

**BRITISH COLUMBIA
MINISTRY OF FORESTS AND RANGE**

Kingcome Timber Supply Area

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

Effective February 2, 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 (BC) in making my determination, under Section 8 of the *Forest Act*, of the allowable annual cut (AAC) for the Kingcome 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 and tree farm licences. 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 North Island–Central Coast Forest District, the Coast Forest Region, and the Ministry’s Forest Analysis and Inventory Branch (FAIB), for compilation and preparation of the information I have considered in this determination. I am also grateful to the Kingcome TSA Licensee-Agency Group and to Timberline Natural Resource Consultants Limited for the 2009 timber supply analysis, and to the First Nations, licensees and non-governmental organizations who have contributed information for my consideration through the consultation and public review processes.

Overview of Kingcome Timber Supply Area

Created in 1980, the Kingcome TSA covers about 1.17 million hectares, mostly on mainland coastal BC adjacent to Queen Charlotte Strait, from Knight Inlet in the south, northwest to Cape Caution and northeast to Tweedsmuir Park, with the remainder of the TSA on northernmost Vancouver Island and the islands between Vancouver Island and the mainland. The TSA lies within the North Island-Central Coast Forest District, and is administered from its main office, located in Port McNeill.

The timber supply analysis report identifies the total area of the TSA as 1 172 428 hectares, of which 650 696 hectares are Crown Productive Forest, and 376 452 hectares are considered operable forest. The area of the TSA considered currently suitable and available for harvesting (the ‘timber harvesting land base or ‘THLB’), net of exclusions associated with the ecosystem-based management (EBM) provisions of the CLUD, is identified as 189 179 hectares. The future THLB, subsequent to anticipated wildlife tree patches and future road construction, is identified as 184 163 hectares.

The AAC for the Kingcome TSA under Section 8 of the *Forest Act* prior to this determination is 1 284 000 cubic metres, temporarily reduced by 52 000 cubic metres by order of the Chief Forester under Part 13, Section 173 of the *Forest Act* for an effective AAC of 1 232 000 cubic metres. The AAC includes a partition of 20 340 cubic metres for harvesting in deciduous forest stands.

Apportionment of the Kingcome TSA AAC

The AAC for the Kingcome TSA is currently apportioned as shown in the following table:

Forest Licences, Replaceable	772 246
Forest Licences, Non-replaceable	94 796
Non-Replaceable Forest Licence – First Nations	47 646
BCTS Forest Licences Non-replaceable	28 460
BCTS Timber Sale Licence/Licence	253 968
Woodlot Licence	18 136
Forest Service Reserve	16 748
Total	1 232 000

Current Apportionment of the AAC for the Kingcome TSA (m³/year)

New AAC determination

Effective February 2, 2010, the new AAC for the Kingcome TSA under Section 8 of the *Forest Act* will be 1 100 000 cubic metres, of which 14 000 cubic metres are specified as harvestable from deciduous species. Concurrent with the effective date of this AAC determination, the temporary AAC reduction of 52 000 cubic metres under Section 173, Part 13 of the *Forest Act* is rescinded. This new AAC represents a reduction of 10.7 percent from the previous AAC. This new AAC excludes all volumes in issued woodlot licences and will remain in effect until the next AAC is determined.

Information sources used in the AAC determination

- *2008 Summary of Forest Health Conditions in British Columbia*. J. Westfall and T. Ebata.
- *2008-2010 Coast Timber Supply Areas Regional Forest Health Overview*, BC Ministry of Forests.
- *Coast Forest Action Plan*. BC Ministry of Forests, October, 2007.
- *Community Watershed Guidebook*, BC Ministry of Forests, October 1996.
- *Background and Intent Document for the South Central Coast and Central and North Coast Land Use Objectives Orders*, Integrated Land Management Bureau, April 18, 2008.
- *Ecosystem Based Management Planning Handbook*, Coast Information Team, March 2004.
- *Identified Wildlife Management Strategy*, BC Ministry of Environment, 2004.
- *Karst GAR Order*, North Island-Central Coast Forest District, March 2007.
- *Kingcome TSA Economic Operability Assessment* Timberline Natural Resource Group, 2006.
- *Kingcome Socio-Economic Assessment*, Robinson Consulting and Associates, and Timberline Natural Resource Group, September 2008 (revised version, January 09, 2009).
- *Kingcome Timber Supply Area Timber Supply Analysis Report* – Timberline Natural Resource Group, December 24, 2008 (revised version, January 14, 2009).
- *Kingcome Timber Supply Area Timber Supply Data Package* – Timberline Natural Resource Group, December 2007, and November 2008 *Addendum*.
- *Methods Used to Model Ecosystem Based Management in the Kingcome TSA for TSR3*, Timberline Natural Resource Group, 2007.

- MFR Discussion paper: Harvest Flow Considerations for the Timber Supply Review, Draft Working Paper, BC Ministry of Forests, 2003.
- Modeling Options for Disturbance of Areas Outside of the Timber Harvesting Land Base, draft working paper, BC Ministry of Forests, March 2004.
- Order Establishing Provincial Non-Spatial Old Growth Objectives, BC Ministry of Sustainable Resource Management, June 2004.
- Phase 2 Vegetation Resource Inventory Statistical Attribute Adjustment Study for the Kingcome TSA; JS Thrower and Associates, May 2005.
- Riparian Management Area Guidebook, BC Ministry of Forests, December, 1995.
- Section 7 Notice for Marbled Murrelet, BC Ministry of Environment, 2004 and Revised Notice March 2, 2006.
- Site Index Adjustment for the Kingcome Timber Supply Area – Timberline [Natural Resource Group Limited], 2007.
- South Central Coast Order, BC Ministry of Agriculture and Lands, July 2007.
- Amended South Central Coast Order, BC Ministry of Agriculture and Lands, March 2009.
- Summary of Harvesting, Planting, and Regeneration Trends for Western Redcedar in Coastal TFLs and TSAs 1991-2005. FORCOMP Forestry Consulting Ltd., March, 2008.
- Wildstone Resources, Riparian Impact Assessment, 1994. Unpublished report prepared for the Province of British Columbia.
- Vancouver Island Land Use Plan Higher Level Plan Order, Government of BC, February 2000.
- Letter from the Minister of Forests and Range to the chief forester stating the economic and social objectives of the Crown. July 4, 2006.
- *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.
- *Forest Practices Code of British Columbia, Guidebooks*, MFR and MELP.
- *Ministry of Forests and Range Act*, (consolidated to January 20, 2010).
- British Columbia Ministry of Forests and Ministry of Environment, Land and Parks. *Biodiversity Guidebook*. Government of British Columbia, Victoria, BC. 1995. 99 pp.
- British Columbia Ministry of Forests, Forest Practices Branch. *Interior Watershed Assessment Procedure Guidebook (IWAP); Second Edition Version 2.1*. Government of British Columbia, Victoria, BC. 1999. 40 pp.
- Technical review and evaluation of current and expected operating conditions through comprehensive discussions with staff of MFR, MoE and MTCA, including the AAC determination meeting held in Port McNeill on June 2 and 3, 2009.
- Input received from First Nations through the consultation process.
- Information received at a meeting held in the MFR District Office, Port McNeill, June 1, 2009, between Quatsino First Nations' representatives, myself as chief forester, and MFR region and district.
- Information received at a meeting held in the MFR District Office, Port McNeill, June 1, 2009, between representatives of major licensee International Forest Products Ltd., 'Interfor', myself as chief, MFR region and district.

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 Kingcome 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 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 Kingcome 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 Kingcome TSA

The timber supply analysis used as a base of reference for my considerations in this AAC determination was performed by Timberline Natural Resource Group Ltd. (Timberline), on behalf of the Kingcome TSA Licensee Group, using the CASH 6 (Critical Analysis by Simulation of Harvesting) simulation model. The analysis was finalized on January 14, 2009. Timberline also completed a prior data package and addendum, and co-produced with Robinson Consulting and Associates Ltd. a socio-economic analysis report for the TSA.

Harvest flow objectives for the timber supply analysis included achieving a stable long-term harvest level (LTHL) over a 250-year period reflecting the productive capacity of the TSA under current forest management practices; achieving an acceptable short-term harvest level consistent with this LTHL; constraining harvest level reductions to 10-percent-or-less per decade; and maintaining the mid-term harvest level at or above a level reflecting the natural productive capacity of the TSA. In addition, a portion of the annual harvest was required to be directed to second-growth stands to reflect current practice.

Under these objectives, in the base case forecast, accounting for Ecosystem Based Management as and where appropriate, the initial harvest level was projected at 1 175 500 cubic metres per year, about five percent below the current effective AAC of 1 232 000 cubic metres (i.e. net of the Part 13 reduction) and about eight percent below the October, 2002, Section 8 AAC determined at 1 284 000 cubic metres. After each of the first four decades the projected harvest rate decreased by 10 percent, followed by a five-percent decline in the sixth decade. The mid-term harvest level was projected at 728 400 cubic metres per year, 5.6 percent above the LTHL and slightly lower than the mid-term level projected in the analysis for the 2002 AAC determination. For the long term, the harvest level was projected to increase by 29 percent in the 14th decade, to 963 200 cubic metres per year. The base case projection included an initial target of 277 000 cubic metres per year for harvesting in second-growth stands, which decreased toward the mid term in sequence with the overall harvest flow. All of the projected harvest levels are net of non-recoverable losses of 13 600 cubic metres per year, and the harvest contribution from sites of low productivity was limited to a level roughly equivalent to current performance in those stands. The analysis model accounted for estimated disturbances outside the timber harvesting land base.

I have reviewed the assumptions and methodology incorporated in the base case projection and related sensitivity analyses. As part of this review, I have examined projections over the forecast period for the growing stock of timber in the TSA, including the dominant tree species, their age classes on the landscape over time and their mean average age at harvest, as well as their contributions to the volumes of timber projected to be harvested over time. Details of my considerations of particular aspects of the analysis and its projections, in some

cases in relation to uncertainties in associated assumptions, are provided in following sections of this document.

From my review of the timber supply analysis, including discussions with the MFR analyst who reviewed and accepted the analysis, I find that the base case forecast provides a reliably 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 and in the reasoning leading to my determination.

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

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 1 (see below).

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.

Table 1. List of factors for which modelling assumptions in the base case have been accepted.

Forest Act section and description	Factors accepted as modelled
8(8)(a) (i) Composition of the forest and its expected rate of growth	Unmerchantable Forest Types Recreation Environmentally Sensitive Areas (ESAs) Unstable terrain Timber licence reversions Volume estimates for existing, natural, unmanaged stands
8(8)(a)(ii) Expected time for the forest to be re-established following denudation	Regeneration delay
8(8)(a)(iii) Silvicultural treatments to be applied	Incremental silviculture
8(8)(a)(iv) Standard of timber utilization and allowance for decay, waste, and breakage	Utilization standards
8(8)(a)(v) Constraints on the amount of timber produced by use of the area for other purposes	Green-up and adjacency Community watersheds Karst

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 the timber harvest

- general comments

The area of the Kingcome TSA, as estimated from inventory data and reported in the 2009 timber supply analysis, is 1 172 428 hectares, of which 650 696 hectares are productive

forest. The timber harvesting land base (THLB) – the area of productive forest land available for timber harvesting – derived in the base case is 186 914 hectares for the short term. Following deductions for future wildlife tree patches and roads, trails and landings yet to be built, the long-term THLB is 184 163 hectares. In making the necessary land base deductions for non-timber resources in deriving the THLB, appropriate assumptions or projections must be made about many factors. In cases where an area falls into more than one category, only one deduction is made, to ensure that there is no ‘double-counting’.

- Coast Land Use Decision and Designated Areas

The B.C. provincial government announced the Coast Land Use Decision (CLUD) on February 7, 2006. The decision included objectives for ecosystem-based management (EBM) and the creation of three land use zones: Protected Areas; Biodiversity, Mining and Tourism Areas (BMTAs, which contribute to the conservation of species, ecosystems and seral-stage diversity and in which commercial timber harvesting and commercial hydro-electric power projects are prohibited); and EBM Operating Areas.

In April 2006, the provincial *Park Act* was amended to create the new ‘Conservancy’ designation for the Protected Areas zone. In Conservancies, logging, mining, and hydro-electric generation are prohibited (except for run-of-the-river hydro projects) but, in distinction from Class ‘A’ Parks, social, ceremonial and cultural uses by First Nations are permitted, as are low-impact economic opportunities such as tourism operations.

In order to protect the Conservancies and the BMTAs prior to formal deletion of these areas from the TSA, government established the Coast Designated Area No.2. On September 28, 2006, to prevent the concentration of harvesting on the remaining TSA land base, I issued an order under Part 13, Section 173 of the *Forest Act* temporarily reducing the AAC by 52 000 cubic metres. This reduction was to remain in effect until May 2010 when the designation was scheduled to expire. However, in accordance with Bills 28 and 24, and 38 Parks and Protected Areas amendments, the necessary deletions from the TSA associated with the fourteen Conservancies that fall within the Kingcome TSA have now been made. Moreover, on January 9, 2009, the BMTAs, four of which fall within the Kingcome TSA, were designated by Order-in-Council #2-2009.

Although the mechanisms for formally removing these areas from the TSA had not all reached conclusion before completion of the timber supply analysis, the locations of the areas were all known and all were excluded in deriving the THLB in the analysis.

From my review of the history of the designation of these areas and of their representation in the timber supply analysis, I am satisfied that the derived THLB and the base case projection adequately account for the removal of these areas from the TSA. In view of the completion of the formal processes for removal of these areas from the TSA, in ‘**Determination**’ below, I have noted that, concurrent with the effective date of this determination, which fully accounts for these land base exclusions, the Part 13 reduction of 52 000 cubic metres is rescinded.

- economic operability

In 2005, an economic operability assessment was completed and subsequently updated in 2006 by the Kingcome TSA licensee group, as documented in the *Kingcome TSA Economic Operability Assessment* (Timberline, 2006). This assessment included applying a ‘value index’—the difference between the timber value (TV) and the delivered wood cost (DWC)—

to each assessed stand. The TV was based on forest inventory information, cutting permit grade distribution, and log-selling information obtained from the Vancouver log market. The DWC consisted of the development cost, the tree-to-truck transport cost, the log-transport cost, and administration and other costs. The DWC did not include stumpage.

The study concluded that, based on the 2006 delivered wood costs, the 12-year median log selling price table (for the period 1995 to 2006), and representative log grade distributions, all stands with a value index above minus ten dollars were operable. This threshold was based in part on the fact that logging has already occurred in the TSA in stands with a negative value index; of the 56 cutting permits reviewed for the project, twenty had a negative value index, of which twelve were below minus ten dollars, and six were below minus twenty dollars.

The minus-ten-dollar operability assumption was applied in the base case, in which it was also assumed that all previously logged stands were operable, regardless of the new operability assessment. Sensitivity analyses showed that increasing the value index threshold from minus ten dollars to zero dollars decreased the base case THLB by 16 percent, reducing the initial harvest level by 17 percent, the mid-term harvest level by 18 percent, and the long-term harvest level by 15 percent.

On the other hand, lowering the value index threshold to minus 20 dollars increased the THLB by nine percent, adding 21 percent and seven percent to the mid- and long-term harvest levels respectively. I note that in this forecast, as well as other sensitivity analyses where timber volumes additional to those in the base case were identified, the additional volumes were applied to the mid-term rather than the short-term level. In this sensitivity analysis, the additional area brought into the THLB consisted mostly of medium and good site hemlock stands, of mature age, suggesting that some of this area could validly be included.

A further sensitivity analysis showed that with a zero-dollar operability threshold and no contribution from low-productivity stands (see *low-productivity stands* below), the initial harvest level would be 23 percent below the base case, and the mid- and long-term harvest levels would be reduced by 26 percent and 19 percent, respectively. From these findings, the timber supply in the Kingcome TSA is clearly very sensitive to changes in the assumptions for economic operability, and I have received professional opinions that differ markedly on the plausibility and reliability of the assumptions adopted in the analysis, as follows.

The major licensee Interfor, which holds licences representing roughly half of the apportioned volume in the Kingcome TSA, asserted that for a number of reasons the 2006 assessment generally underestimates the actual economic operability in the TSA. According to Interfor:

- The company has significantly increased the efficiency of its operations in a number of ways in recent years, such that it can operate in much less valuable stands than was previously possible.
- The older logging-helicopters operating until quite recently have now been replaced by a new class of far more efficient machines, increasing feasible yarding distances while reducing costs.
- The assumed 1250-metre maximum yarding distance understates actual performance.
- The analysis model made no accounting for the possibility of ‘blending’ and ‘piggybacking’ of differently valued stands, many otherwise unprofitable, lower-value stands can be gainfully accessed in combination.

- Blending and piggybacking are also effective in occasionally harvesting particular stands at an apparent loss in order to maintain particular product lines in support of the overall profitability of the large, integrated forest company.
- The negative-ten-dollar assumption excludes many harvestable hemlock sites of good and medium productivity.
- Blending and piggybacking with higher value stands will allow the company to access some stands valued as low as between minus ten and minus twenty dollars.

North Island-Central Coast Forest District staff indicated that the new conservancies and BMTAs under the Coastal Land Use Decision excluded several large tracts of land in the TSA. Furthermore, they noted that the EBM objectives have increased harvesting constraints in other areas. District staff submitted a number of observations that suggest the 2006 economic operability assumptions as applied in the 2009 timber supply analysis have resulted in an overestimation, rather than underestimation, in the size of the THLB. Staff submissions in support of this position include:

- Under the 2006 assessment, 18 percent of the THLB consists of stands with a negative value index; while acknowledging that the ability to blend negative and positive value index blocks does allow some negative stands to be harvested, and that favourable stumpage and economies of scale would also improve on the modelled negative value of some stands, nonetheless the inevitable implication is that 18 of every 100 hectares harvested will need to come from the negative-value margin area if harvesting is to remain consistent with the base case modelling.
- The 2006 operability assessment was made as an update to a 2005 assessment which identified a significantly smaller operable land base; main differences were attributable to adjustments to site indices, the use of second-growth end-use sort values, lower logging costs (the majority of the increase in operable area being in second growth) and different median prices, noted next.
- Log selling price was an important input to the operability model; the 2005 assessment had used a 10-year median average, while the 2006 version used a 12-year median average that retained the two most profitable years of 1995 and 1996 in the calculation; for the more recent and less favourable current market conditions which are below the median price used in 2006, district staff believe the 2006 version significantly overestimates the currently economic operable land base.
- In 2006, district staff reviewed the economic operability map and identified, from a cutblock overlay, areas of historical non-performance, areas with limited amounts of stands greater than 120 years old, and areas with a high access cost due to road deactivation. In 2009, further review of eight of these areas indicated that they represented 13 percent of the THLB; however, based on licensee performance in these areas from 1999 to 2009, they only contributed one percent to the total volume harvested during this period.
- While licensees have identified the potential for increasing the timber supply from levels indicated in the base case forecast, for instance, by including additional good- and medium-site hemlock stands presently excluded due to the negative-ten-dollar threshold, recent harvest performance has been below the AAC. District information on performance between 2000 and 2007 shows a total harvest in the TSA of 92 percent of the

potential harvest under the AAC, with a consequent accumulated undercut of roughly 900 000 cubic metres since the 2002 AAC determination.

- District staff noted that 3383 hectares of stands previously harvested for old-growth cedar were included in the THLB in the analysis, even though the current value indices of these stands are below minus ten dollars.
- They also indicated that substantial amounts of the area brought into the THLB are second-growth hemlock, for which there is currently very little demand due to its low market value.

District staff conclude that uncertainty in the modelling assumptions has led to overestimation in the economic land base. They indicate that the results of the 2005 operability assessment are more reliable than the 2006 results and that this conclusion is supported by the results of their harvest performance review. Local staff recognize the viability of blending and piggybacking cutblocks in the TSA, and therefore consider that a zero-dollar value index would be overly pessimistic, but are concerned for the level of risk in assuming full utilization of the land base generated from the minus-ten-dollar index.

In addition to the licensee and forest district staff submissions, I also received a statement of concerns presented by the Tsawataineuk First Nation at a meeting held between First Nations representatives and MFR staff on May 28, 2009 in Campbell River, which were later confirmed in a letter to me of June 4, 2009. In respect of operability considerations in particular, the Tsawataineuk Band Council expressed concerns (i) that seven years ago, Interfor had removed all of its operations from the Kingcome Valley, where there is now no activity and the roads are deactivated and deteriorating; and (ii) that it is unrealistic to consider the harvesting of stands valued at less than a break-even point. In response to (i) I note that this concern was also noted by North Island-Central Coast Forest District staff with respect to the likelihood or timing of any re-entry into the valley. In response to (ii), MFR district staff note that licensees are operating in such stands.

In weighing the merits and uncertainties in all of the points above, no particular factor or group of factors stands out as persuasive enough to singly or jointly turn the balance of probabilities toward a definitive figure identifying a 'correct' value index from which to estimate a reliable threshold for profitable operations across the TSA. In fact, given the variations in terrain, in stand types and in their distribution and proximity to access—directly or through more or less valuable stands—and given variations in licensee experience and efficiency as well as fluctuating market conditions, the idea of such a figure can be no more than a convenient analytical generalization, to be proved or disproved over time as practical, operational experience accumulates.

In my experience, almost any 'operability line' for any management unit in British Columbia will unavoidably both *exclude*, as economically inoperable, some stands that will eventually prove profitable to harvest in the circumstances of the day, and *include*, as economically viable, some stands that will eventually be left on the landscape as uneconomic.

In the present case, for the Kingcome TSA, I do not doubt that the licensee Interfor has been able to increase its operational efficiencies in recent years, such that some stands which the company previously would have considered uneconomic are now economically viable for that company, even in today's markets. This assertion was explained in a meeting in Port McNeill on June 1, 2009, between Interfor, MFR staff and me. However, these same stands may very well prove uneconomic for operations by a different licensee without the particular

advantages available to this large, integrated company. In this situation it would be just as unreasonable to assume that Interfor would not be able to take advantage of at least some of the opportunities it has identified, as it would be to assume that all licensees across the TSA will be able to operate successfully in all of the stands within the revised operability line, particularly in those stands with a substantially negative value index.

I have concluded from this that at least some of the economic advantages identified by Interfor as particular to its operations may reasonably apply to all of its own licences, constituting roughly half the apportioned harvesting rights in the TSA. For all of the other licensees, constituting the other half of the harvesting rights, the prospect of presuming economic viability for all stands with a value index of minus ten dollars invites an immediate risk of determining an AAC based on a land base larger than that which will prove financially viable overall. Therefore, since it is not possible to accurately delineate operability for each stand by each licensee in the TSA, I have taken guidance at this stage of my considerations from the earlier noted sensitivity analyses, and have proceeded as follows.

The information available does not provide me with a high level of confidence that a THLB defined using a minus ten-dollar threshold would provide a reasonable approximation of what is likely to be economic to harvest by all operators in the TSA over the period of this determination. Since Interfor's advantages apply generally to about half of the available timber supply, then acknowledging—as unavoidable—the inherent imprecision and uncertainty, I have decided to assume the economic viability of a land base in the mid-range between that which would be available at a zero-dollar index, which would generally represent a break-even condition for licensees other than Interfor (before stumpage) and that which would be available at a threshold of minus ten dollars, as was assumed in the analysis. The sensitivity analyses indicate that the difference between these two land bases corresponds to a difference of approximately 200 000 cubic metres per year in the projected initial harvest levels under the two respective assumptions. Thus the timber supply projected from a land base sized in the middle of the indicated range would correlate with an overestimation in the initial harvest level in the base case (projected from a minus-ten-dollar-threshold land base) by approximately 100 000 cubic metres per year, or about 8.5 percent.

I believe this conclusion to be a fair resolution of the range of documented facts and opinions before me. It acknowledges and facilitates the benefits of operational efficiencies where these exist, without imposing an unacceptable risk of overestimating the ability of the land base to contribute such that areas of better timber would be harvested disproportionately. In my **'Reasons for Decision'**, I have further considered and reasoned from the implications of this conclusion, in a wider context of other factors and considerations, including government's expression of social and economic objectives for the province. In order to ascertain the economically harvestable land base with a greater degree of certainty for the next analysis and AAC determination, district staff should continue to monitor licensees' performance in marginal, lower-value stands, and I have included an instruction to that effect in **'Implementation'** below.

- low productivity sites

In the base case analysis, all stand types on low productivity sites that are not considered harvestable—based on inventory site index thresholds derived by licensees following a review of harvest history in the TSA—were excluded from contributing to the THLB. This resulted in a net reduction of 101 077 hectares from the THLB.

The minimum inventory site index thresholds, 10.5 metres for cedar-leading stands and 12.5 metres for hemlock/balsam-leading stands, are one metre lower than the thresholds applied in the previous TSR. Stands within the THLB that had site indices that fell between the new and previous thresholds were classified as 'marginal stand' in the analysis.

To track and control the distribution of marginal stands, as described in the analysis report, their contribution in the base case was constrained to 75 000 cubic metres per year. In the model, these stands were assumed to grow after harvest with a managed stand site index. Inventory information shows that marginal stands occupy 12 percent and 'good', 'medium' and 'poor' site index stands occupy 10 percent 43 percent and 34 percent of the THLB, respectively. From 2002 to 2006, harvesting in marginal stands accounted for roughly four percent of the total harvested area.

Sensitivity analysis showed that without any contribution from marginal cedar or marginal hemlock/ balsam stands, the initial harvest level would be five percent lower than in the base case, the mid term 17 percent lower, and the long term would remain unchanged. When stands with a value index less than zero dollars were also excluded, the initial, mid-term and long-term levels were significantly reduced, by 23 percent, 26 percent and 19 percent, respectively.

The licensee Interfor submitted that, as directed in the previous AAC determination, considerable effort had been made in reviewing lower productivity limits for inclusion in the THLB. And that despite general agreement on the results, considerable harvest performance still occurs outside the derived THLB, indicating the base case timber supply projection may be conservative.

The Tsawataineuk First Nation submitted at the May 28, 2009 meeting in Campbell River, and by letter dated June 4, 2009, that while marginal stands are included in the THLB and some are being harvested, in their view licensees are not harvesting the profile and there is no regulation enforcing licensees to do so. The First Nation asserted that licensees included low-productivity sites of cedar, hemlock and balsam in the THLB, in part because some of these contain valuable old-growth cedar. They are concerned that once the old-growth cedar is harvested, the second-growth stands will not regain the same value as the original stand; therefore, these sites should not be included in the THLB.

In response, district staff note that licensees are currently performing appropriately in these stands, not all of which were included in the THLB, and that the assumed contribution of marginal stands is capped at 75 000 cubic metres, as noted earlier. However, district staff note that as marginal stands have been harvested since the previous AAC determination, it is uncertain whether there are sufficient remaining stands of this type remaining to support a harvest contribution of 75 000 cubic metres per year to the extent indicated in the base case.

I am aware that once the old-growth cedar on some marginal sites has been harvested it may be over 120 years before a stand of comparable value becomes available for harvest. However, I note that site productivity estimates based on the attributes of old-growth stands often result in an underestimation of site productivity. Consequently, second-growth stands often grow faster than predicted, resulting in a reduction in the projected rotation age. Furthermore, I note that while marginal stands comprise roughly 12 percent of the THLB, their contribution to harvest levels in the base case was constrained to a maximum of about six percent. Based on a review of current performance, marginal stands represent four percent of the area harvested. Given this relatively small difference and the potential for

overestimation of rotation age, I conclude that the risk of overestimation of the eventual contribution to the harvest from areas of low productivity in the THLB is adequately accounted for in the base case.

- roads, trails and landings

I have reviewed the land base deductions applied in the base case analysis in respect of existing and future roads, trails and landings.

Although no related concern was expressed during the public review and comment period for the data package for the 2009 analysis report, Interfor expressed concern, in a letter of March 25, 2009, which was reiterated at the June 1, 2009 meeting in Port McNeill, between Interfor, MFR staff and me, that all forecasts in this analysis are based on the assumption that roads essentially represent a 14-metre, non-productive denudation that never produces any subsequent volume. Interfor suggests that in its operational experience, many old roads grow back in completely, such that a 14-metre, permanent exclusion for existing roads is excessive. Interfor concludes that the THLB and thus the timber supply forecast in the base case are underestimated and that a correct assessment of the impacts of roads would improve the currently projected mid-term harvest level.

In my experience with coastal TSAs, road width allowances for analysis purposes typically range from 10 metres to 14 metres, which encompasses the assumption for the Kingcome TSA. Interfor provided a photograph of a non-mainline road, suggesting its width was closer to five or six metres. District MFR engineering staff reviewed the road assumption applied in the analysis, both at the data package stage and recently, and I am advised that the 14-metre assumption is appropriate, this being explained partly by the relatively high number of mainline roads in the Kingcome TSA, which are also maintained for the benefit of communities located at the ends of the roads, and partly by the need to incorporate implicitly in the road exclusion assumption, an allowance for quarries and turn-arounds which are not otherwise accounted for. I am advised by MFR district staff that the average road construction width allowance in this district is 25 metres.

From this I conclude that it is likely that in-growth will occur to some degree on some roads constructed by some licensees. However, it will not happen on maintained mainline roads, nor will it likely happen on smaller roads to a predictable degree. Furthermore, it is unlikely to occur in stands that will be managed with a known species mix that could be expected to be harvested under permit during future reconstruction of a road. The result of this uncertainty is such that there is no basis from which any reliable adjustment could be made to the projected timber supply for the whole TSA. I am therefore satisfied for the purposes of this determination that the base case has reasonably and adequately accounted for the land base reduction for roads, trails and landings. If licensees or district staff consider there to be sufficient potential for benefit, I would encourage a properly constituted sampling that might result in sufficiently reliable information to vary the assumption in the analysis for the next determination.

- woodlot licences

In 2006, in the data package, 2756 hectares of land base exclusions for issued woodlots were identified, representing seven woodlots with an associated AAC of 14 030 cubic metres. Since then, three additional woodlots have been awarded and a fourth has been 'topped up' from 400 hectares to 800 hectares, representing 2757 hectares overall with an associated

overall AAC of 14 400 cubic metres. Further woodlots are planned for disposition in 2009, and two direct award woodlots have been offered; however, none of these woodlots has yet been formally issued or removed from the TSA. If these woodlots are issued before the next AAC determination, the associated area and AAC will be removed from the TSA at that time, for separate administration.

Deleting the area from the TSA for the unaccounted woodlots and the ‘top-up’ awarded since 2006 decreases the THLB by 2757 hectares and reduces the projected initial harvest level for the TSA by 14 400 cubic metres per year, or 1.2 percent, as noted and discussed in ‘**Reasons for Decision**’.

Existing forest inventory

The 2009 timber supply analysis was based on data from a Vegetation Resources Inventory (VRI) for which Phase I was completed in 2003 and the Phase II ground and net volume adjustment factor sampling were completed in 2004. The Phase II adjustments were approved by the MFR Forest Analysis and Inventory Branch and applied, the VRI was updated for disturbances in July 2004 and the VRI attributes were projected to January 2006.

In the 2004 update process, minor discrepancies were found in the area identified as previously logged, indicating a small overestimation in the THLB. This was slightly more than offset in the analysis by the removal of ‘sliver’ polygons of less than 0.1 hectare in size, with negligible net error.

Another finding was that 12 937 hectares in the THLB are either not satisfactorily regenerated (NSR) or are lacking in stand attributes; of this, 8851 hectares are known to have incomplete or missing attributes. The NSR area was assumed to be regenerated in the first planning period and is considered further below, in ‘*not-satisfactorily-restocked areas*’.

During the MFR’s review of the 2006 data package, two areas in the TSA were found to be missing from the data set, due to gaps in the inventory data originating from the transfer of licences into the TSA. From data used in support of the 2002 AAC determination, MFR Coast Region staff estimated the THLB in the TSA from within these areas to be an additional 999 hectares in the Mahatta area plus 526 hectares from Nimpkish timber licences, for a total needed adjustment of 1525 hectares, or 0.7 percent of the mature inventory in the THLB.

From these considerations I conclude that the adjusted VRI is the best available forest cover inventory for the TSA, and that, in respect of the missing data, the initial harvest level in the base case has been underestimated by 0.7 percent, or 8300 cubic metres per year, which I have accounted for in this determination as discussed in ‘**Reasons for Decision**’.

With respect to the 8851 hectares in the VRI with missing or incomplete attributes, there is a risk that some portion of this area may have been improperly included in the THLB. However, I have concluded that such an overestimation would be negligible and would not likely impact the short-term harvest level projected in the base case. I request that this information be clarified prior to the next AAC determination for this TSA and I have issued an instruction to this effect in ‘**Implementation**’ below.

- aggregation procedures

For the timber supply analysis, the land base was aggregated into Resource Emphasis Areas and analysis units, as detailed in the data package and in the timber supply analysis report. I have reviewed the aggregation procedures as applied, and I am satisfied that the land base has been adequately rendered for analysis, with one important qualification as follows.

Biogeoclimatic site series are used to describe ecosystems in terms of climate, topography, soil moisture, nutrient availability and plant community. Where biogeoclimatic site series are not mapped and available for use in establishing biodiversity targets, timber supply analysis units are currently used as a surrogate. These analysis units describe principal tree species and growth rate, and may not fully capture ecosystem representation. In the Kingcome timber supply analysis, the default analysis unit site series surrogates were used for the CLUD area, and were defined using the provincial biogeoclimatic ecosystem classification system and VRI attributes, consistent with the July 2007 South Central Coast Order (SCCO).

In public input, Interfor noted that the site series surrogates were used to model the EBM old-seral objectives and that these site series surrogates are not fully correlated with ecosystem characteristics. Interfor performed internal analysis suggesting that this use of surrogates created an inaccurate appearance of rarity in some ecosystems, and noted that Terrestrial Ecosystem Mapping (TEM) is necessary for managing ecosystems when implementing EBM.

This is consistent with the existing MFR view. Nonetheless, because TEM mapping is currently available for only about 20 percent of the Kingcome TSA, I find that the analysts followed correct procedure in applying biodiversity targets to the site series surrogates, and that the best available information was used for this purpose. I agree with ministry staff and Interfor on the need to complete TEM mapping for the TSA, and I have issued a related instruction in **'Implementation'**.

- age class structure and species profile

As noted earlier under '*base case for the Kingcome TSA*', I have reviewed the age class structure and species profile as reported in the data package and the timber supply analysis report. At the noted June 1, 2009 meeting in Port McNeill, Interfor also presented an additional related chart showing changes from the 2001 timber supply analysis, whereby the revised economic operability, which included more low-productivity sites, has included more cedar while reducing the amount of hemlock in the THLB. Interfor suggested from this chart that performance figures from 2005 to 2008 show that cedar is not being harvested beyond its representative profile in the THLB, a statement with which I agree as discussed below in '*harvest species profile*'.

From my review and discussion with district staff, I am satisfied that the analysis report accurately reflects the age class structure and species profile present in the Kingcome TSA.

Expected rate of growth

- site productivity estimates

For all existing stands, the site index values used to create analysis units were derived from the adjusted Phase II VRI information. For managed stands, yield estimates were developed from adjusted site index values, the derivation of which is documented in the report *Site Index Adjustment of the Kingcome Timber Supply Area* (Timberline, 2007). I have reviewed the steps of the site index adjustment procedure and the results obtained for leading species and site class. I note that for western redcedar and for western hemlock the procedure resulted in significant increases in the estimated average mean annual increments, of 60 percent and 30 percent, respectively. I also note that sensitivity analysis shows that the progression of harvest levels in the base case projection would remain unchanged for the first 50 years of the projection, whether or not the current site index adjustments were applied (the only difference

being that without the adjustments, the long-term level would be reduced to the mid-term level). When managed stand site index values were reduced by two metres from the current adjusted values, the initial harvest rate in the base case was reduced by 16 percent, with the mid-term harvest reduced to the natural stand long-run sustained yield (LRSY) estimate and the long-term level reduced by 20 percent.

From my review of the procedures for obtaining and applying site index values in the analysis, I am satisfied that the best available information was used and that the base case projection is reliable in this regard.

- volume estimates for regenerating, managed stands, and operational adjustment factors

In the analysis, all forest stands 37 years old or younger at the commencement of the projection were considered to be managed stands. For these stands, volume estimates were based on MFR's BatchTIPSY (version 4.1c) projections using the standard provincial operational adjustment factors (OAF) of 15 percent 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.

Interfor submitted in March, 2008 that the combined OAFs amount to a reduction of 20 percent on the yield curves. Reference was made to the Morice and Lakes Innovative Forest Practices Agreement, where local information indicated that lower OAF values were appropriate. Interfor suggested that with smaller block sizes, better mapping of non-productive areas, more even stocking, and in-block overlaps between OAF-related features and other exclusions, OAF 1 could now be reduced to eight percent, and OAF 2 could remain at five percent, reflecting changes in practices and management. On March 25, 2009, Interfor reiterated the position that OAFs are not consistent with current practice and recommended that both values be revisited prior to the next AAC determination.

The Tsawataineuk First Nation also indicated that the licensees' uncertainty regarding the appropriate OAF values suggests that the use of TIPSY is inappropriate given current levels of stand management and that since current policies do not enforce silviculture in regenerating stands, VDYP should be used to estimate volumes in these stands.

In response, I note that no study or assessment supporting a specific change from the default OAF values has been completed for the Kingcome TSA, and the applicability in this TSA of data from distant regions such as Morice and Lakes TSAs is uncertain at best. MFR Research Branch staff advise that VDYP is not ideal for applying to regenerating stands, but acknowledge that TIPSY does need to be reconfigured to better reflect growing stands.

Weyerhaeuser Hardwoods Ltd. submitted that the regenerated yield curves used in the analysis are very conservative relative to Pacific Northwest Hardwood Cooperative data and to the yield curves for alder developed with the Tree and Stand Simulator (TASS). Furthermore, the Alder Management Strategy document illustrates a significant difference between what is assumed in the analysis and what alder is capable of producing.

In response, I note that alder-leading stands make up 3.4 percent of the THLB, and that the estimates of managed stand yields for alder were developed using TIPSY and VRI inventory parameters using standard procedures. These estimates may be low compared to estimates from the TASS yield model, and further inventory work would be required to validate new volume estimates for alder stands.

To conclude, I understand that licensees feel that OAF-related features can be co-located within-block reserves of various kinds, and in principle I agree with this to a certain extent in respect of certain features and occurrences. However, I cannot see this to be true for all instances, nor do I see the issue being adequately accounted for by the use of small blocks. Even if licensees are able to avoid natural openings in the ‘first pass’ by this means, eventually there will still come a time when in the THLB overall these gaps must be accounted for or they will result in residual unmanaged areas.

If licensees believe an opportunity now exists to gain a better understanding of the interaction between current management and the estimated losses to natural operational conditions, I encourage efforts toward this end, since these may well lead eventually to increases in the projected timber supply. For the present determination, while I appreciate the thoughtful input, I accept that the best available information has been used in estimating the volume yields applied for regenerating stands in the base case analysis.

- minimum harvestable ages

The assumed minimum harvestable ages (MHA) applied in the Kingcome timber supply analysis were based on the age at which a volume threshold was achieved, and/or 95 percent of the culmination of mean annual increment (CMAI) was reached. The MHAs are detailed in Table 57 of the 2006 data package, and I note that sensitivity analysis in the 2009 timber supply analysis report shows that the short-term timber supply is sensitive to an increase in MHAs.

The Tsawataineuk First Nation submitted that MHAs based on volume and CMAI may not be realistic for stands in remote areas, noting that operability in these stands requires higher stand values. They recommend that a product-based approach to MHAs would be more suitable, that could for example be based on achieving a minimum diameter.

This may be a valid suggestion for specific areas where costs are higher and profitability may not be achieved until sometime after the assumed MHA has been reached. However, from my review of the assumptions underlying the MHAs, as well as the related sensitivity analysis, I am satisfied that overall the modelling in the base case projection incorporates values for harvestable ages that are reasonable and adequate for use in support of this determination.

- harvest profile

I have reviewed and discussed with MFR regional and district staff the annual harvest projected for the TSA over the 250-year planning horizon, both by leading species and by individual species, as identified in the 2009 timber supply analysis. I have also reviewed the actual volumes harvested annually in the TSA for the years 1995 to 2006, inclusive.

The figures show that the proportion of cedar and cypress in the volumes harvested annually in the TSA increased from approximately 50 percent in 1995 to almost 70 percent in 2004, declining again since that time to about 50 percent, which is roughly consistent with the inventory profile. District staff note that in the first of these two periods, the harvest in hemlock and balsam was lower than would be expected from the inventory, such that the cedar constituted a higher proportion of a lower overall harvest, which therefore did not automatically indicate an over-harvest of cedar. Staff note that since 2005, the trend in the TSA has been toward improving performance in hemlock and balsam as a proportion of the total harvest, although this applies much more to second-growth than old-growth stands, which is indicative of some concern, as I have discussed further below.

For the above reasons, I agree with Interfor's statement noted earlier in '*age class structure and species profile*' that the cedar component is not currently over-harvested, and I also acknowledge the industry's submission that for accuracy in determining the appropriateness of harvest proportions, inventory figures must be relied on in all cases, rather than using cruise or scale figures to compare with the inventory.

Interfor also submitted that a species-specific harvest partition is not required in the TSA at this time, since while inventory-based harvest statistics indicate that the amounts of cedar and cypress—as compared with hemlock and balsam—do fluctuate between years, there is no indication that the harvest in any year or group of years is inordinately dependent on one particular species.

My conclusion is that, as noted in '*age class structure and species profile*', the currently defined THLB includes more cedar/cypress-leading stands, and fewer hemlock-balsam-leading stands than in the 2001 analysis, such that cedar-cypress now contribute roughly one-half of the total available volume in the inventory. This change in the land base brings the inventory profiles in the TSA more in line with actual harvesting performance, which in past years included a higher proportion of cedar and cypress. Nonetheless, the level of performance in hemlock/balsam-leading stands, particularly old-growth stands, continues to be an issue of concern in the TSA warranting further monitoring.

In view of the dependence of the base case projection on ongoing contributions to the harvest in identified proportions from particular stand types—noting specifically for hemlock-balsam stands that the cap on second-growth harvesting necessitates an annual harvest of 235 000 to 300 000 cubic metres on old-growth stands of these types—I have issued an instruction in '**Implementation**' below, that licensees and district staff continue to monitor the volumes harvested from the species profile in the inventory for the TSA. My intention is that these old-growth hemlock-balsam stands not be harvested only for cedar values, leaving excessive standing waste of the other species, but that they be appropriately regenerated with an adequate entrance of light and without degradation of productivity.

Matters related to the deciduous component of the profile are discussed below, in '*deciduous harvest levels*'.

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

Not-satisfactorily-restocked areas

A 2005 review of MFR's 'Reporting Silviculture Updates and Land Status Tracking System' (RESULTS) data indicated that the current Not-Satisfactorily-Restocked area (NSR) in the Kingcome TSA is 5518 hectares, of which 54 hectares are backlog. This figure may be overstated since attributes for openings are not updated immediately after planting, but tend to be reclassified after a regeneration or survival survey.

As noted earlier, in '*existing forest inventory*', the THLB includes 12 937 hectares of recently logged areas that were classified in the analysis as either NSR or lacking stand attributes. The areas classed as NSR include 9128 hectares of polygons that have no stand attributes (8851 hectares) or questionable attribute data (277 hectares). Of this, 8851 hectares are known to have incomplete or missing attributes.

The area lacking VRI attributes in the 2006 inventory occurred because at that time silviculture data had not been merged with the VRI. Since then, many polygons within the Kingcome VRI attributes have been updated with RESULTS records, but time has not

permitted their resolution here. Since all of the questionable stands were assumed in the analysis to regenerate in the first period of the forecast, and were not assumed to contribute to the timber supply until the sixth decade, I am satisfied that any remaining uncertainty applies only to the mid-to-long-term harvest levels, by which time any real timber supply implications will have been appropriately accounted for. For the purposes of this current AAC determination, any residual error is negligible.

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

Silvicultural systems

In the 2006 data package, three main silvicultural systems are identified as in current practice in the Kingcome TSA: clearcutting; clearcutting with reserves; and high retention.

In the analysis, retention assumptions were applied to three zones: non-EBM areas on Vancouver Island (19 percent of the THLB), areas of clearcut with reserves (78 percent of the THLB), and a 'high retention zone' (three percent of the THLB). The latter includes areas with 'preservation' or 'retention' visual quality objectives (VQO). Effective retention levels of six percent, 10 percent, and 40 percent were applied to the non-EBM, clearcut with reserve areas, and high retention zone, respectively. The effective retention level applied to areas of clearcut with reserves was subsequently reduced from 10 percent to six percent to reflect already constrained areas and the fact that 40 percent of the cutblocks are less than 15 hectares. The net result is that 97 percent of the THLB was assumed to be clearcut with an effective retention level of six percent.

In 2009, district staff reviewed silvicultural system data from 2002 to 2006, as reported in RESULTS. The results indicate that 38 percent of the area was harvested under clearcut, 33 percent was harvested under clearcut with reserves and 29 percent of the area was harvested under partial-cut silvicultural systems. District staff also determined the extent of dispersed retention harvesting by reviewing the number of hectares harvested by even- and uneven-aged stocking standards as reported in RESULTS during the same time period. District staff are also aware of unreported high levels of dispersed retention that is not reported in RESULTS, on blocks with even-aged stocking standards where the over-story is ignored, and of high-retention blocks harvested between 2002 to 2006 but that were not reported until after this period. The expectation is that future forest cover and silvicultural system reporting is expected to improve as per the 2008 Coast Regional Implementation Team Guidance Memorandum, dated November 18, 2008, that provides forest cover reporting guidelines.

Accounting for this information indicates that in total, in that period, harvesting involving dispersed retention actually occurred on roughly five percent of the THLB.

District staff also advise that the 2008 report *Summary of Harvesting, Planting and Regeneration Trends for Western Redcedar in Coastal TFLs and TSAs 1991-2005* identifies the percentage of harvest openings occupied by mature trees in the Kingcome TSA. In the period from 2001 to 2005, the average percentage of opening occupied by mature trees under different silvicultural systems were as follows: 8.7 percent for clearcuts, 14.8 percent for clearcuts-with reserve; 23.1 percent for openings in retention systems; and 17.8 percent for openings in other systems (i.e., seed-tree, shelterwood and patch-cut.)

Both district and Forest Practices Board staff completed field reviews and sampling on 192.8 hectares or 37.8 percent of the dispersed retention blocks harvested between 2002 and

2006 to determine levels of basal area retained within the net area to be reforested, defined as (a) ‘dispersed retention’ with less than 30 percent dispersed basal area retention, or (b) ‘high retention’ with greater than 30 percent dispersed basal area retention. For this period, of the total area of 509.1 hectares harvested under partial-cut systems with dispersed retention, the average basal area retained in eight ‘high retention’ harvest blocks that were field-reviewed by the district staff is 49 percent, not including wildlife tree retention (WTR), and the average basal area retained in four ‘dispersed retention’ blocks that were field-reviewed by the Forest Practices Board is 23.5 percent, not including WTR.

To summarize, in the base case it was assumed that 97 percent of the THLB would be clearcut or clearcut with reserves with an applied retention of six percent, and three percent of the THLB would be under ‘high retention’ with an applied retention of 40 percent. Contrasting with this, field observations indicate that actual operationally observed retention levels are considerably higher than those assumed in the base case. In fact they are reasonably consistent with the assumptions incorporated in a sensitivity analysis, described in the timber supply analysis report in which: an effective level of retention of 15 percent was applied to a general EBM zone covering 76 percent of the THLB; an effective retention of six percent was applied to a non-EBM zone covering 19 percent of the THLB; and an effective retention level of 50 percent was applied to a ‘high retention’ zone covering five percent of the THLB. In this sensitivity analysis, the initial harvest level was eight percent lower than in the base case, and the mid- and long-term levels were reduced by six percent.

The timber supply impacts accrue from the increase in area from three percent to five percent in the ‘high retention’ zone, as well as the increase in the total retention in the general zone to 15 percent (this being the *minimum* level to meet EBM requirements), without the earlier noted 60/40 reduction. The additional retention affects the amount of the existing stand volumes to be recovered, and is also accounted for by a volume reduction factor in TIPSYS to account for the loss in stand occupancy from the retained trees, as well as from their shading of the balance of the regeneration. This factor was applied only to hemlock and fir stands, as the TIPSYS model is not calibrated for cedar. Therefore, the effect of shading on regenerating trees was not accounted for in cedar stands. Additional impacts on the timber supply require accounting for in all EBM zones.

In public input, Interfor suggested that much of the necessary retention in the general EBM zone will be accounted for by overlaps with other EBM reserves, as shown in a 2007 Symmetree report suggesting a net 4.6 percent incremental retention (rather than six percent). However, a number of the features intended to be accounted for in this way occur either only on Vancouver Island (e.g. old growth management areas, karst) and not in the EBM area at all, or to only a small degree in the EBM areas (e.g. wildlife habitat areas).

To summarize and conclude, limited sampling to date shows that licensees are responsibly leaving higher levels of retention, consistent with meeting objectives for EBM. In many cases; however, current operational levels of retention actually exceed EBM requirements, where full advantage has not been taken of opportunities for co-locating retention to meet complementary objectives. The actual amounts of retention may vary to some degree over time with fluctuations in markets and the associated merchantability of particular stands; however, it should be remembered that higher levels of retention than are explicitly required will have implications for the timber supply since the growth potentials of resultant stands are affected. These timber supply implications need to be carefully considered during the development of site level prescriptions, with attention paid to spatial relationships. Careful

planning respecting overlaps with retention for other objectives may reduce the overall net associated constraint, while other factors, including the non-accounting in the analysis for the loss of growth in cedar, the need to retain monumental cedar for First Nations—which was not directly modelled—and the need for 50 percent of the retention in cutblocks over 15 hectares to be distributed within the block, will tend to increase the overall constraint. The net timber supply implication from higher retention levels must of course be assessed in consideration of the constraints applied to meet stand-level biodiversity objectives, which are considered below in ‘*stand-level biodiversity*’.

In consideration of the potential for co-location to meet complementary objectives and licensee regard for the impact of retention on the growth and yield of residual trees, I have concluded that it is appropriate to account for a net six percent overestimation in the base case initial harvest level rather than eight percent as shown in the sensitivity analysis, which I have also discussed further in conjunction with other factors in ‘**Reasons for Decision**’.

In preparation for the next AAC determination, I encourage licensees to work with district staff to improve forest cover reporting for blocks with high residual basal area in RESULTS as recommended in the November 2008 CRIT Guidance Memorandum. Furthermore, I have instructed MFR staff to continue to monitor silvicultural system usage in the TSA and the resulting levels and distributions of the ensuing forest cover retention as indicated in ‘**Implementation**’.

Genetic improvement

In the 2009 analysis, the use of class “A” seed for both redcedar and coastal Douglas-fir was accounted for. The Tsawtaineuk First Nation expressed concern that the stand that is eventually harvested may contain natural ingress for which it would be inappropriate to apply a genetic gain. However, in the analysis the assumed gain was applied to planted species only, and was appropriately matched to stand species profiles. I have reviewed the accounting for genetic gain in the analysis, which I consider to reasonably reflect current practice for planted areas.

- (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:**

Decay, waste and breakage

I have reviewed with district staff the assumptions applied in the 2009 analysis respecting volume adjustments for decay, waste and breakage and I am satisfied that the best available information was incorporated in the base case projection and that the modelling adequately reflects current practice, with the following exception. I am advised that the potentially utilizable component of standing dead trees has been assessed at up to 18 percent of the total live volume on the THLB. Much of this volume, which is not captured in the inventory, is not accountable under-cut control and, in practice, typically less than half of the ‘dead-potential’ volume is harvested and scaled. District staff estimate that in their experience the recovered component of this wood amounts to something between zero percent and three percent of the projected timber supply.

From my experience in other coastal TSAs where I have made adjustments to the projected timber supply based on the availability of an unaccounted for component of this ‘dead-potential’ wood, I am in agreement with the need to account in this AAC determination for the availability of some proportion of the indicated volume. This is consistent also with

the volumes of cedar currently harvested in the TSA, which exceed those indicated in the inventory. However, determining an appropriate figure for the utilizable component of this potential from among the living trees with dead tops and the standing dead trees would be a laborious process necessitating on-site studies. Such a process could be contemplated in future if a TSA 'Steering Committee' were to be established and suitable, effective procedures could be agreed on.

For this determination, in the absence of more accurate information, acknowledging that these 'dead-potential' wood volumes do afford some small additional flexibility to the timber supply, I have accounted for a mid-range underestimation of 1.5 percent of the initial harvest level projected in the base case, as discussed in '**Reasons for Decision**'.

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

Integrated resource management objectives

Management of the many uses of the TSA land base is addressed by two strategic land use plans. Areas of the TSA on Vancouver Island, Malcolm Island and the islands west of Malcolm Island are subject to the provisions of the 2000 Vancouver Island Land Use Plan. However, the majority of the TSA, lying on the mainland as well as on some of the islands between the mainland and Vancouver Island, is subject to the July 2007 South Central Coast Ministerial Order proceeding from the provincial Coast Land Use Decision (CLUD) of February, 2006.

- visually sensitive areas

For the Kingcome TSA, the Visual Quality Objectives (VQOs) were established under the Government Actions Regulation (GAR) 7(2) through a district GAR Order on August 31, 2005. The recommended visual quality classes (rVQC) originated from the 1999 visual landscape inventory and these rVQCs were the basis for the VQOs in the GAR Order. The scenic area was made known by the district manager in 1999, with the earlier Visual Mitigation Strategy already incorporated.

I have reviewed the amounts of area included in the analysis for resource emphasis areas with Preservation, Retention, Partial Retention, and Modification VQOs, as well as the associated visual absorption capacities, required green-up heights, and maximum areas permitted to be below green-up. I note that while VQOs are applied to about one-quarter of the entire productive land base in the TSA, a large proportion of each resource emphasis area occurs outside the THLB in areas that are able to contribute to achieving the visual quality objectives without constraining the timber supply.

In public input at the data package stage, Interfor submitted that since green-up height requirements are variable depending on slope, average slopes should be used for determining green-up heights. However, this represents just one of the two acceptable methodologies available for determining these height requirements, and the alternative method chosen by the Timberline analyst is equally effective.

From my review of the assumptions modelled in respect of VQOs and of scenic management under the VILUP in the Enhanced Forestry Zones (with a 1.3-metre green-up constraint) and Special Management Zones (with a three-metre constraint), I am satisfied that the 2009 timber

supply projection adequately accounts for the implications of managing to meet visual quality objectives in the TSA.

- Identified Wildlife Management Strategy

In the Kingcome TSA, the provincial Identified Wildlife Management Strategy (IWMS) has resulted in the establishment of wildlife habitat areas (WHAs) and the implementation of general wildlife measures (GWMs) and wildlife habitat area objectives. In deriving the THLB in the 2009 timber supply analysis, 671 hectares of established WHAs and 456 hectares of draft WHAs were excluded. One WHA for marbled murrelet was overlooked in the analysis but affects only 1.3 hectares of the THLB.

After the analysis, in late 2008, a new murrelet nesting habitat inventory was completed for the mainland part of the TSA. The Ministry of Environment (MOE) considers this an improvement on the 2006 habitat model used in the analysis, and requests that it be used in future assessments of murrelet nesting habitat on the mainland coast. The MOE requested a sensitivity analysis to measure the effects of applying the Marbled Murrelet Recovery Team's recommendations for the retention of suitable habitat. This analysis showed that after 170 years the amount of suitable habitat harvested in the Kingcome THLB will exceed the maximum deletion rate recommended by the Recovery Team (not including any recruitment calculation). Forestry professionals and decision makers should be aware of the potential long-term risk to this threatened species.

Staff of the Coast Forest Region, using information from the 2009 analysis report, have calculated the impact of managing to meet the Recovery Team's recommendations, if these are adopted as government policy. This would require 83 998 hectares of murrelet habitat in the non-contributing forest, plus 14 597 hectares, or 7.8 percent of the total THLB in the TSA, implying a reduction in timber supply in the Kingcome TSA of up to 7.8 percent, although the potential for overlap with areas retained for landscape-biodiversity objectives would reduce the overall incremental impact.

From these considerations I conclude that while there is no net impact on the timber supply in the short- or-medium terms, meeting the Section 7 notice requirements for marbled murrelet habitat may imply a reduction of roughly 1.3 percent in the timber supply after 170 years. From this I am satisfied that for the time frame relevant to this determination, habitat requirements for marbled murrelet, and for the other IWMS species present—the coastal tailed frog—are appropriately modelled in the base case projection.

- ungulate winter range

Ungulate Winter Range (UWR) areas were officially established in the Kingcome TSA on June 9, 2006. The legal boundaries of these areas were incorporated into the data package and the areas were excluded in deriving the THLB for all harvest forecasts, resulting in a net exclusion of 1968 hectares. This exact figure may be subject to a small revision, pending confirmation from the Integrated Land Management Bureau (ILMB), but any resulting discrepancy amounts to approximately 500 hectares of the total area, implying probably about 50 hectares of the THLB. For this AAC determination, I am satisfied that the UWR is appropriately represented in the base case timber supply projection. For the next timber supply analysis, this discrepancy should be investigated and remedied, and I have included an instruction to that effect below, in **'Implementation'**.

- *riparian management*

I have reviewed all of the riparian management assumptions as noted in the data package and applied in the timber supply analysis, and find no concern with the modelling procedures, except for the following two qualifications originating from public input by licensees.

First, Kruger Products Limited expressed concern that in the model all double-line rivers were classified as S1 streams to which a 60-metre reserve zone was applied. However, Kruger noted that the Kingcome TSA includes several ‘large rivers’ for which only a 20-metre management zone is required and indicated that this requirement should have been applied in the model. In response, MFR staff note that portions of the Wakeman, Kingcome, and Seymour Rivers are probably subject to riparian class S1A requirements. These requirements include a 100-metre management zone and no reserve zone, such that when management zones are 50-percent excluded, the effective riparian buffer of 60 metres applied for these rivers is overstated by 10 metres. The net effect of this is negligible since the area associated with these buffers probably overlaps areas already excluded from the THLB for other factors, such as EBM objectives for ‘high value fish habitat’ and for active fluvial areas.

Second, in the timber supply analysis, an eight-metre retention zone was applied to all S5 streams to model the effective retention resulting from the 30-metre buffer zone with 25-percent retention required by the *Riparian Management Area Guidebook* for those streams. In public input, Interfor stated that this result is not consistent with its current operational practice in the Kingcome TSA, which is to apply an effective buffer of three or four metres to S5 streams. Interfor correctly noted that, in the analysis, the total retention of 4632 hectares resulting from the buffering just for S5 streams forms nearly 20 percent of all of the applied riparian retention. Interfor clarified that its concern is not with the overall length of S5 streams identified, but with the assumed management practices for those streams.

Based on my review of this factor with MFR district, regional and branch staff, I have concluded that the net area removed from the THLB in the analysis by assuming an eight-metre effective retention for S5 streams is probably too high, although without additional, direct, operational information, it remains difficult to establish a more reliable figure. In this situation, I consider it reasonable to assume that a more appropriate level of effective retention may be represented by reducing the value assumed in the analysis by one-half from eight to four metres, and assuming further that this also reduces the total associated effective retention by one-half, from 4632 hectares to roughly 2300 hectares or about 1.2 percent of the THLB. For this determination, I have accounted for an underestimation in this amount in the initial harvest level projected in the base case forecast, as discussed in ‘**Reasons for Decision**’.

To reduce the level of uncertainty in this factor, to better identify all streams and to quantify the timber supply implications of current operational practices for buffering S4, S5 and S6 streams—particularly the S5 streams—additional information on these practices should be collected, by monitoring through the Forest and Range Evaluation Program (FREP) or by field visits, for incorporation in the next timber supply analysis; I have issued an instruction to this effect in ‘**Implementation**’, below.

- *EBM objectives for important fisheries watersheds*

In the base case, an accounting was included for Objective 8 of the July, 2007 SCCO, which is intended to protect habitat within important fisheries watersheds. The constraints applied in

the analysis are described in the analysis report. Having reviewed the associated methodology with MFR district, regional and branch staff, I am satisfied that the base case forecast adequately reflects management practices under Objective 8 for important fisheries watersheds, with the following qualification.

In the March, 2009 Ministerial Order, the 2007 Schedule 2 for this objective was replaced by Schedule 3, which includes several additional watersheds—in the Allison, Huaskin, Belize, Ahta and Lull-Sallie landscape units. For the current determination, the base case remains reliable in that the best currently available information has been modelled, and when the data associated with the additional watersheds has been compiled, this can be incorporated in the next timber supply analysis for the TSA in support of the next AAC determination.

- *EBM objectives for high value fish habitat*

Accounting for Objective 9 of the July, 2007 SCCO, which is intended to protect high value fish habitat (HVFH), resulted in the exclusion of 7052 hectares from the THLB (or about one percent of the THLB) derived in base case forecast.

The 2005 mapping used to identify HVFH for the analysis constituted the best available information at the time; however, licensees and MFR staff now consider the accounting in the analysis overestimates the constraint on timber supply, for the following reasons:

First, the 2005 mapping (1:50 000) classified as HVFH all scale fish-bearing streams with gradients less than 20 percent and under 900 metres in elevation, while the *Background and Intent* document for the SCCO and the Central and North Coast Order (CNCO) from April 2008 suggests that HVFH is associated with alluvial streams and their floodplains, which generally occur at lower gradients. The latter would constitute a smaller subset of the 2005 mapped HVFH, which may include both alluvial and non-alluvial streams. In the Mid Coast TSA, licensees have proposed that a slope gradient of five percent or less is more reasonable than 20 percent for defining alluvial streams and that the 2005 HVFH may overestimate the number of HVFH streams.

Second, the current legal order, established in March 2009, limits the application of Objective 9 for portions of the Allison Landscape Unit within the Kingcome TSA to critical spawning and rearing channels for anadromous species only, if an adaptive management plan is developed.

However, potentially off-setting the overestimation of HVFH are two other considerations. First, it is likely that not all of the smaller fish-bearing streams were identified in the 2005 HVFH mapping which was based on 1:50 000 base mapping. Secondly, Objective 13 of the SCCO, which requires 90 percent retention of the functional riparian forest on active fluvial plains, was assumed to be met in the base case forecast by excluding the areas associated with active floodplains.

Interfor suggested that the buffer applied for HVFH should not be a uniform 80 metres (two tree lengths) on all shoreline, as was assumed in the analysis since in many situations it will be zero because not all ocean shoreline is classified as marine interface zone. Marine interface zones are "...shallow inter-tidal areas, kelp beds, herring spawn areas and other near-shore habitats..." which are critical to spawning and rearing. Further, Interfor noted that the areas excluded to address HVFH must apply only to low-bench, active floodplains, not to medium-bench floodplains. From these considerations and from its own field work and

analysis, Interfor believes that the overall land base exclusion of 7052 hectares should be reduced by 80-to-90 percent.

Having considered and discussed all of this information with MFR district, regional and branch staff, and having received a presentation by Interfor on these issues, I accept that the HVFH assumptions used in the base case forecast resulted in an underestimation in the initial harvest level. If only those streams with gradients associated with alluvial streams (which correlate with the occurrence of HVFH) were buffered, the constraint attributable to this factor would be reduced. However, without further study using GIS, which is impracticable for this determination, it is difficult to determine exact figures.

In consultation with an MFR timber supply analyst, I have concluded that it is not reasonable to assume that the entire 7052 hectares can be included in the THLB. In view of the information before me, I do conclude that the buffering for HVFH has been overestimated by about 50 percent. This represents an underestimation of about 0.5 percent in the initial harvest level in the base case forecast, and I have accounted for this in my determination as discussed in '**Reasons for Decision**'.

In view of the high uncertainty in this factor, I have issued an instruction below, in '**Implementation**' for definitive information to be obtained and incorporated in the next timber supply analysis on the required buffering and the net land base exclusion necessary to meet objectives for HVFH.

- EBM objectives for aquatic habitat that is not high value fish habitat

Accounting for Objective 10 of the July, 2007 SCCO, which is intended to protect aquatic habitat that is not HVFH, resulted in the exclusion of 1462 hectares from the THLB. Having reviewed the associated methodology with MFR district, region and branch staff, I am satisfied that the base case adequately reflects management practices under this objective.

I note that in public input, Interfor noted in March 2008 that under the Minister's Order, operators may use FRPA riparian management regimes instead of the direction under Objective 10, section 1, and that since most if not all operators would be harvesting under a forest stewardship plan (FSP), it would be appropriate to model the FRPA regimes. However, the provision in the Order allows management to FRPA standards only when specified conditions are met, which include the establishment of an adaptive management plan. So far, only one licensee in the TSA has chosen to apply this provision. I am therefore satisfied that the base case forecast adequately accounts for the Minister's Order's objective for this aquatic habitat.

- EBM objectives for forested swamps

As detailed in the analysis report, in the base case timber supply forecast an accounting was included for Objective 11 of the July, 2007 SCCO, which is intended to protect forested swamps. I have reviewed with MFR district, regional and branch staff the associated methodology, which resulted in the exclusion of 209 hectares for this objective, and I am satisfied that the base case forecast adequately reflects management practices under Objective 11 for forested swamps. The March 2009 revised legal order included minor changes to clarify Objective 11, but these do not significantly affect the adequacy of the modelling in the base case forecast, which was based on the best available information.

- EBM objectives for upland streams

As detailed in the analysis report, in the base case timber supply forecast an accounting was included for Objective 12 of the July, 2007 SCCO, which is for the maintenance of riparian forests associated with upland streams. I have reviewed with district, regional and branch staff of MFR the associated methodology, which permitted a maximum of 24 percent of the upland forest area to be below a green-up height of six metres, which was considered equivalent to a 30-percent Effective Clearcut Area constraint, applied to a zone affecting 137 859 hectares of productive forest, including 31 638 hectares of the THLB in the Kingcome TSA.

The 2007 Schedule 2 for this objective was replaced by Schedule 3 in the legal order established in March 2009. Schedule 3 includes several watersheds in the Allison, Huaskin, Belize, Ahta and Lull-Sallie landscape units that were not included in the 2007 Schedule 2. In the base case, no constraint was applied to these additional fisheries-sensitive watersheds, but the net impact of the discrepancy is considered by MFR staff to be minimal, since the upland stream retention target can often be met in non-contributing forests. From my review I am satisfied that Objective 12 of the Minister's Order is adequately accounted for in the base case forecast.

- EBM objectives for active fluvial units

In the base case timber supply forecast, Objective 13 of the July, 2007 SCCO, which directs that 90 percent of the functional riparian forest on active fluvial units be retained, was assumed to be met by the exclusion applied in respect of Objective 9 of the Minister's Order, for HVFH, which is applied to an area that includes the active low and medium bench floodplains to which Objective 13 is intended to apply. This methodology was questioned in public input by Kruger Products Limited, but from my review I am satisfied that the area excluded as HVFH under Objective 9 did indeed include the active low- and medium-bench floodplains intended to be captured under Objective 13, and that the base case forecast has therefore adequately accounted for this retention requirement.

- First Nations' cultural heritage resources and traditional uses

The setting aside of areas for harvesting to protect First Nations' cultural heritage resources was accounted for by excluding area from the THLB prior to generating the base case. To determine the overall area that should be reserved from harvesting, traditional use and archaeological areas were delineated as either buffered points or polygons. In this way, a total of 4099 hectares of productive forest were identified and 1476 hectares of the THLB were identified. Since First Nations had requested that the information on archaeological sites remain confidential, the area of the THLB associated with identified archaeological areas was removed from the THLB as an aspatial exclusion factor of 0.63 percent applied to all harvestable polygons.

Additional requirements for First Nations' traditional uses associated with the July, 2007 SCCO are described next, in '*EBM Objectives for First Nations*'.

With regards to areas of the TSA on Vancouver Island that are not subject to EBM requirements, the Nuu-chah-nulth Tribal Council, representing the Mowachaht-Muchalaht First Nation, has expressed a desire to continue to access an area of reverted Timber Licences in the TSA for the continued practice of aboriginal interests, including hunting, fishing, cultural activities and gathering (e.g. cedar bark stripping). MFR staff assured me that access to the area for bark stripping and all other activities identified by the Nuu-chah-nulth Tribal

Council on behalf of the Mowachat-Muchalaht First Nation, can be accommodated within current operational practices.

The Mowachat-Muchalaht also indicated that the MFR cannot dispute that their people may have lived in the inland areas of their asserted traditional territory, including those portions that overlap the Kingcome TSA, due to a lack of evidence of such occupation. They indicated that such evidence is lacking because these areas have not yet been recorded or surveyed and asked that the MFR provide funding for cultural studies. While the issue of funding for cultural studies is beyond the scope of my authority under Section 8 of the *Forest Act*, I recognize the importance of gathering and maintaining traditional use/cultural information and; therefore, in keeping with my guiding principles, I will forward this concern for consideration by the appropriate decision makers.

In the analysis, it was assumed that each First Nation would require about 250 cubic metres per year for cultural and domestic use. The First Nations forestry advisors, who were part of the timber supply analysis technical committee, considered this to be a reasonable assumption for the purposes of timber supply analysis. District staff indicate that there has been sufficient volume available from the Forest Service Reserve to meet all First Nations' requests for Free Use Permits. However, they note that there have been changes in their Free Use Permit Policy in response to recent Court decisions that broadened the definitions of cultural and domestic use and disallowed maximum volume limits for personal and domestic use, including housing. Staff anticipate that these changes may result in increased volume requests under Free Use Permits. They indicate that every attempt will be made to provide the requested wood volume from outside of the THLB; that is from conservancies, BTMAs, etc. If these sources are insufficient, district staff will request an increase apportionment to the Forest Service Reserve.

I am satisfied from my review that the best available information was incorporated in the base case forecast, which adequately reflects current performance, and that the methodology permitted this to be done while preserving the confidentiality of the information. With regards to First Nations' volume requirements for cultural and domestic use, I note that the volume assumptions used for the base case were deemed to be adequate by First Nations' forestry technical advisors. I also note that district staff have been able to meet all requests for Free Use Permits received from First Nations and have plans in place to provide additional volume, if required. Therefore, for the purposes of this determination, I accept the assumption used in the base case. In the event that there are significant changes in the volumes required for First Nations', this information can be considered at the time of the next determination.

- EBM objectives for First Nations

Part 2 of the July, 2007 SCCO includes five sections with objectives for First Nations' forest resources and features, including: traditional forest resources; traditional heritage features; culturally modified trees (CMT); monumental cedar; and the stand-level retention of cedar. In the base case analysis, these objectives were accounted for through land base reductions in the EBM zone, incremental to the basic exclusions for First Nations Cultural Resources, considered in the previous section. I have reviewed the associated procedures and I note the following.

After consultation with First Nations forestry advisors, the licensee group assumed that land base reductions associated with traditional forest resources, traditional heritage features and

CMTs would be reasonably accounted for by applying an aspatial exclusion factor of 0.63 percent to all stands in the EBM zone, incremental to that noted earlier as applied for cultural heritage resources.

No specific accounting was made for maintaining monumental cedar, or for the stand-level retention of cedar; the licensee group assumed that land base reductions for conservancies, biodiversity areas and specific EBM features would meet the demands for cultural uses. Constraints applied for stand-level biodiversity objectives, including WTPs and variable retention, were assumed to contribute to the stand-level retention of cedar.

In the Kingcome TSA, First Nations may access timber free of stumpage for cultural and traditional uses, with the expectation that the volume required for traditional use will be charged to the AAC apportioned to Forest Service Reserve. The forecast volumes supporting the base case projection have not been reduced on this account.

A representative of the Kwicksutaineuk-Ah-Kwaw-Ah-Mish First Nation expressed concern that confidential data might appear in public forums related to the timber supply review. MFR staff assure me that no site-specific information on First Nations features was compromised during the timber supply review process.

From my review of the matters addressed in this section and from discussions with MFR staff I am assured that this and other emerging point-feature areas requiring particular consideration can be accommodated within operational flexibility at this time, and I am satisfied that the base case includes an appropriate accounting for EBM-related objectives for resources and features for First Nations' cultural use.

- *stand-level biodiversity*

In the timber supply analysis, differing assumptions were applied for EBM and non-EBM zones to reflect the differing requirements for managing stand-level biodiversity under the respective land use plans. In each case, my consideration of the modelling of the required retention has been made in conjunction with my assessment of the retention levels applied under the silvicultural systems in current practice in the TSA, as discussed earlier, under '*silvicultural systems*'.

For non-EBM areas, where biodiversity planning is guided by the FRPA and focuses on the retention of old-growth forest and the retention of stand structure through wildlife tree retention (WTR), the specific WTR targets from the seven landscape units with completed plans were applied, resulting in a weighted average of 5.9 percent retention. For landscape units without completed plans, a generalized six percent WTR was applied—in all cases as aspatial reductions to the harvest area. These procedures are consistent with the non-spatial Old-Growth Order.

For EBM areas, Objective 16 of the July, 2007 SCCO directs that stand-level retention be maintained at or above 15 percent. The levels actually applied in the base case for EBM zones amounted to an effective six percent in the general EBM zone covering 78 percent of the THLB and 40 percent in the 'High Retention' zone covering three percent of the THLB, as noted earlier in '*silvicultural systems*'. For the reasons discussed in the '*silvicultural systems*' section, I have concluded that the levels of retention applied in the base case analysis are not sufficient to achieve consistency with the requirements of Objective 16, which requires a *minimum* of 15 percent retention.

I further concluded that the implications of meeting EBM requirements would be modelled more appropriately by applying the assumptions used in a ‘high-retention’ sensitivity analysis. In this I note that these implications involve accounting both for the fact that cutblocks less than 15 hectares in size do not require dispersed, in-block retention, and for the impacts of retention—for instance from shading—on the growth of managed stands.

I ended my considerations in ‘*silvicultural systems*’ by concluding that, after accounting for the possibility of co-locating retained cover to meet overlapping objectives, the initial harvest level in the base case forecast is overestimated, in respect of meeting EBM stand-level retention objectives, by six percent in the short term, which I have discussed further in conjunction with other factors, in ‘**Reasons for Decision**’. This one conclusion serves to resolve my findings both in respect of silvicultural systems, and of stand-level biodiversity considerations.

- landscape-level biodiversity and old-forest retention

As described in the timber supply analysis report, management for landscape-level biodiversity in the non-EBM zone was accounted for by land base exclusions for established Old Growth Management Areas (OGMAs) within completed Landscape Unit Plans, and by the application of non-spatial cover constraints for old-growth forest in other landscape units. The modelling also included a simulation of natural rates of disturbance in the non-THLB land base. For EBM areas, as also detailed in the analysis report and the data package, Objectives under Section 14 of the July, 2007 SCCO were accounted for in the base case; this is intended to ensure that, for each ecosystem surrogate in each landscape unit, specified amounts of old forest are retained, and the amount of forest in the mid-seral stage (40 to 80 years) remains at less than 50 percent.

As noted in the analysis report, due to model limitations, no mid-seral constraint was applied in the base case. However, MFR staff have determined that, overall, the 50-percent requirement was met throughout the forecast period across all zones although, in some individual zones, the requirement was temporarily exceeded, with the net excess area temporarily amounting to a maximum of just over 6000 hectares after five decades. It is not known whether dispersal of the harvest in the model could have permitted the base case forecast to be achieved throughout, as projected, while applying this requirement, and consequently in my determination I have made no adjustment in this respect.

In the March, 2009 SCCO, the old-seral objective was modified to become generally more constraining, including defining ‘old’ as 250 years rather than 180 years. While the associated changes could not be modelled in the January, 2009 base case, an independent analysis supporting the Coast Land Use Decision (CLUD) indicates that the revised objectives would generally reduce the projected timber supply in the whole southern plan area by very roughly three percent in the next decade from that projected on the basis of the 2007 Order, and by four percent in the long term.

In public input, in a letter of March 5, 2008, from Forest Ethics, Greenpeace, and Sierra Club BC recommended that in the transition to full implementation of EBM by March 31st, 2009, the AAC should be set at a level that does not compromise options for full implementation of EBM as in the EBM Planning Handbook, which includes maintaining options for achieving the regional old-growth representation target of 70 percent of the natural distribution of old forest by ecosystem type. In response, the amended 2009 SCCO, which provides the most recent direction on EBM implementation, incurs an additional constraint on

timber supply from that modelled in the base case, and my accounting for that additional constraint, noted below, addresses this concern.

Interfor stated that the use of ecosystem surrogates in timber supply analysis does not provide adequate correlation with actual ecosystems, and moreover introduces ‘BEC variant administrative rarity’ which inordinately constrains the availability of old forest types. Interfor recommends that to correct this, Terrestrial Ecosystem Mapping (TEM) is necessary to represent the implementation of EBM. In response, I note that TEM is not currently available for the whole TSA, and that the Order specifies that where TEM is unavailable, the surrogates should be used, as was done.

In conclusion, I acknowledge that there is some uncertainty in respect of the mid-seral representation; however, based on my review of the methodology and information provided, I am satisfied that the 2007 SCCO was adequately modelled in the base case forecast. However, it appears that the default objectives in the 2009 SCCO, which were not modelled, will further constrain the short-term timber supply projected in the base case by about two percent. I have accounted for this in my determination, as discussed further in ‘**Reasons for Decision**’.

To resolve any uncertainty introduced by the use of site-series-based ecosystem surrogates, in ‘**Implementation**’ below I have instructed licensees and MFR staff to co-operate to complete TEM mapping for the remainder of the TSA, as also noted earlier in respect of ‘*aggregation procedures*’.

- EBM objectives for red- and blue-listed plant communities

As detailed in the analysis report, in the base case timber supply forecast an accounting was included for Objectives under Section 15 of the July, 2007 SCCO, which is intended to protect red-listed and blue-listed plant communities. On this account, in the analysis, from an identified affected area of 50 848 hectares of productive Crown forest land, 6077 hectares were excluded in deriving the THLB. I have reviewed the methodology for accounting for these areas in the analysis, and I am satisfied with their representation, with the following observation and qualification.

The March, 2009 SCCO made no materially significant change to Objectives under Section 15. However, in public input, Interfor submitted that, based on the mapped abundance of some of the blue-listed ecosystems identified under these objectives, they cannot be rare, threatened or endangered. Interfor submits that the magnitude of the area constrained for these objectives is excessive, and that this should be considered in the AAC determination process. In response, I note that Interfor’s concern is with the mapping of the affected areas rather than with the modelling of the mapped areas in the timber supply analysis. I have consulted on this with an MOE staff ecologist, and with MFR staff, and have concluded that without further study and information it is not possible or appropriate for me to assess the validity of, or account differently for, the identification of red- and blue-listed communities, the initial listing of which was provided by the provincial Conservation Data Centre, and the current listing of which results from negotiation between all interested parties in the CLUD process.

My conclusions, therefore, are that the assumptions applied in the base case on this account are consistent with the SCCO and that the best available information was applied in the analysis. I note that without the TEM information, which I have instructed to be completed

for the TSA, a high degree of uncertainty will remain in predictions of the occurrence of red- and blue-listed plant communities.

- EBM objectives for grizzly bear habitat

As detailed in the analysis report, in the base case timber supply forecast an accounting was made for Objectives under Section 17 of the July, 2007 SCCO, which is intended to protect sensitive grizzly bear habitat. Of the affected area of 14 511 hectares of productive Crown forest land in the TSA, 3124 hectares were 100-percent excluded in deriving the THLB.

The current legal order was amended in March, 2009 and provides additional flexibility for harvesting of up to five percent of each habitat polygon to accommodate minor changes in cutblock boundaries, provided that the disturbance does not cause a material, adverse impact. Changes made in March 2009 to the mapped sensitive grizzly bear habitat added one small area including approximately 50 hectares of the THLB.

In public input, Interfor submitted that the 100-percent exclusion was inappropriate, because Objective 17(2), as well as the guidance document, provide for flexibility to harvest in or alter grizzly bear habitat if a qualified professional confirms that the habitat will remain suitable. In response, having discussed this matter with an MOE ecologist, it is clear to me that the intent of the guidance for the Objective is not, on the one hand, to permit significant levels of disruptive harvesting in this sensitive habitat, nor on the other hand to prevent access to and tie up an entire drainage from harvesting by protecting 100-percent of a critically located habitat area. Clearly in such a case one intent of the five percent allowance is to permit a small amount of harvesting in a less sensitive portion of the habitat, to facilitate access to harvesting in upstream areas beyond the habitat.

Additionally, I am advised that not all of the sensitive habitat has been mapped to the same degree of accuracy or reliability, and further study may well show that some areas within the identified habitat are less sensitive than others. However, since the majority of the sensitive grizzly bear habitat area is not forested, and the total extent of this habitat covers less than five percent of the THLB, any additional harvesting that may prove to be appropriate within this habitat is not likely to be significantly influential in increasing the overall timber supply, and I have made no adjustment to the base case projection 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

- Vancouver Island Land Use Plan

The 2000 Vancouver Island Land Use Plan Higher Level Plan Order (VILUP HLP), which established management objectives for a number of Special Management Zones (SMZ), General Management Zones (GMZ) and Enhanced Forestry Zones (EFZ) on Vancouver Island, is now fully implemented in the Kingcome TSA and was accounted for in the 2009 timber supply analysis as described in the analysis report. I have reviewed the forest cover requirements and other constraints applied in respect of the SMZs and EFZs and I am satisfied that the base case projection adequately accounts for current management practices in the various zones.

- Ecosystem Based Management

The majority of the Kingcome TSA, lying on the mainland, as well as the islands between the mainland and Vancouver Island, is subject to the provincial government's Coast Land Use Decision (CLUD) of February 7, 2006, and to subsequent Ministerial Orders of July 2007 and amended March 2009, all of which include objectives for EBM.

The modelling of specific EBM objectives in the 2009 timber supply analysis is discussed in earlier sections of this rationale document. The analysis also included an accounting of the overall implications of EBM for timber supply in the TSA, showing that before implementation of EBM, the initial, mid-term and long-term harvest levels were respectively 19 percent, 12 percent and 18 percent higher than in the base case forecast.

A sensitivity analysis was performed to assess the implications of separating the component of the harvest in the TSA that is subject to management under VILUP, on Vancouver Island, from that which is subject to EBM, in the rest of the TSA. This analysis reflected a 'partitioned' approach in modelling the unique, distinct, management rules and zones that apply to the respective areas of the TSA, as well as the physical separation of the two areas. The results showed that by partitioning the harvest to the EBM and non-EBM regions of the TSA, the reduced degree of flexibility in locating the harvest in the short term reduced the initial harvest level by nine percent from that projected in the base case. In this model run, the necessity of reducing short-term timber supply led to more availability in later decades, such that timber supply levels increased in the mid term by five percent. Over the 250-year forecast, timber supply was changed by less than one percent.

The actual volumes harvested from 2000 to 2007 within the EBM and non-EBM zones (without the partition) were approximately 78 percent from the mainland, and 22 percent from Vancouver Island, while the analysis showed that in the first projected period of the sensitivity analysis (with the partition) these respective proportions were approximately 85 percent from the mainland and 15 percent from Vancouver Island. These figures correlate roughly with the proportions of the THLB located within the EBM zone, about 82 percent, and within the non-EBM zone, about 18 percent.

In January 2008, representatives of the Quatsino First Nation and the Kwakiutl First Nation expressed concern that implementing EBM on the mainland could increase harvesting in asserted traditional territories on Vancouver Island. The Gwa'sala-'Nakwaxda'xw First Nation wondered if the AAC could be set by supply block, and expressed concern regarding the practical application of EBM. Due to these concerns, the earlier noted sensitivity analysis was included in the timber supply analysis, exploring the implications of regulating the harvest from the EBM and non-EBM zones.

In March, 2009, the Quatsino First Nation stated its position that the AAC should be partitioned between Vancouver Island and the mainland, to regulate the annual harvest from EBM and non-EBM zones, since licensees with licences on both Vancouver Island and the mainland could shift the bulk of their harvest to the lower-cost Vancouver Island region in the short-term, in response to the implementation of EBM. They confirmed their position with me personally at a meeting at the MFR District Office on June 1, 2009.

In public input at the data package stage, ForestEthics, Greenpeace, and Sierra Club BC raised eight points of concern related to incorporating the implementation of EBM in the AAC determination process. I believe these concerns have been appropriately addressed both in the

assumptions and modelling procedures in the timber supply analysis, and in my documented consideration of specific EBM objectives and related matters in this rationale.

I have considered all of this information and I have concluded as follows. First, the modelling of EBM for the appropriate zones in the timber supply analysis provides a far more realistic representation of the implications for timber supply of implementing EBM in the TSA than does the analysis which accounted only for management prior to EBM (see also '*alternative harvest flows*'). The significant reductions in overall projected harvest levels confirm the generally more constraining effect of managing to meet the noted EBM objectives.

Second, the concern expressed by First Nations, that the difficulties of implementing EBM might lead to intensified harvesting on Vancouver Island, identifies a risk I have already discussed with MFR staff. One way to manage this risk is to establish the suggested 'partition' specifying separate harvest levels for EBM and non-EBM zones. As noted, analysis shows that the consequent, reduced operational flexibility would reduce the overall initial timber supply for the TSA by nine percent. The Quatsino First Nation has indicated also that it is a forestry-based community and that the AAC should reflect this. Accordingly, if the risk of a 'waterbed' harvest displacement could be mitigated without incurring the additional constraint associated with a partition, to my mind this would be preferable. On examination I believe such an outcome can be satisfactorily achieved as follows.

In the Kingcome TSA, BC Timber Sales (BCTS), Interfor and WFP are the only licensees with current TSA administrative areas both on Vancouver Island and on the mainland. Given the size of their respective operations in the TSA, and their prior harvesting histories on Vancouver Island, the ability of either licensee to focus the bulk of its operations on Vancouver Island is limited. Moreover, as participants in the Coast Forest Conservation Initiative, both BCTS and Interfor have been active in the voluntary implementation of EBM since 2006, and to date, the implementation of EBM does not appear to have concentrated additional harvesting activity on Vancouver Island. The MFR district manager has discretion over the approval of cutting permits for all licensees in the TSA; with the necessary monitoring he can ensure an appropriate distribution of harvest activity between the EBM and non-EBM zones in the TSA. Given the implications for coastal forestry operations of current global economic conditions, it would be best in any case to ensure that forestry activity is spread as evenly as possible among the various communities within the TSA, and therefore efforts should be made to continue monitoring the distribution of harvesting.

On this basis, I have decided that with ongoing co-operation between licensees and MFR staff, any risk of transferring intensified harvesting to Vancouver Island can be avoided by (a) the continuation of recent, responsible levels of licensee performance in accessing in a representative way the areas that contribute from both the EBM and non-EBM zones, without concentrating harvesting in one area or the other, and (b) careful monitoring to ensure that no trend toward over-harvesting becomes evident for either zone. I have therefore issued an instruction below, in '**Implementation**', that MFR district staff maintain ongoing monitoring of the distribution of the harvest in the TSA between the EBM zone and Vancouver Island. The results of this monitoring should be communicated periodically to the concerned First Nations. If a problem develops, I will reconsider the establishment of a partition between the EBM and non-EBM areas.

- *deciduous harvest levels*

The current AAC includes a partition of 20 340 cubic metres for harvesting in deciduous forest stands. The 2009 timber supply analysis projected that under EBM, the deciduous volumes available consist of 6403 cubic metres per year of alder for the first decade, followed by a decline to 2051 cubic metres per year in the second decade, rising to over 12 000 cubic metres per year in the third, fourth and fifth decades, with no cottonwood volume available throughout this time. The current THLB reflects a significant increase in the available alder land base, from 1078 hectares to 4726 hectares since the 2001 timber supply analysis, and a recent GIS query by district staff supports these figures.

In public input, Weyerhaeuser Company Limited submitted in March, 2009 that to maintain the best management and utilization of hardwoods, the AAC should include a partition for hardwoods, suggested to consist of 20 000 cubic metres for alder and 5000 cubic metres for cottonwood.

In response, I note that although the pre-EBM analysis for the TSA indicated the availability of 5000 cubic metres per year of cottonwood, the EBM analysis identifies no availability of cottonwood, and recent direction from the MFR Coast Region and from the Integrated Land Management Bureau indicates that all future tenures in the TSA will be required to meet the land-use orders in effect. This effectively rules out the possibility of any future licence for harvesting cottonwood within the portion of the TSA subject to the SCCO.

I also note that a much higher availability of deciduous volumes in the pre-EBM analysis was predicated on some assumptions that are now unfounded, including (a) a new alder inventory from which many deciduous-leading stands located within sensitive riparian and floodplain areas—that are now protected under the SCCO—were assumed to be 100-percent available; (b) the assumption that new deciduous licences would continue to be exempt from EBM, which is now not the case; and (c) the assumption that deciduous-leading stands would remain as such throughout the rotational planning horizon, when in fact recent and current practice has included conversion of deciduous to coniferous stands.

District staff inform me that there is currently a non-replaceable forest licence for about 14 000 cubic metres per year which is exempt from EBM requirements. This licence does not expire until 2017. However, in the analysis this licence was not exempted from the EBM constraints used in the base case resulting in an underestimation in the initial deciduous volume. On this basis, district staff recommend that a deciduous partition of 14 000 cubic metres per year, which is sufficient to meet current licence requirements, be established during this determination.

My conclusion on this factor is as follows. The 2009 analysis indicates availability for harvest for ten years of 6043 cubic metres per year of alder-leading stands. Based on the existing exemption from EBM of one remaining licence, I consider it appropriate and socio-economically advantageous to supplement the 6043 cubic metres by an additional 7597 cubic metres to meet the existing licence requirement of 14 000 cubic metres per year, for the duration of this AAC. In my determination therefore, I have accounted for an underestimation, in the base case projection, of 7597 cubic metres of deciduous-leading stands, or roughly 0.6 percent of the initial harvest level, as noted in '**Reasons for Decision**'.

- harvest flow for second-growth stands

In the base case projection the rate of harvesting in second-growth stands was limited initially to 277 000 cubic metres annually to reflect the current age class structure in the TSA. Over the next 40 years this initial rate was constrained to step down by 10 percent per decade in conjunction with the total harvest. Sensitivity analyses evaluated the effects of (a) further limiting and (b) not limiting at all, the second-growth contribution. In (a) with the contribution limited to 150 000 cubic metres annually for the first 50 years, the total initial harvest level in the TSA declined by five percent, indicating the initial dependence of the base case forecast on an appropriate level of harvesting in second-growth stands. In (b) with no limit applied, the maximized second-growth contribution was 39 percent higher than in the base case over the first 50 years, but the contribution thereafter became sporadic and the overall achievable mid-term level declined by five percent. The moderated flow incorporated in the base case is clearly preferable to either of these outcomes.

District policy for current second-growth practice originates from the September, 2005 'Kingcome TSA Interim Second Growth Harvest Agreement' between the district, BCTS and TSA licensees. According to this agreement each holder of a replaceable forest licence was entitled to a percentage, based on its AAC, of a second-growth harvest set at 235 000 cubic metres per year for an interim period until this current determination. A review by district staff found reasonable levels of associated harvest performance by some, but not all, licensees, with the number of cutting permits for second growth being market driven and highly variable, and the set annual volume of 235 000 cubic metres not always being harvested.

In public input, Interfor submitted that a significant volume of second growth, consistent with the company's operational expectations and performance, can be harvested without impacting future harvest volume. Furthermore, since the transition to second-growth harvesting has already begun in the TSA, a substantial volume must remain available to maintain and encourage investment in harvesting and processing infrastructure for second-growth stands. Interfor also noted that changes to the assumptions for OAFs, road widths and good and medium hemlock sites could mitigate the projected decrease in mid-term harvest levels.

I agree that the harvesting of second growth is important because analysis shows that without its adequate contribution in the short term, the overall initial harvest level in the base case forecast cannot be achieved. However, I am advised that Interfor's performance in second-growth stands has been somewhat variable and I cannot rely on the availability of additional volume due to adjusted assumptions until these are verified in the field. Performance by other licensees in second growth is generally less reliable.

The Tsawataineuk First Nation submitted that assuming that naturally regenerated second-growth hemlock-balsam stands will be harvested, particularly by helicopter, is unrealistic due to the number of other opportunities in the world for low-grade fibre. Whether—and if so, to what degree—this assertion will prove true are currently unknown, but the questions contribute to the general uncertainty in the level of performance that may reasonably be expected.

From all of this information I conclude as follows. In the base case, the initial second-growth harvest level of 277 000 cubic metres per year is 42 000 cubic metres more than the 235 000 cubic metres per year currently available in the district but which has not been consistently harvested in recent years. Without an adequate contribution by second growth,

the base case initial harvest level must be reduced in proportion to the shortfall in the projected second-growth harvest. Moreover, from the sensitivity analyses it is clear that the required level of second-growth harvest must be neither too low to meet the base case initial harvest level, nor so high as to cause mid-term shortfalls. In view of the uncertainty present, district staff and licensees should work collaboratively to establish appropriate target levels for future second-growth harvesting that avoid both of these undesirable outcomes. Until the first such level is established and accounted for in the next AAC determination, I accept the existing level of 235 000 cubic metres per year as a suitable interim target, performance in which should be verified by ongoing monitoring. I have issued an instruction to this effect in **'Implementation'**, below.

- actual harvest performance

A review by district staff has shown that the assessment in the 2008 *Kingcome Socio-Economic Assessment Report*, that the actual harvest in the TSA had averaged 80 percent of the AAC over the most recent eight years, was based on incomplete data. From two subsequently completed analyses, district staff now report that, overall, the actual harvest over the period has been about 92 percent of the apportioned volume. Staff estimate the net undercut volume accruing between 2000 and 2007 at 796 848 cubic metres, and that between 1997 and 2001 at 715 754 cubic metres. I am advised that part of this volume has since been awarded as undercut licences. As in other TSAs with similar undercut situations, for instance in the Strathcona TSA, care must be taken to ensure that these timber volumes are not performing 'double-duty', that is, that they are not assumed from inventory information to be available to support the timber supply as currently projected in the base case forecast when in fact they may already have been identified by another statutory decision maker as available for harvest.

- First Nations consultation process

The Crown maintains a duty to consult with, and accommodate if necessary, those First Nations for whom it has knowledge of the potential existence of aboriginal interests that may be impacted by a proposed decision, including strategic-level decisions such as AAC determinations. As chief forester of British Columbia I must therefore consider information arising from the consultation process with First Nations respecting aboriginal interests and treaty rights that may be affected by my AAC determination. As well, I will consider relevant internal information available to the ministry regarding aboriginal interests.

Nineteen First Nations have asserted traditional territories overlapping the TSA, on Vancouver Island, Malcolm Island and the islands to the east of Malcolm Island and on the mainland: Gwa'sala-'Nakwaxda'xw; Gwawaenuk Tribe; Kwicksutaineuk-Ah'Kwaw'Ah'Mish; Tsawataineuk; Campbell River; Cape Mudge; Da'naxda'xw-Awaetlala; Kwakiutl; Mamalilikulla-Qwe'Qwa'Sot'Em; 'Namgis; Quatsino; Tlatlasikwala; Tlowitsis Tribe; Ulkatcho; Homalco; Ka:'yu:k't'h/Che:k:tes7et'h'; Mowachaht-Muchalaht; Nuxalk; and Wuikinuxv. First Nations populations make up almost one-quarter of the population of the TSA, with most of the First Nations people now residing on Vancouver Island. The larger First Nations settlements include Fort Rupert, the Tsulquate reserve, Quatsino, and Alert Bay.

The Laich-Kwil-Tach Treaty Society was engaged in the TSR process as the representative for the Campbell River and Cape Mudge First Nations, and the Nuu-chah-nulth Tribal Council was engaged as the representative of the Mowachaht-Muchalaht First Nation. The Kwakiutl First Nation signed a Douglas Treaty in 1851, which affords them treaty rights to

hunt over unoccupied lands and to carry out fisheries as formerly. All but two of the noted First Nations hold forestry agreements with the MFR. The Ka:'yu:k't'h/Che:k:tl'es7et'h', one of the Maa-nulth First Nations, is at Stage 5 in the BC Treaty process, with a ratified final agreement, and many of the other First Nations are at Stage 4 and negotiating an Agreement-In-Principle in the BC treaty process.

The consultation and information sharing related to the current timber supply review process for the Kingcome TSA began in April 2006 with a letter notifying First Nations with asserted traditional territories overlapping the TSA ("affected" First Nations) of the process start-up and inviting their attendance at a timber supply review information meeting. The affected First Nations were also invited to participate in the technical working group. The role of participants in this group was to advise and to provide valuable input into the modelling from a First Nations perspective to ensure adequate First Nations considerations were included. The Forestry Advisors from the Gwa'sala-'Nakwaxda'xw First Nation and the Kwicksutaineuk-Ah'Kwaw'Ah'Mish First Nation were full-time participants in the working group and the forestry coordinator from the Quatsino First Nation was an occasional participant.

Consultation was undertaken on the information package with all affected First Nations. The review and comment period for this component of the process was from December 31, 2007 to March 5, 2008. Letters requesting a meeting, and review and comment on the information package were sent out on January 7, 2008, and an information-sharing meeting was held with First Nations on January 31, 2008, to discuss the information package so First Nations would be better able to assess potential impacts on aboriginal interests or treaty rights.

Consultation on the analysis report was undertaken with all affected First Nations, beginning on February 5, 2009. Letters initiating consultation on the analysis report were sent out on January 23, 2009. An information-sharing meeting was held on February 5, 2009 in which the licensee group explained the analysis report in detail. A follow-up request for comments was sent to all affected First Nations on April 3, 2009. For each First Nation the response period for consultation was the standard 60-days identified in signed forestry agreements, whether or not an agreement was in place. Individual information-sharing meetings were held with the Quatsino First Nation on February 18, 2009, the Mamalilikulla-Qwe'Qwa'Sot'Em on March 23, 2009, and the Tsawataineuk on May 28, 2009.

On June 1, 2009 I met personally with representatives of the Quatsino First Nation in Port McNeill. I am committed to considering all responses received before the signing of this rationale document, and I have received and considered submissions from First Nations subsequent to my June 2 and 3, 2009, AAC determination meeting in Port McNeill.

I have reviewed assessments, by MFR district First Nations Liaison staff, of the strength of claim for specific First Nations, and assessments of their aboriginal rights, primarily the rights to hunt, fish and gather. Based upon this information, and on the information received during the TSR process, I am satisfied that the level of consultation employed was appropriate for all of the 19 First Nations.

I have also reviewed a documented summary of all of the information received through the First Nations consultation process. Formal written comments were received from the Quatsino, Gwa'sala-'Nakwaxda'xw, 'Namgis, Wuikinuxv, Laich-Kwil-Tach Treaty Society, Nuu-chah-nulth Tribal Council, Tsawataineuk First Nation and Kwakiutl First Nation. In this rationale statement I have included specific suggestions and comments that have been

influential in my considerations for this determination I have included them herein, in the appropriate section, together with a response indicating how I have addressed the issues raised.

My responses to other more general comments that are not specifically addressed in this way are as follows.

Questions were raised as to whether certain meetings constituted information sharing or consultation. In the most cooperative spirit I would suggest that information sharing by all sides is in itself an essential component of a successful consultation process. On the MFR's part, the publication and further explanation of the data package and analysis, directly or with assistance through approved delegation, are intended as aids to that end. The confidentiality of the information provided by First Nations for analytical purposes of course becomes an essential part of the process when requested.

Suggestions were received that 'sustainability' should be maintained on a 'per watershed' basis, rather than analysing the timber supply over the whole TSA. I have two responses. First, the sustainability of biodiversity at the stand- and landscape-levels is a standard feature required by the FRPA for all lands managed by the MFR in British Columbia. The management regimes under the land-use plans for the coast and Vancouver Island enhance sustainable management for biodiversity and other forest values. Second, in this context of legislated sustainability, applying a non-declining, even-flow harvest level to the entire TSA would require a significant initial reduction in harvest, as noted in '*alternative harvest flows*'; applying this principle to each separate watershed in a TSA has been shown in other analyses to constrain the timber supply to an even greater degree, considerably reducing the achievable social and economic advantages of the harvest. In addition, determining AACs for each watershed would implicitly require harvesting in all watersheds every year. Such a requirement would increase operational costs significantly and might in fact increase impacts on forest values by expanding the scope of operations.

The Tsawataineuk First Nation submitted that, due to an incomplete land use planning process, conservancy and bio-retention areas are under-represented in its asserted traditional territory. Furthermore, the First Nation asserts that as the THLB did not account for such areas, the harvest level attributed to its asserted territory is too high. District staff indicated that the Tsawataineuk have had some initial discussions with government regarding the establishment of additional conservancies and protected areas within their asserted traditional territory. However, for this determination only those conservancies or protected areas that were legally established at the time were accounted for in the analysis. For this determination I am satisfied that the legally established conservancies and protected areas were appropriately accounted for in the analysis. However, in the event additional conservancies and protected areas are established, I am prepared to revisit my determination prior to the legislated deadline and make any necessary adjustments to the AAC.

The Kwakiutl First Nation considers that the AAC recommended for the Kingcome TSA in the analysis report (the base case initial harvest level) is higher than the forests within its asserted traditional territories can accommodate, and that if set too high, the AAC determination could infringe treaty and title rights. My findings with respect to specific overestimations in the overall operational achievability of the initial harvest level in the base case forecast are addressed in my considerations in a number of sections in this document,

notably in ‘*economic operability*’, ‘*silvicultural systems*’ and ‘*stand-level biodiversity*’; they are further addressed in ‘**Reasons for Decision**’, and are reflected in my determination.

The Kwakiutl First Nation also submitted that the MFR has ‘failed to recognize, respect and accommodate our aboriginal title and rights, and has instead sought to rely on the Douglas Treaty as an extinguishment of our title and rights in relation to our traditional territory’. The Kwakiutl also indicated that inadequate resources prevented its full participation in the timber supply review process. I am aware that the Kwakiutl First Nation is a signatory to a Douglas Treaty and the Crown continues to consult them in regard to those Douglas Treaty rights of hunting over unoccupied land and carrying out their fisheries as formerly. District staff informed me that they provided a detailed response addressing the Kwakiutl First Nation’s concerns separately by letter.

From all of the foregoing in this section, I believe that the MFR has engaged in consultation at an appropriate level with affected First Nations, and that this consultation has been meaningful and adequate for the circumstances. I would like to thank the First Nations for a productive and mutually respectful exchange of information and ideas during this consultation process, and I reiterate that most of my considerations with respect to specific aboriginal interests relevant to my decision are discussed throughout this document in sections under the appropriate headings.

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

- *alternative harvest flows*

The 2009 base case projection for the Kingcome TSA incorporated a harvest flow designed to achieve an acceptable short-term harvest level consistent with other objectives for providing a managed, gradual transition from the short term to the mid- and stable long-term levels, avoiding large, abrupt disruptions in timber supply, as briefly described in ‘*base case for the Kingcome TSA*’ and detailed in the 2009 timber supply analysis report. In the chosen base case forecast, the projected mid-term level is 38 percent below the initial level. A number of alternative harvest flow forecasts were undertaken and are described in the analysis report, each of which was evaluated prior to establishing the base case.

In particular, in a ‘Pre-EBM’ analysis, the timber supply was reviewed based on the November 2001 analysis with current data sources and inventories, and land base removals for Conservancies, BMTAs, and the Central Coast Designated Area No. 2. This analysis did not address EBM as described in law and articulated in the SCCO, and as I have noted in ‘*Ecosystem Based Management*’, the actual base case, in which the modelling of EBM for the appropriate zones was included, is a more realistic projection of the timber supply.

I have reviewed all of the alternative harvest flow projections included in the analysis report, and for the valid reasons outlined in the report, I agree with the analysts’ conclusion that the ‘alternative harvest flow patterns do not provide significant benefit in the mid- or long-term, and in fact do not fully capture the productive capacity of the land base’.

In the base case, a portion of the annual harvest was required to be directed to second-growth stands, and in ‘*harvest flow for second-growth stands*’ I have considered sensitivity analyses representing alternate harvest flows for this component. I concluded there that the second-growth harvest flow as applied in the base case was the most desirable of those

presented, and noted that the second-growth harvest target must be met to achieve the overall harvest levels throughout the base case projection.

Other alternative harvest flows, represented in sensitivity analyses associated with differing assumptions about the financial viability of components of the land base, are also considered in ‘*economic operability*’, where I concluded on specific implications for the achievability of the initial harvest level in the base case projection, as discussed further in ‘**Reasons for Decision**’.

In public input, The Sierra Club, Forest Ethics and Greenpeace submitted that for long-term sustainability, the harvest flow rules should provide an even-flow over the long term, rather than the current scenario which increases short-term harvest ‘at the expense of the long-term harvest level’. In response I note that, for this TSA, analysis shows that implementing a non-declining, even-flow harvest projection actually *reduces* slightly, rather than increases, the long-term level, in a projection that also incurs an immediate reduction with a prohibitive socio-economic cost. The analysis report illustrates that this projection necessitates a starting level at just 799 500 cubic metres, 32 percent below the base case, in order to gain about 10 percent in the mid term and actually lose three percent in the achievable long-term level.

A June 4, 2009 letter from the Tsawataineuk First Nation submitted that a declining flow harvest volume is not in the interest of the band and the local communities, which require a consistent economic base. Again I refer to the analytical results described in the previous paragraph, noting that gaining a sustained constancy in the harvest level in the Kingcome TSA is achievable only at a much reduced level of immediate activity and is without long-term advantage.

The Sierra Club, Forest Ethics, and Greenpeace also requested that the AAC determination should reflect human well-being and socio-economic opportunities (forestry-related and other sectors) available to First Nations, local communities and the Province. They suggested that volume increases found through increased estimates of site indices should be applied to maximize the public good, including reducing the risk to non-timber values. These suggestions are consistent with the stewardship approach I have taken throughout this determination, and I note that, in the analysis, where timber volumes additional to those in the base case were identified in sensitivity analyses, these volumes were applied to the mid-term rather than the short-term level to minimize the overall socio-economic adjustment associated with the projected decline in the harvest flow over the next few decades.

To conclude, all of the analyses presented in the timber supply analysis report have been helpful in identifying the advantages and shortcomings of various harvest flows and, with the qualifications addressed in specific sections in this document, I am satisfied that the base case projection represents the most advantageous progression of harvest levels achievable in the Kingcome TSA at this time.

- community dependence on harvest level

Settlement in the TSA is sparse. Larger communities include Port Hardy, Port McNeill and Port Alice on Vancouver Island, with smaller island communities including Alert Bay and Sointula. The 2009 Socio-Economic Assessment report identifies the 2007 population of the Mount Waddington Regional District, as a proxy for the Kingcome TSA, at 12,300 persons, currently trending downward.

Please note: Table 3.1 of the *Kingcome Socio-Economic Assessment Report* contained errors and omissions; the corrected table, from which some of the following information is drawn, is included as Appendix 5 to this rationale.

From 2005 to 2007, the average total annual harvest in the TSA was 1 122 135 cubic metres, roughly 91 percent of the allowable harvest level, which supported about 314 person-years of direct employment and 202 person-years of indirect employment for people living in the TSA. Harvesting the entire AAC of 1 232 000 cubic metres would have realized an additional 51 person-years of employment.

In the base case, the initial harvest level is 4.6 percent lower than the current AAC, which was estimated to reduce employment by 26 person-years for residents of the TSA and 153 person-years for residents of BC, with further reductions in the second decade. However, in relation to the actual, currently reduced harvest condition, harvesting at the base case initial harvest level would result in an increase of 25 person-years locally, and 144 person-years provincially. Approximately 23 percent of the jobs directly related to the forest industry within the TSA are held by residents of the TSA, the remaining direct employment being located elsewhere, most probably on Vancouver Island and in the lower mainland. Only 7.5 percent of the total indirect employment generated for the province by the TSA occurs within the TSA.

The average harvest from the Kingcome TSA in recent years has generated an estimated 116 million dollars in annual wages, and annual government revenues of 72 million dollars. If the new AAC were to be set at the base case projection, and were harvested in full, wages and revenues would increase from these levels by an estimated 4.5 percent in the first decade, then decrease by 10 percent relative to decade one.

In my determination I have considered the need and the potential for the forest sector to continue to contribute to the well-being of people in the area and throughout the province, as discussed further in '**Reasons for Decision**'.

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

Economic and Social Objectives

- 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 here as Appendix 3.

The letter stresses the importance of a stable supply of timber 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 becomes stable, neither increasing nor 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 considered with care the adequacy of the provisions, both as made in current practice and as assumed in the analyses, for maintaining a range of forest values. 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 TSR where these are consistent with government's broader objectives. To this end, and to ensure appropriate opportunities both for public input and for consultation with First Nations, in addition to the specific elements of the formal First Nations consultation process described separately under '*First Nations consultation process*', public input was invited on the data package from December 31, 2007 to March 5, 2008, with advertising notices placed twice in seven newspapers, hard copy letters sent to all available First Nations and public stakeholders, and additional e-mail notices sent where available. A website was also made available. Feedback from this process resulted in a number of changes to the data package.

The analysis report was similarly advertised and public input was invited from January 24 to March 27, 2009. Public input from these processes is noted and addressed in a number of sections throughout this rationale, and in my considerations and reasoning in this determination I have remained mindful of this input and of the need to balance and integrate social and economic as well as biophysical considerations, in consistency with the Minister's recommendation. I thank all those persons who have taken the time and trouble to provide me with their ideas and information.

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

Non-recoverable losses

In the 2009 timber supply analysis, the figures for unsalvaged annual volume losses were obtained from the 2001 analysis, i.e. 3083 cubic metres lost to fire, and 10 500 cubic metres lost to wind throw, for an annual total of 13 583 cubic metres. Licensees originally agreed with these figures, but two questions have since arisen. First, the 2008-2010 Coast Timber Supply Areas Regional Forest Health Overview suggests the existing estimate is too conservative, with the increased use of partial cutting and retention system harvesting. Second, the *2008 Summary of Forest Health Conditions in British Columbia* by Westfall and Ebata identifies yellow-cedar decline as an area of uncertainty and an emerging area of study on the coast; this decline has been observed in the TSA in several areas between Seymour Inlet and Kingcome Inlet.

At this time I have no new data as a basis from which to vary either of these loss figures. Studies on yellow-cedar decline are underway in the North Coast and Mid Coast TSAs, and development of a new predictive model will better inform the potential scope of this issue in the Kingcome TSA for the next timber supply review. With respect to wind throw, I am advised that (a) with increasing partial retention, licensees are exercising extra care in block layout to minimize wind throw, and (b) difficulty and uncertainty are often present in determining what constitutes natural blowdown in areas of retention that are not intended to be salvaged, and what should count as an unrecoverable loss against the timber supply. I hope these uncertainties will be resolved by ongoing FREP studies and/or other means, and any new information be incorporated in the analysis for the next AAC determination.

Reasons for Decision

In reaching my AAC determination for the Kingcome 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 current AAC for the Kingcome TSA, determined under Section 8 of the *Forest Act* effective October 1, 2002, is 1 284 000 cubic metres, temporarily reduced by 52 000 cubic metres under Section 173, Part 13 of the *Forest Act*, for an effective AAC of 1 232 000 cubic metres, which includes a partition of 20 340 cubic metres for harvesting in deciduous forest stands.

The January, 2009 base case analysis projected an initial harvest level of 1 175 500 cubic metres per year, 4.6 percent below the current effective AAC, and eight percent below the 2002 Section 8 AAC, including an initial 277 000 cubic metres per year for harvesting in second-growth stands, and with a subsequent progression of harvest levels as noted in '*Base case for the Kingcome TSA*'.

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 the timber supply by introducing an element of risk or uncertainty, but cannot be quantified reliably at the time of the determination and must be accounted for in more general terms.

In my considerations for the Kingcome TSA I have identified the following reasons why the timber supply may have been overestimated in the 2009 base case projection:

- *Woodlots*: Deleting the necessary area from the TSA for woodlots awarded since 2006 decreases the THLB by 2757 hectares and reduces the projected initial harvest level for the TSA by 14 400 cubic metres per year, or 1.2 percent.
- *Economic operability*: Overestimation in the economically operable land base means the timber supply projected in the base case is overestimated in the immediate term by approximately 100 000 cubic metres per year, or about 8.5 percent.
- *High retention silvicultural systems and stand-level biodiversity*: The net timber supply implication from the use of higher retention levels, considered in conjunction with constraints for stand-level biodiversity objectives, is an overestimation of 70 500 cubic metres per year or six percent in the base case initial harvest level, applying also in the long term.
- *Landscape-level biodiversity*: The default objectives in the 2009 SCCO, which could not be modelled due to timing, will further constrain the timber supply in the short term by roughly 23 500 cubic metres per year or two percent.

In my considerations I have identified the following reasons why the timber supply may have been underestimated in the 2009 Kingcome TSA base case projection:

- *Missing inventory data*: In respect of the missing data in the adjusted VRI, the initial harvest level in the base case has been underestimated by 8300 cubic metres per year, or 0.7 percent.

- *'Dead potential' wood volumes:* The absence of accounting for these volumes in the analysis indicates an underestimation of roughly 17 500 cubic metres per year or 1.5 percent in the projected initial harvest level.
- *High Value Fish Habitat:* Overestimating the buffering required for high value fish habitat has led to an underestimation of roughly 6000 cubic metres per year or 0.5 percent in the base case initial harvest level.
- *Deciduous-leading stands:* I have adjusted the assumed contribution by red-alder-leading stands to the overall harvest for the next five years by 7597 cubic metres, indicating a 0.6 percent addition to the initial harvest level over that projected in the base case forecast.
- *S5 streams:* The exclusion from the THLB of excessive effective retention for S5 streams indicates an underestimation of 14 000 cubic metres per year or 1.2 percent in the initial harvest level projected in the base case.

From reviewing all of the above-listed indications of over- and underestimation in the projected timber supply, I have reasoned as follows. The overestimations total approximately 208 400 cubic metres per year. The underestimations total approximately 53 400 cubic metres per year. The net result of all the adjustments indicates a potential overestimation of approximately 155 000 cubic metres, or roughly 13.2 percent in the initial harvest level projected in the base case. This implies a new, adjusted harvest level roughly 17 percent below the currently effective AAC a very substantial reduction that, taken at face value, would exceed the 10-percent-per decade objective used as socio-economic guidance in modelling declining harvest levels during transitions to mid-term levels. However, most of the figures considered in its derivation are subject to degrees of approximation and uncertainty and some, as discussed further below, to confirmation or variance as operational experience is acquired in implementing EBM practices. In this situation, I have proceeded in accordance with my earlier stated Guiding Principles, where I note that

...the AAC is not determined by calculation but by a synthesis of judgement and analysis in which numerous risks and uncertainties must be weighed.

From this principle I have considered the appropriate use to be made of the finding of overestimation as less of a quantitative, purely numerical adjustment requiring to be applied directly to the base case, and more of an informative, qualitative conclusion to be applied to a currently evolving complex situation using a judgement informed also by the following considerations.

First, a harvest-level reduction in this TSA at this time approximating the size potentially indicated would have significant social and economic implications in a period when coastal forestry is already disadvantaged by financial constraints imposed by external economic conditions well beyond any local control. The net result could be a compounded need for rapid and difficult social adjustment to operational downsizing, just when industrial efficiencies are beginning to show results in a rapidly changing management environment. In such a situation, I consider it appropriate to review and take particular guidance from the social and economic objectives of government as expressed by the minister, by attempting to moderate fluctuations in the rate of adjustment necessitated by the phases in the transition from short-term to mid-term harvest levels, always provided that the requirements of responsible stewardship under the FRPA continue to be met.

Second, the currently effective AAC of 1 232 000 cubic metres accounts for part, but not all of the CLUD; it reflects the implications of land use changes for the conservancies approved by government, but does not reflect the additional constraints on harvesting imposed by the government-approved EBM practices themselves, which are relatively new in implementation, and still hold somewhat uncertain ultimate implications for the timber supply. The higher levels of retention currently resulting from operational application of the new silvicultural practices, in combination with questions about the economic operability of parts of the land base, are major contributing factors in this finding of overestimation. If a harvest level reduction approximating this magnitude does in fact prove warranted, there are benefits to implementing the reduction more slowly, rather than all at once at this time, as I will discuss next.

Some licensees have the structural and organizational capacity to adapt to changing management requirements more quickly than others. This may well be one reason why recent, operationally experienced levels of retained forest cover are generally higher under new silvicultural practices than are formally required. A period for all licensees to gain expertise in meeting the challenges of new practices in the field could be beneficial in implementing EBM more efficiently by helping to optimise both environmental and social values. Careful planning and co-location of retained forest cover to meet overlapping objectives, where appropriate, could help to offset some of the currently indicated constraints on the timber supply.

Also, as licensees accumulate experience not just in implementing EBM but in operating in the lower value stands recently added to the THLB, the need to question the viability of some of these stands may well lessen over time if an opportunity is provided to demonstrate capability in these stands. While such an opportunity is therefore clearly advantageous, if performance does indeed prove lacking, with no prospect of improvement, some of the stands will inevitably have to be excluded from contributing to the harvest.

Thus there are potential benefits in not applying all at once a large, sweeping harvest level reduction that is based to some extent on resolvable uncertainties—to address which I have set out a list of ten instructions in ‘**Implementation**’ below—in order to continue to provide opportunities for licensees to show capability in meeting EBM objectives efficiently and in operating in the lower-value stands.

Keeping these benefits in mind, I have reviewed the recent, actual harvest levels in the TSA, to help in determining a harvest rate that will be consistent with the clearly indicated need for some degree of reduction, while also ensuring provision of the noted opportunities for demonstrating performance.

A review of the period from 2000 to 2007 shows that the actual harvest level in the TSA has been at 92.1 percent of the apportioned volume. Applying this ratio to the currently effective AAC indicates a currently achievable annual harvest in the TSA of roughly 1.1 million cubic metres. This harvest level has been achieved in recent years despite the need for innovative practices in the implementation of EBM (and in spite of an industry strike in 2007 after which the harvest rate increased somewhat).

A harvest level of 1.1 million cubic metres represents a 10.7 percent reduction from the already reduced AAC of 1 232 000 cubic metres, which accounts in part for the CLUD through the Part 13 reduction, but not for EBM. Accounting for EBM in other management

units that are fully subject to EBM is expected to incur timber supply reductions somewhat greater than I would contemplate for the Kingcome TSA which is only partly subject to EBM.

From all of the foregoing, it is my judgement that a harvest rate of 1.1 million cubic metres for the duration of this AAC will account for a clearly needed reduction while also leaving licensees the opportunity to demonstrate operationally the appropriateness of avoiding a larger reduction at this time.

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 Kingcome TSA that a timber harvest level that accommodates as far as possible the objectives for all forest resources under the areas subject respectively to the VILUP and CLUD, 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, 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 1.1 million cubic metres, of which 14 000 cubic metres are specified as harvestable from deciduous species. This new AAC excludes all volumes in issued woodlot licences and will remain in effect until the next AAC is determined

The new AAC will become effective on February 2, 2010.

The new AAC represents an overall reduction of 10.7 percent from the currently effective AAC. Since the approved conservancy areas and biodiversity mining tourism areas under the CLUD are now fully accounted for in this Section 8 AAC determination, the temporary AAC reduction of 52 000 cubic metres under Section 173, Part 13 of the *Forest Act* is rescinded, concurrent with the effective date of this determination.

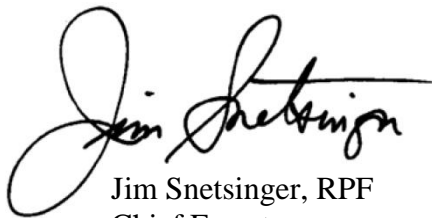
Implementation

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 Kingcome TSA.

1. The noted missing or incomplete attributes for 8851 hectares in the VRI should be clarified prior to the analysis for the next AAC determination for this TSA by District staff.
2. Ministry staff and licensees should co-operate in completing TEM mapping for the remainder of the TSA.
3. District staff should continue to monitor the volumes harvested from the species profile in the inventory for the TSA.
4. Licensees should collaborate with District staff to ensure that forest cover data for blocks with high residual basal area are entered in the RESULTS system as endorsed in the CRIT Guidance Memorandum. District staff should continue to monitor, by use of the RESULTS system or other appropriate means, which of the silvicultural

systems are being used in the TSA, and the resulting levels and distributions of the ensuing forest cover retention.

5. The discrepancy in the extent of the THLB in Ungulate Winter Range should be investigated and remedied for the next timber supply analysis.
6. Additional information on current operational practices for buffering S4, S5 and S6 streams—particularly S5 streams—should be collected by monitoring through FREP or by field visits, for incorporation in the next timber supply analysis.
7. Definitive information on the required buffering and net land base exclusions needed to meet objectives for HVFH should be obtained and incorporated in the next timber supply analysis.
8. MFR district staff should maintain ongoing monitoring of the distribution of the harvest in the TSA between the EBM zone and Vancouver Island, communicating the results periodically to First Nations who have expressed related concern.
9. MFR district staff and licensees should work collaboratively to establish appropriate target levels for future second-growth harvesting, consistent with base case assumptions.
10. District staff should continue to monitor licensees' performance in marginal, lower-value stands, to ascertain the economically harvestable land base with a greater degree of certainty.



Jim Snetsinger, RPF
Chief Forester

February 2, 2010



Appendix 1: Section 8 of the *Forest Act*

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

Allowable annual cut

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

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

(2) If the minister

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

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

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

(3) If

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

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

(3.1) If, in respect of the allowable annual cut for a timber supply area or tree farm licence area, the chief forester considers that the allowable annual cut that was determined under subsection (1) is not likely to be changed significantly with a new determination, then, despite subsections (1) to (3), the chief forester

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

(b) must give written reasons for the postponement.

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

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

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

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

(5) In determining an allowable annual cut under subsection (1) the chief forester may specify portions of the allowable annual cut attributable to

(a) different types of timber and terrain in different parts of Crown land within a timber supply area or tree farm licence area,

(a.1) different areas of Crown land within a timber supply area or tree farm licence area, and

(b) different types of timber and terrain in different parts of private land within a tree farm licence area.

(c) [Repealed 1999-10-1.]

(6) The regional manager or district manager must determine an allowable annual cut for each woodlot licence area, according to the licence.

(7) The regional manager or the regional manager's designate must determine an allowable annual cut for each community forest agreement area, in accordance with

(a) the community forest agreement, and

(b) any directions of the chief forester.

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

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

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

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

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

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

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

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

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

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

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

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

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

Section 4 of the *Ministry of Forests and Range Act* (consolidated to March 30, 2006) reads as follows:

Purposes and functions of ministry

4 The purposes and functions of the ministry are, under the direction of the minister, to do the following:

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

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



JUL 04 2006

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

Dear Jim:

Re: Economic and Social Objectives of the Crown

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

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

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

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Minister of
Forests and Range
and Minister Responsible
for Housing

Office of the
Minister

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Jim Snetsinger

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

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

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

Sincerely yours,

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

Rich Coleman
Minister

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

Records of all related communications are maintained in the North Island-Central Coast Forest District Office.

First Nations:

Formal written submissions were received from the following First Nations:

Quatsino; Gwa'sala-'Nakwaxda'xw; 'Namgis; Wuikinuxv; Laich-Kwil-Tach Treaty Society; Nuu-chah-nulth Tribal Council; Tsawataineuk and Kwakiutl.

Licensees:

Written submissions were received from:

International Forests Products Limited, 'Interfor'; Weyerhaeuser Hardwoods and Industrial Products, Delta Division; Kruger Forest Products Limited.

General Public and Organizations:

Letter was received from:

ForestEthics, Greenpeace, and Sierra Club of BC.

Appendix 5: Corrected Table 3.1 from the *Kingcome Socio-Economic Assessment*
Report: Socio-economic impacts of the base case harvest forecast

Line		Current Conditions	Current AAC	Decade 1	Decade 2
Timber Supply (m³/year)					
1	AAC		1,232,000	1,175,500	1,056,500
2	Harvest level (05-07)	1,122,135			
3	Cumulative Change	-109,865	0	-56,500	-175,500
Kingcome TSA					
Employment (person-years)					
4	Direct	314	345	329	296
5	Indirect/Induced	202	222	212	190
6	Total	516	567	541	486
7	Cumulative Change in total person years	-51	0	-26	-81
Employment Income (before tax, millions)					
8	Direct	\$16.3	\$17.9	\$17.1	\$15.4
9	Indirect/Induced	\$6.1	\$6.7	\$6.4	\$5.7
10	Total	\$22.4	\$24.6	\$23.5	\$21.1
11	Cumulative Change	-\$2.2	\$0.0	-\$1.1	-\$3.5
Province (includes Kingcome TSA)					
Employment (person-years)					
12	Direct	1,369	1,503	1,434	1,289
13	Indirect/Induced	1,661	1,823	1,740	1,564
14	Total	3,030	3,326	3,174	2,853
15	Cumulative Change in total person years	-297	0	-153	-474
Employment Income (before tax, millions)					
16	Direct	\$65.7	\$72.2	\$68.9	\$61.9
17	Indirect/Induced	\$50.2	\$55.1	\$52.6	\$47.3
18	Total	\$115.9	\$127.3	\$121.4	\$109.1
19	Cumulative Change	-\$11.3	\$0.0	-\$5.8	-\$18.1
Provincial Government Revenues					
20	Provincial income tax	\$33.6	\$36.9	\$35.2	\$31.7
21	Stumpage and Rent	\$14.6	\$16.1	\$15.3	\$13.8
22	Other B.C. revenues	\$23.4	\$25.7	\$24.6	\$22.1
23	Total Revenue	\$71.7	\$78.7	\$75.1	\$67.5
24	Cumulative Change in total revenue	-\$7.0	\$0.0	-\$3.6	

Note: Columns may not add due to rounding. (Updated May 12, 2009)