified uncertainty into the analysis. For the current determination, in context of other uncertainties discussed in **‘Reasons for Decision’**, I make no adjustment for this factor.

- visually sensitive areas

Careful management of scenic areas along travel corridors and near recreational sites is an important IRM objective requiring that visible evidence of harvesting be kept within acceptable limits in specified areas. The FRPA provides for scenic areas to be identified and made known, and for visual quality objectives (VQOs) to be established to limit the amount of visible disturbance permitted in sensitive areas. Visual landscape inventories are carried out to identify, classify, and record those areas of the province that are visually sensitive; and appropriate visual quality classes (VQCs) are recommended—for example Preservation, Retention, Partial Retention, Modification, or Maximum Modification—to identify levels of alteration appropriate to particular areas. Guidelines to meet the VQOs include setting a maximum percentage of a specified area or ‘viewshed’ that is allowed to be harvested at any one time, and setting a ‘visually effective green-up’ or ‘VEG’ height at which a stand of reforested timber is perceived by the public to be satisfactorily greened-up.

Sensitivity analysis results showed that decreasing the classification of all visually sensitive areas by one class, resulted in a 24 000 cubic metres (4.7 percent) increase in the mid- to long-term timber supply. In a second sensitivity analysis, all non-spatial forest requirements for VQOs, ungulate winter range, and green-up were removed; which resulted in a 45 000 cubic metre (8.8 percent) increase in the mid- and long-term harvest level.

District MFR staff advise that data relevant to this factor have been gathered since 2007 during eight visual effectiveness evaluations carried out under the Forest and Range Evaluation Program (FREP). The results show that the base case assumption (that is, that all visually sensitive areas had high visual absorption capability) underestimates the actual constraints on harvesting that will result from management for VQOs in the mid-term and long term.

Given the percentage of the THLB that is classified as visually sensitive, the results of the FREP visual effectiveness evaluations, and the way in which this factor was modelled in the base case, it is apparent that management for visual quality could be a significant constraint on the timber supply in the mid-term and long term. I have made no adjustment to the short-term timber supply on this account, but I urge licensees to consider the potential implications of their cutblock designs on the long-term availability of adjacent timber, particularly in light of the FREP monitoring results, and to consult with district and regional staff on potential improvements to cutblock design.

- recreation values

In the Golden TSA most forest recreation sites and trails overlap with the riparian areas around streams and lakes; therefore, no additional area was excluded from the THLB on

this account. Forest cover constraints applied for other resource values, such as scenic areas and wildlife habitat, were also assumed to provide for recreation values outside of riparian areas.

To account for the productive forest associated with the *Kicking Horse Resort* Controlled Recreation Area, about 1700 hectares were excluded from the THLB. However, district staff indicate that the Ministry of Tourism, Culture and the Arts are expected to approve a request to expand the resort. When this occurs, an additional 410 hectares of productive forest will be excluded from timber harvesting.

Based on this information and my discussions with district staff, I accept that the assumptions used in the analysis to account for recreation values adequately reflect current practice. With regard to the Kicking Horse Controlled Recreation Area, given that expansion of this area has not been finalized and the small – about 0.25 percent – overestimation in the size of the THLB that may result, this issue can be reconsidered at the next determination.

- identified wildlife

IWMS Version 2004 indicates that thirteen species of identified wildlife occur or may occur in the Golden TSA: bull trout, westslope cutthroat trout, Coeur d'Alene salamander, northern leopard frog, great blue heron, Lewis's woodpecker, short-eared owl, badger, bighorn sheep, fisher, grizzly bear, mountain caribou, and wolverine. Government has not established specific wildlife habitat areas (WHAs) for particular identified wildlife species in the Golden TSA, and no WHAs are officially proposed. Other than species considered in higher level plans, few identified wildlife species with significant implications for the THLB have known distributions within the Golden TSA.

In the base case analysis, no specific accounting was made for WHAs or for management or policy considerations respecting the IWMS or any species at risk other than caribou, as it was assumed that these species are being managed to levels accepted by government under riparian and other provisions of the Kootenay-Boundary Land Use Plan. Provisions for caribou in the KBLUP Order and the February 2009 Order for caribou under the Government Actions Regulation (GAR) of the FRPA were considered separately, and as noted in Table 2, I accept them as modelled.

In many management units where specific measures have not yet been taken to identify and provide for species at risk, my customary approach is to account for future land base exclusions and other strategies by assuming a one-percent overestimation in the timber supply throughout the forecast period. In the case of the Golden TSA, however, where government-approved management strategies for other species are already in place, I will defer to the established provisions of the Kootenay-Boundary Land Use Plan as an adequate accounting of anticipated requirements for identified wildlife. If requirements for new, unanticipated habitat areas become identified, these can be taken into account in the next analysis and AAC determination.

- ungulate winter range

Ungulate winter range is currently being managed under a notice under Section 7 of the Forest Planning and Practices Regulation of the FRPA and under a pending order under

the Government Actions Regulation of the FRPA. Ungulate winter range mapping and guidelines modelled in the base case reflect the impending GAR order, as recommended by the Ministry of Environment. There have been some revisions to mapping of ungulate winter ranges over the past few years, resulting in greater certainty about the scale and nature of management for this value. Current approved Forest Stewardship Plans are following the most up-to-date mapping and are consistent with the impending GAR order.

In the analysis, forest cover requirements for ungulate winter range were modelled to reflect the impending GAR order's requirements for forest cover retention, which vary by ungulate species and habitat type. To assess the effect of the improved mapping and new management objectives since the last determination in 2004, Forsite conducted a sensitivity analysis that replaced the current provisions with the non-spatial 2004 provisions, which required 40 percent of ungulate winter range to be retained in stands over 100 years old. The sensitivity analysis showed a significant downward pressure on the mid-term and long-term harvest forecast under the 2004 provisions.

In reviewing the situation with district staff, I note that the current requirements and their application in the analysis are much clearer and more accurate spatially than was the case in the analysis for the 2004 determination. I thank the district and MOE for working to improve the mapping and the accounting for ungulate winter range in the current analysis. I conclude that the base case accurately reflects the current, legally sanctioned constraints as applied on the ground respecting ungulate winter range and I make no adjustment on this account.

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

Other information

- north/south split (economic operability)

Economic operability is not a major concern in the southern zone of the TSA; however, in the northern zone differences in species composition and accessibility mean that not all landscape units (LU) support harvesting across the entire range of market conditions. Licensee and district staff indicate that in recent years there has been little harvesting in several of the northern landscape units (LU) – most notably the Kinbasket (G6), Sullivan (G7), Goosegrass (G11) and Windy-Austerity (G12) LUs.

In order to assess the potential impact inclusion of these units may have on the base case timber supply projection, the licensee prepared three sensitivity analyses, as follows:

1. Maintain the 'relative oldest first' harvesting rule and harvest up to a maximum of 70 percent of the harvest from pine-leading stands before non-pine leading stands;
2. Model the northern and southern zones independently, as if each was a separate sustained yield unit, then combine the results; and
3. Model the northern and southern zones independently, but delete landscape units G12 and most of G7 from the northern zone assuming that they will be uneconomic to harvest for the entire harvest projection.

In the first sensitivity analysis, removing the requirement to harvest fir/larch stands before other non-pine leading stands resulted in a one-percent increase in the short-term harvest level and a one-percent decrease in the mid- to long-term harvest levels. The results also indicate that during the first two decades, harvest activity shifted significantly from the southern zone to the northern zone. This shift is due to the increased harvest priority assigned to spruce, cedar and hemlock stands – species that pre-dominate in the northern zone of the TSA. Over the entire forecast period, harvest levels in the north fluctuated from a maximum of 94 800 cubic metres in decade two to a minimum of 17 400 cubic metres in decade seven.

In the second sensitivity analysis, modelling the timber supply of the northern and southern zones separately and then combining the two harvest projections had little impact (less than one percent) on the harvest levels projected in the base case.

In the third sensitivity analysis, excluding the G12 LU and most of G7 LU had little impact in the short term but resulted in decreases of 3.7 percent in the mid-term and four percent in the long-term harvest levels.

In the second and third scenarios, there was little difference between the harvest level contribution between the northern and southern zones.

In view of the low level of harvest activity in the northern zone and the results of the sensitivity analyses it is apparent to me that the economic operability of several landscape units in the northern zone of the TSA—especially G6 (Kinbasket), G7 (Sullivan), G11 (Goosegrass), and G12 (Windy-Austerity)—will be a significant factor determining the future timber supply of the Golden TSA. Given current market conditions, I consider it unlikely that much of the timber from these landscape units will be economically operable in the short term. Therefore, I am accounting for a 3.5 percent overestimation in the mid- to long-term harvest levels projected in the base case due to this factors, as discussed in my **‘Reasons for Decision’**.

For the next determination, I encourage licensees and MFR to review the economic operability of timber in landscape units G6, G7, G11, and G12 and to incorporate the results in subsequent timber supply analyses.

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

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.

(c) 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 have asserted traditional territories with the Golden TSA: the Ktunaxa Nation Council, the Akisq’nuk First Nation, the Shuswap Indian Band, the Shuswap Nation Tribal Council, the Simpcw First Nation, the Okanagan Nation Alliance, and the Okanagan Indian Band. In addition, the Adams Lake Indian Band and the

Neskonlith Indian Band have been identified as being the co-owners of a traditional use study which covers a substantial part of the Golden TSA. It is not certain, however, if their asserted traditional territory extends into Golden TSA. The Ktunaxa Nation (Ktunaxa Kinbasket Treaty Council) has submitted a comprehensive land claim that covers the southeast corner of the province and includes the Golden TSA.

In accordance with my guiding principles, I will not anticipate the impact of decisions that have yet to be made, such as treaty settlements. If such decisions are made, they can be considered during subsequent determinations.

I am aware that the licensee-group conducted information sharing regarding the timber supply review process with the seven First Nations who have asserted traditional territory within the Golden TSA, and with the Adams Lake Indian Band and the Neskonlith Indian Band. The licensee-group provided First Nations with the *Timber Supply Analysis Data Package, Golden TSA Timber Supply Review #4* on July 17, 2008 and the *Timber Supply Analysis Report, Golden TSA Timber Supply Review #4* on February 20, 2009. No responses were received from First Nations during the 60-day consultation periods that followed distribution of the data package and analysis report.

The First Nations consultation process for the timber supply review in the Golden TSA was based upon current government direction received from the Ministry of Attorney General and Aboriginal Affairs Branch of MFR regarding the duty to conduct preliminary assessments. MFR district staff initiated the consultation process on May 9, 2008 in a letter to the First Nations with asserted territory within the Golden TSA, and with the Adams Lake Indian Band and the Neskonlith Indian Band. These First Nations groups were requested to provide information on how their aboriginal interests may be affected by an AAC determination for the Golden TSA.

No formal submissions were received by MFR from First Nations concerning their aboriginal interests. Final follow-up was carried out by district staff via an e-mail to all nine First Nations on April 21, 2009, and the review and comment period ended on May 4, 2009.

I note that MFR district staff continue to be available to meet and consult with First Nations on specific issues at the operational planning level.

Based on the results of the consultation process, the lack of permanent First Nations settlements in the TSA, and the protection afforded First Nations cultural heritage resources by current operational practices and the *Heritage Conservation Act*, I am satisfied that First Nations' interests were adequately represented in the analysis. 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 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.

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

Reasons for Decision

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

In the analysis, the base case projected a stable harvest level of 513 000 cubic metres per year over the 250-year forecast period. I am satisfied that the assumptions applied in the base case forecast for the majority of the factors applicable to the Golden TSA were appropriate. Following is my consideration of those factors for which I consider it necessary in this determination to further take into account implications to the timber supply as projected in the base case forecast.

In determining an AAC for the Golden TSA, 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.

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

- *Volume estimates for regenerated stands:* The base case estimate of a 21 percent genetic gain for Douglas-fir beginning in decade two appears too high given the lack of Class 'A' seed for this species in the Golden TSA. I concluded that this has resulted in a 2.9 percent overestimation of the mid- and long-term harvest levels;
- *North-south split (economic operability):* Much of the timber in several northern landscape units in the TSA is, at best, marginally economic to harvest, and will likely remain so in the short term. The base case included this timber in its harvest projections, and I concluded that this resulted in about a 3.5 percent overestimation in the mid- and long-term harvest levels projected in the base case.

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

- *Woodlot licences:* In the analysis, a greater area was excluded from the TSA for woodlots than the area of issued licenses. I concluded that this resulted in an underestimation in the projected timber supply corresponding to an area of 1129 hectares – 0.8 percent of the THLB – throughout the forecast period;
- *Site productivity:* Consistent with the prevailing provincial trend, use of the site indices based on old stands to project the growth of regenerating, managed stands resulted in an unquantified underestimation of mid- and long-term harvest levels projected in the base case;
- *Utilization standards:* Assumptions applied in the base case for utilization standards did not reflect the actual merchantable harvest under current utilization standards and log grades. I concluded that this resulted in a 7.7 percent underestimation in all of the harvest levels projected in the base case.

I am also mindful of one factor that introduces further uncertainty to the decision:

- *Cutblock adjacency, forest cover and green-up:* The accuracy of the assumptions employed in the base case for this factor is difficult to assess because aspatial modelling does not reflect an operationally feasible pattern of cutblocks. I concluded that this factor introduces an unquantified uncertainty into the analysis.

In consideration of the above-mentioned conclusions, I note that the quantified factors—volume estimates for regenerated stands, north-south split (economic operability), woodlot licences, and utilization standards—in combination result in about a one percent underestimation of the mid- to long-term harvest levels projected in the base case. One unquantified factor—site productivity estimates—results in an additional underestimation on the mid- and long-term timber supply.

Although the net result of my considerations suggests that there may be an opportunity to increase the harvest in the Golden TSA above the current AAC of 485 000 cubic metres, I believe it would be imprudent to do so at present. There is considerable uncertainty concerning the economic operability of the timber in several northern landscape units, with little prospect of active harvesting there in the foreseeable future. Should harvesting continue to be deferred in these units under an increased AAC, greater harvesting pressure would be applied to other areas of the land base, especially to lodgepole pine and Douglas-fir stands in the southern region of the TSA in the short term. On the other hand, district staff advise that there have, in the recent past, been periods of active harvesting in certain northern units with good road infrastructure, so prospects for future activity are not so bleak as to require a reduction in the harvest level.

When I take into account the over- and under-estimation of harvest levels, sensitivity analyses, uncertainties, and risks, I conclude that it is appropriate to determine an AAC for the Golden TSA of 485 000 cubic metres per year. I also conclude that, at this time, there would be little risk in continuing the AAC at this level for up to 10 years.

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 during the next

10 years 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 485 000 cubic metres.

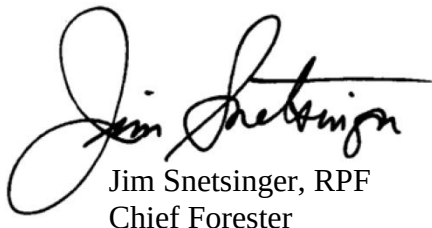
This determination is effective June 3, 2010, and will remain in effect until a new AAC is determined, which must take place within 10 years of the effective date of this determination.

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 MFR staff and licensees to undertake the tasks and studies noted below that I have also mentioned in the appropriate sections of this document. I recognize that the ability of staff to undertake these projects is dependent on available staff 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:

- *Environmentally sensitive areas:* The validity of the methodology used for mapping terrain stability needs to be confirmed. I encourage the MFR and the DFAM group of licensees to consider using more detailed terrain analysis based on updated information; and
- *North-south split (economic operability):* I encourage licensees and MFR to review the expected economic operability of timber in landscape units G6, G7, G11, and G12 and incorporate the results in the next timber supply analysis.
- *Area-based tenures:* I am concerned that the exclusion of additional productive forest from the THLB associated with the issuance of new area-based tenures—especially Community Forests and Woodlot Licences—in the TSA, could result in a concentration of harvesting in the southern zone of the TSA. Therefore, any decision to establish additional area-based tenures should include careful consideration of their risks and benefits.



Jim Snetsinger, RPF
Chief Forester

June 3, 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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Minister

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Jim Snetsinger

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

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

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

Sincerely yours,

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

Rich Coleman
Minister