

**BRITISH COLUMBIA
MINISTRY OF FORESTS AND RANGE**

Tree Farm Licence 25

Western Forest Products Inc.

Rationale for Allowable Annual Cut (AAC) Determination

Effective February 1, 2008

**Craig Sutherland, R.P.F.
Deputy Chief Forester**

Table of Contents

Objective of this document.....	1
Statutory framework.....	1
Description of Tree Farm Licence 25.....	1
History of the AAC.....	3
Information sources used in the AAC determination.....	5
Role and limitations of the technical information used.....	7
Guiding principles for AAC determinations.....	7
The role of the base case.....	11
Timber supply analysis.....	11
Consideration of factors as required by Section 8 of the <i>Forest Act</i>	14
Land base contributing to timber harvest.....	14
General comments.....	14
Land base exclusions.....	15
- deciduous species - alder.....	16
- economic and physical operability.....	16
- riparian reserves.....	18
- environmentally sensitive areas.....	19
- harvest profile.....	19
Existing forest inventory.....	19
- general comments.....	19
- ecosystem mapping.....	20
- aggregation procedures.....	21
- Volume estimates for existing natural stands.....	21
- Coastal log grades.....	22
Expected rate of growth.....	23
- site productivity estimates.....	23
- volume estimates for regenerated managed stands.....	24
- minimum harvestable ages.....	26
- gains from the use of select seed.....	27
- gains from fertilization.....	27
Regeneration delay.....	27
Impediments to regeneration.....	28
Not-satisfactorily-restocked areas.....	28
Silvicultural systems.....	29
Incremental silviculture.....	30
Utilization standards.....	30
Decay, waste and breakage.....	30
Integrated resource management objectives.....	30
- adjacency, green-up, and forest cover requirements.....	31
- recreation.....	31
- wildlife habitat.....	31
- visually sensitive areas.....	33
- stand-level biodiversity.....	34
- riparian management areas.....	35
- Landscape-level biodiversity.....	35
- cultural heritage resources.....	36
Other information.....	40
- area-based AACs.....	40
- removal of private land.....	41
- planning processes.....	41

- First Nations consultation	49
- twenty-year plan	54
- harvest sequencing rules.....	54
- actual harvest level	55
Alternative harvest flows	55
- community dependence on forest industry	56
Minister’s letter.....	56
Local objectives	57
Non-recoverable losses	57
Reasons for decision.....	57
Block 1	59
Block 2	60
Block 3	62
Block 5	63
Block 6	65
Determination	68
Implementation.....	69
Appendix 1: Section 8 of the <i>Forest Act</i>	70
Appendix 2: Section 4 of the <i>Ministry of Forests and Range Act</i>	72
Document attached:	72
Appendix 3: Minister’s letter of July 4, 2006.....	72

Objective of this document

This document is intended to provide an accounting of the factors I have considered and the rationale I have employed in making my determination, under Section 8 of the *Forest Act*, of the allowable annual cut (AAC) for Tree Farm Licence (TFL) 25. 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 TSAs and TFLs. Section 8 is reproduced in full as Appendix 1 of this document.

In accordance with Section 23(3) of the *Interpretation Act*, the deputy chief forester is expressly authorized to carry out the functions of the chief forester, which include those required under Section 8 of the *Forest Act*.

Description of Tree Farm Licence 25

Tree Farm Licence 25, held by Western Forest Products Inc. (WFP, the licensee) is situated in coastal British Columbia (BC) in five blocks, two on Vancouver Island, two on the mainland coast, and one on the Queen Charlotte Islands. At the time of the 2003 timber supply analysis, which was based on 2002 data and was used as the initial reference for considerations made in this determination, the TFL covered a gross area of 480 149 hectares. Within the TFL, 268 851 hectares are classified as productive forest of which 138 077 hectares are considered suitable and available for timber harvesting.

Since the analysis, the size of the TFL has changed in several ways that are accounted for in this determination. On January 31, 2007, the licensee removed all private land from the TFL, following which the gross area of the TFL was reduced from 480 149 hectares to 468 012 hectares. The productive forest area decreased to 257 324 hectares, of which 129 152 hectares are considered suitable and available for timber harvesting. In April, 2007 the area of forest in the TFL contributing to the timber supply was further reduced when government established 10 conservancies overlapping TFL 25 through the North and the Central Coast Land and Resource Management Planning (LRMP) processes. The timber supply implications for TFL 25 from all of these changes are accounted for in this determination.

The five blocks comprising TFL 25 are distributed non-contiguously over five forest districts, and are located as follows:

On Vancouver Island:

- Block 1 is at Jordan River on the southwest coast of the island, west of Sooke, and is administered by the Ministry of Forests and Range (MFR) South Island Forest District office in Port Alberni;
- Block 3 is at Naka Creek on the northeast coast of the island, northwest of Campbell River, and is administered by the MFR Campbell River Forest District office in Campbell River.

On the Mainland Coast:

- Block 2 is at the head of Loughborough Inlet across Georgia Strait from Campbell River and is administered by the MFR Campbell River Forest District office;
- Block 5 is at Swanson Bay on the central coast near Bella Coola. It lies partly in the North Island Central Coast Forest District and partly in the North Coast Forest District, and is administered by the MFR North Island-Central Coast and Prince Rupert Forest District offices.

On the Queen Charlotte Islands:

- Block 6 on Moresby Island on Haida Gwaii, formerly TFL 24, was added to TFL 25 in 1998 and is administered by the MFR Queen Charlotte Islands Forest District office in Queen Charlotte City.

The former Block 4 of TFL 25, located at Beaver Cove near Port McNeill, was transferred out of TFL 25 in 1998 and was added to TFL 6 which is also held by WFP.

All five of the blocks in TFL 25 lie predominantly within the Coastal Western Hemlock biogeoclimatic zone. Small areas of the Mountain Hemlock zone occur in blocks 2 and 5. The principal tree species in all blocks are western hemlock and western redcedar. Only Block 1 includes a substantial component of Coastal Douglas-fir.

Block 1 is bounded by TFL 46 to the northwest and the Arrowsmith Timber Supply Area (TSA) to the east and south. The block originally covered 32 202 hectares in the 2003 analysis but now covers 20 264 hectares following the removal of the private land. Of the 32 202 hectares reported in the 2003 analysis, 30 477 hectares are productive forest, and 25 562 hectares are considered suitable and available for timber harvesting—that is, are included in the timber harvesting land base or THLB. This block has the longest harvesting history of the five blocks with operations in the area dating back to 1857. The block includes some third growth areas as well as significant amounts of remaining old growth. The terrain consists mainly of moderate slopes dissected by steep-sided creeks. Major waterways include the Jordan River and the Sombrio, Loss, Noyse, and Muir creeks. Douglas-fir is the principal species in the drier, eastern portion of the block, with western hemlock and western redcedar more prevalent in the wetter, western portion.

Block 2 is bordered by TFL 45 to the north, the Kingcome TSA to the west, TFL 47 and the Strathcona TSA to the south, and TFL 39 to the southeast. The block includes the Heydon Bay, Apple River, Frazer Bay and Stafford River sub-units. The total area of the block is 66 891 hectares, of which 28 312 hectares are productive forest, and 15 002 hectares are included in the THLB. Timber harvesting in most areas began only in the 1960s and 1970s. The topography is relatively rugged, with steep-sided valley walls and flat, frequently inundated, valley bottoms. The major species is western hemlock with substantial areas of western redcedar and balsam. Douglas-fir grows on some drier, well-drained sites.

Block 3, situated roughly midway between Campbell River and Port McNeill, lies along Johnstone Strait and is surrounded by TFL 39. The block covers 15 985 hectares, of which 12 852 hectares are productive forest and 9444 are included in the THLB. Timber harvesting in this area began only in 1974 and substantial areas of old growth still remain. The Peel, Naka, Teissum and Cedarstadt watersheds, and part of the Tsitika watershed, lie within the block borders. Most of the land base is below 1000 metres in elevation and the terrain features

moderately sloped valleys generally visible from Johnstone Strait. Western hemlock and western redcedar are the most common tree species.

Block 5, covering 311 707 hectares, is by far the largest in the TFL. Block 5 extends over several islands including Princess Royal, Yeo, Roderick and Pooley. It also includes portions of the mainland from Millbank Sound in the south to Collins/Gardner Canal in the north. The block shares borders with the North Coast TSA to the northwest, the Mid Coast TSA to the south, TFL 41 to the east and north, and the Fiordland Provincial Recreation Area, which is adjacent to the Kitlope Heritage Conservancy, to the east. Large portions of the block are visible from the heavily travelled Inside Passage waterway. Elevations are generally below 1000 metres but the terrain is relatively steep in the northern portions of the block. Block 5 includes 150 248 hectares of productive forest, but the steep terrain and remoteness of the block limit the THLB to 62 901 hectares, roughly 20 percent of the total block area. Some timber harvesting in the area began in the early 1900s but substantial areas of old growth remain. Western hemlock and balsam are the principal species in the block. To the south, where the topography is gentler, western redcedar is more common.

Block 6 consists of two supply blocks on the upper half of Moresby Island. One block is centred on Mosquito Lake at the head of Gillat Arm. The other surrounds Sewell Inlet, includes Talunkwan Island, and is bordered to the south by the Gwaii Haanas National Park Reserve and Haida Heritage Site. Western hemlock is the most common species on this block, and stands of Sitka spruce and western redcedar are also present. The total area of the block is 53 364 hectares, of which 46 961 hectares are productive forest and 25 169 hectares, or 47 percent of the block, are included in the THLB.

On blocks 3 and 6, the entire harvest is currently allocated to British Columbia Timber Sales (BCTS). All harvest operations and management planning on these blocks are the responsibility of BCTS.

History of the AAC

Regulated harvesting and forest management activities have occurred in the general areas now known as TFL 25 since May 21, 1958, when a Forest Management Licence to harvest 407 762 cubic metres annually was issued to Alaska Pine and Cellulose Ltd. Shortly afterward the company changed its name to Rayonier Canada Ltd., to whose subsidiary, Rayonier B.C. Ltd., TFL 25 was assigned on May 1, 1961. In September 1961, Rayonier B.C. Ltd. became Rayonier Canada (B.C.) Ltd.

In 1966, the AAC for the TFL was increased to 594 654 cubic metres to account for anticipated Close Utilization on all blocks, and in 1967 it was revised to 580 495 cubic metres to account for Intermediate Utilization on blocks 2 and 5. In 1972 the AAC was increased to 614 475 cubic metres to account for a large increase in the net operable area in the TFL. In 1975 the AAC was determined at 668 277 cubic metres, to reflect Close Utilization on all blocks except Block 5, together with adjustments reflecting decay and breakage standards. In 1977, the AAC was reduced to 615 891 cubic metres, mainly for environmental considerations.

On May 21, 1979, TFL 25 was issued to Rayonier Canada (BC) Ltd. as a replaceable TFL with a 25-year term, and on December 28 that year, the company changed its name to ITT Industries of Canada Ltd.

In January 1980, the AAC was increased to 653 180 cubic metres, to better account for loss factors and to account for the conversion to metric mensuration. In October that year, ITT Industries of Canada Ltd. assigned TFL 25 to Western Forest Products Ltd.

In 1987, the AAC was determined slightly lower at 653 000 cubic metres. In January 1988, under Bill 28, 2.5 percent of the Crown portion of the AAC, or 10 925 cubic metres, were apportioned to the Small Business Forest Enterprise Program (SBFEP). In May 1989, TFL 25 was issued to Western Forest Products Ltd. as a replaceable TFL with a 25-year term, and in October that year Doman Forest Products Ltd. acquired control of the company. At the close of 1989, following further apportionments from the Crown land portion of the AAC to the SBFEP (the second of two 2.5-percent apportionments under Bill 28, and 5 percent in respect of the transfer of control to Doman) the total AAC of 653 000 cubic metres for the TFL was apportioned as 610 393 cubic metres to the licensee and 42 607 cubic metres to the SBFEP.

In 1990, the chief forester increased the TFL AAC by 55 000 cubic metres to 708 000 cubic metres, to provide the licensee with an opportunity to develop a helicopter-logging operation.

In 1993, the total AAC was determined at 783 000 cubic metres, and in 1996 the apportionment to the SBFEP from this AAC was recorded at 51 233 cubic metres. The change in the volume attributed to the SBFEP was the result of an agreement between the government and Western Forest Products Limited to exchange timber harvesting rights between the Strathcona Timber Supply Area and TFL 25 to mitigate the impact on timber supply of the implementation of the Vancouver Island Land Use Plan.

On December 30, 1996, the total AAC for the TFL was determined under Section 8 of the *Forest Act* at 779 000 cubic metres.

In 1998, the AAC was adjusted administratively (i.e. not under Section 8 of the *Forest Act*) to 692 000 cubic metres, to account for the transfer of Block 4 near Port McNeill from TFL 25 to TFL 6, and for the addition to TFL 25 of the former TFL 24 in the Queen Charlotte Islands, as Block 6.

Effective July 3, 2002, the chief forester ordered a temporary AAC reduction of 135 000 cubic metres for blocks 2 and 5, under Part 13, Section 173 of the *Forest Act*, in respect of government's specification of the Central Coast Designated Area, under Section 169 of the *Forest Act*.

On October 29, 2003, the Part 13 temporary AAC reduction in respect of the Central Coast Designated Area expired, and the AAC reverted to 692 000 cubic metres.

On September 28, 2006, again under Part 13 of the *Forest Act*, a temporary AAC reduction of 84 000 cubic metres was applied to Block 5 only, in respect of Designated Areas under the Central Coast and North Coast LRMP processes.

On October 17, 2006, effective September 8, 2006, an AAC reduction of 8 500 cubic metres was applied to Block 6 under Part 13 of the *Forest Act* in respect of government's specification of two Haida Gwaii/Queen Charlotte Islands designated areas.

All private land was removed from TFL 25 on January 31, 2007. On May 9, 2007, the deputy chief forester reduced the AAC for the TFL by 66 500 cubic metres to reflect the reduced land base of the TFL (as discussed below, under '*removal of private land*').

To summarise these adjustments, the total AAC in effect for TFL 25 today derives from the 779 000 cubic metres determined under Section 8 in 1996, as follows. The 1998 administrative adjustment accounting for the removal of Block 4 and the addition of Block 6 brought the AAC to 692 000 cubic metres. Further reductions resulted from the two AAC reductions made under Part 13 of the *Forest Act* remaining in effect for designated areas (1) under the Central Coast and North Coast LRMPs, and (2) on Haida Gwaii/Queen Charlotte Islands. These two reductions, of 84 000 cubic metres and 8500 cubic metres respectively, when combined, lowered the AAC to 599 500 cubic metres. Subtracting from this the 66 500 cubic metres associated with the removal of the private land brings the total AAC for TFL 25 in effect prior to this determination to 533 000 cubic metres.

The portion of the AAC currently allocated to the Crown through the *Forestry Revitalization Act* is 164 918 cubic metres. An additional 48 326 cubic metres of AAC was previously allocated to the former Small Business Forest Enterprise Program, now BC Timber Sales. Therefore a total of 213 244 cubic metres of the AAC is not available to the licensee. It will be disposed of by BC Timber Sales and through First Nation tenures and woodlot licences.

Information sources used in the AAC determination

Sources of information referenced for the purposes of this AAC determination include, in addition to specific sources of data used and identified in the Timber Supply Analysis and Analysis Information reports:

- *Yield Tables for Existing Stands* accepted by MFR Forest Analysis and Inventory Branch (formerly Resources Inventory Branch) May 6, 2002;
- *Yield Tables for Managed Stands* accepted by MFR Research Branch April 29, 2003;
- Site Index information accepted by MFR Research Branch April 29, 2003;
- *WFP Tree Farm Licence 25 Management Plan Number 10, (MP #10)* submitted October, 2003, approved October 22, 2003;
- *WFP Tree Farm Licence 25 Timber Supply Analysis Information Package, MP #10, Revised*, prepared by WFP, submitted March 2003, accepted by MFR Forest Analysis and Inventory Branch, April 2003;
- *WFP Tree Farm Licence 25 Timber Supply Analysis, MP #10, prepared by WFP*, submitted March 2003, accepted by MFR Forest Analysis and Inventory Branch, April 2003;
- *TFL 25 Twenty-year Plan*, submitted for each block, October 2003, approved October 22, 2003;
- *Review of TFL 25, blocks 2 and 3: terrain stability netdowns*, Research Geomorphologist, Coast Forest Region, 2003;
- *Tree Farm Licence 25 Issued to Western Forest Products Ltd. Rationale for Allowable Annual Cut Determination effective December 30, 1996*, Larry Pedersen, Chief Forester;
- *Procedures for Identifying and Approving Existing Ungulate Winter Ranges*. August 6, 1998 memo from Larry Pedersen, MFR and Jon O'Riordan, Ministry of Environment;
- *Procedures for Factoring Visual Resources into Timber Supply Analyses*. 1998. BC Ministry of Forests. Province of British Columbia;
- *Summary of dead potential volume estimates for management units within the Coastal Forest Region*. March 2006. Ministry of Forests and Range;

- Letter from the Minister of Forests and Range to the chief forester stating the economic and social objectives of the Crown. July 4, 2006;
- Memorandum from the Minister of Forests to the Chief Forester dated February 26, 1996, stating the Crown's economic and social objectives regarding visual resources;
- *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*, Province of British Columbia;
- *Ministry of Forests and Range Act*, (consolidated to March 30, 2006);
- *Government Actions Regulation* (B.C.Reg. 582/2004);
- *Bill 24, Parks and Protected Areas Statutes Amendment Act, 2007*;
- *Haida Gwaii/Queen Charlotte Islands Designated Area* (B.C. Reg 210/2005;)
- *Haida Gwaii/Queen Charlotte Islands Designated Area No. 3* (B.C. Reg 251/2006);
- *Central Coast Designated Area No. 2* (B.C. Reg. 82/2006);
- *South Central Coast Order*, Ministry of Agriculture and Lands, July 27, 2007;
- *Central and North Coast Order*, Ministry of Agriculture and Lands, December 19, 2007;
- *Joint Solutions Project Agreement in Principle*, December 9, 2003;
- *Understanding Arising From April 22, 2005 Discussion Between the Province and the Council of the Haida Nation*, May 11, 2005
- *Haida Gwaii Strategic Land Use Agreement*, Ministry of Agriculture and Lands, December 12, 2007;
- *Landscape Unit Planning Guide*. Forest Practices Code of British Columbia. 2000. Province of British Columbia;
- *Managing Identified Wildlife: Procedures and Measures. Volume 1*. 1999. BC Ministry of Forests. Province of British Columbia;
- *The Identified Wildlife Management Strategy (IWMS) Version 2004: Procedures for Managing Identified Wildlife and Accounts and Measures for Managing Identified Wildlife*. BC Ministry of Forests. Province of British Columbia;
- *Notice – Indicators of the Amount, Distribution and Attributes of Wildlife Habitat Required for the Survival of Species at Risk in the Queen Charlotte Forest District*, December 2004;
- *Notice – Indicators of the Amount, Distribution and Attributes of Wildlife Habitat Required for the Winter Survival of Ungulate Species in Tree Farm Licence 25, Block 2*;
- Input received from First Nations through the consultation process;
- Technical review and evaluation of current and expected operating conditions through comprehensive discussions between the deputy chief forester, MFR district, regional and branch staff, and staff of the BC Ministry of Environment at the AAC determination meeting held in Nanaimo on June 22-23, 2007;
- *Coast Forest Region Administration Bulletin, Planning and Practices Options to Facilitate Transition to Central Coast, North Coast and Haida Gwaii - Queen Charlotte LRMP Land Use Objectives*, May 18, 2007;
- *Ministry of Forests BC Timber Sales, Queen Charlotte Islands Forest District, Ecosystem Based Management GIS Analysis Report*, Chartwell Consultants Ltd., June 2007;

- *Analysis of the Impact on Timber Supply and Critical Habitat of the Central Coast LRMP Government-to-Government Draft Proposed Interim Legal Objectives*, Cortex Consultants, May 2006;
- *Economic Implications of Stand Level Retention Recommendations Developed for the Central Coast LUP Planning Process*, Ministry of Agriculture and Lands, May 2007.

Role and limitations of the technical information used

Section 8 of the *Forest Act* requires the chief forester, in determining AACs, to consider biophysical as well as 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 computerised analytical models currently used to assess timber supply unavoidably simplify the real world and inevitably involve uncertainty in many of the inputs, due in part to variations in physical, biological and social conditions. While ongoing science-based improvements in the understanding of ecological dynamics will help reduce some of these uncertainties, technical information and analytical methods alone cannot incorporate all the social, cultural and economic factors relevant to forest management decisions, nor do they necessarily provide complete answers or solutions to the forest management problems addressed in AAC determinations. However, they do provide valuable insight into potential outcomes of different resource-use assumptions and actions—important components of the information that must be considered in AAC determinations.

In determining the AAC for TFL 25, I have considered and discussed known limitations of the technical information provided, and I am satisfied that the information provides a suitable basis for my determination.

Guiding principles for AAC determinations

The chief forester has expressed the importance of consistency in judgement in making AAC determinations. I also recognize the need for consistency of approach, and am familiar with the guiding principles that the chief forester has employed in making AAC determinations. I find these principles to be reasonable and appropriate and have adopted them as set out below in making my AAC determination for TFL 25.

Rapid changes in social values and in our understanding and management of complex forest ecosystems may affect our interpretation or weighing of 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 such changes and associated 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, to ensure they incorporate current information and knowledge—a principle that has been recognized in the legislated requirement to redetermine AACs every five years. The adoption of this principle is central to many of the following guiding principles.

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 operability and forest management factors that are a reasonable extrapolation from current practices. It is not appropriate to base my decision on unsupported speculation with respect either to factors that could work to *increase* the timber supply—such as optimistic assumptions about harvesting in unconventional areas, or using unconventional technology, that are not substantiated by demonstrated performance—or to factors that could work to *reduce* the timber supply, such as integrated resource management objectives beyond those articulated in current planning guidelines or the *Forest Practices Code of British Columbia* (‘the Code’)—which is now in transition to the *Forest and Range Practices Act* (FRPA).

In many areas, the timber supply implications of some legislative provisions, such as those for landscape-level biodiversity, remain uncertain, particularly when considered in combination with other factors. In each AAC determination the chief forester takes this uncertainty into account to the extent possible in the context of the best available information. In making my determination for TFL 25, as deputy chief forester, I have followed the same approach.

As British Columbia progresses toward completion of strategic land-use plans, in some cases the eventual timber supply impacts associated with the land-use decisions resulting from the various regional and sub-regional planning processes remain subject to some uncertainty before formal approval by government. In determining AACs, I will not speculate on timber supply impacts that may eventually result from land-use decisions not yet finalized by government.

In some cases, even where government has made a formal land-use decision, it is not necessarily possible to analyze and account for the full timber supply impact in a current AAC determination. Many government land-use decisions must be followed by detailed implementation decisions requiring, for instance, the establishment of resource management zones and resource management objectives and strategies for those zones. Until such implementation decisions are made it would be impossible to assess in full the overall impacts of land-use decisions. In such cases, the legislated requirement for frequent AAC reviews will ensure that future determinations address ongoing plan implementation decisions. Whenever specific protected areas have been designated by legislation or 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 biodiversity.

In the case of TFL 25 I must consider the following strategic land use planning initiatives which apply to and guide current management on the TFL:

Vancouver Island: The Summary Vancouver Island Land Use Plan (VILUP), which came into effect December 1, 2000, established resource management zones and objectives within blocks 1 and 3 of the TFL.

Central and North Coast: The February 7, 2006 provincial government's land use announcement on the Land and Resource Management Plans for the North Coast (NCLRMP) and Central Coast (CCLRMP) committed to protect large areas of temperate rain forest and also provided for the implementation of Ecosystem Based Management (EBM). In TFL 25, the plan areas cover blocks 2 and 5. The recommended areas for protection were designated under Part 13 of the *Forest Act* and in September 2006 the chief forester reduced the AAC to account for the designation of these areas. While the timber supply analysis for TFL 25 predated these coastal decisions, an interim decision of the CCLRMP was announced on April 4, 2001, to protect 'more pristine' areas, to defer logging in other areas pending completion of the plan, and to commit to EBM. An Agreement-in-Principle was reached on December 9, 2003 between licensees and environmental non-governmental organizations which included the adoption of seven principles for implementing EBM.

In April 2006 the Park Act was changed to create a new designation of protected area called a 'conservancy'. Conservancies prohibit logging, mining, and hydro electric power generation, except for run-of-the-river projects, but differ from Class A Parks in allowing for social, ceremonial and cultural uses by First Nations and for low impact compatible economic opportunities. In the two coastal LRMP areas, 24 conservancies were established in April 2006, and 41 conservancies were established in April 2007. All conservancies within TFL 25 have now been established except one, the 'Europa East' in Block 5, which does not overlap the THLB.

Draft Orders by the BC Minister of Agriculture and Lands, released in December 2006 and January 2007 for public review, described proposed land use legal objectives for many specified resource values in the coastal planning areas. The Province, First Nations and stakeholders are engaged in implementing the Coast Land Use announcement through the establishment of Plan Implementation and Monitoring committees, Land and Resource Forums, and an EBM Working Group. The BC government committed to full implementation of EBM by March, 2009.

On July 27, 2007 the BC Minister of Agriculture and Lands signed the South Central Coast Order, and on December 19, 2007, the Central and North Coast Order. These orders establish land use objectives for the purposes of the *Forest and Range Practices Act*. The orders include detailed objectives related to First Nations, aquatic habitats, and biodiversity. The South Central Coast Order covers Block 2 of TFL 25 and the Central and North Coast Order covers Block 5.

Queen Charlotte Islands: Under the Haida Gwaii Land Use Plan process, a draft Strategic Land Use Agreement that affects Block 6 of TFL 25 was initialled by the government and the Council of the Haida Nation on May 31, 2007. Following public review, the Haida Gwaii Strategic Land Use Agreement was signed on December 12, 2007. The agreement includes a map of land use zones, including New Protected Areas, Operating Areas and Special Value Areas; ecosystem based management objectives for the Operating Areas; and a commitment to achieve an initial timber harvest opportunity of no less than 800 000 cubic metres per year on Haida Gwaii.

The implications of these planning processes for land use status, forest management and timber supply are considered in later sections of this rationale, primarily under '*planning processes*', and '*Ecosystem-Based Management*'.

When appropriate, I will consider information on the types and extent of planned and implemented intensive silviculture activities as well as relevant scientific, empirical and analytical evidence on the likely magnitude and timing of their timber supply effects.

Some have suggested that, given the large uncertainties present with respect to much of the data in AAC determinations, any adjustments in AAC should wait until better data are available. I agree that some data are not complete but this will always be true where information is constantly evolving and management issues are changing. Moreover, in the past, waiting for improved data created the extensive delays that resulted in the urgency to redetermine many outdated AACs between 1992 and 1996. In any case, the data and models available today are superior to those available in the past, and will undoubtedly provide for more reliable determinations.

Others have suggested that, in view of data uncertainties, the chief forester or I should immediately reduce some AACs in the interest of caution. However, any AAC determination made by the chief forester or myself must be the result of applying our individual judgements to the available information, taking any uncertainties into account. Given the large impacts that AAC determinations can have on communities, no responsible AAC determination can be made solely on the basis of a response to uncertainty. Nevertheless, in making my determination, I may need to make allowances for risks that arise because of uncertainty.

With respect to First Nations' issues, I am aware of the Crown's legal obligations resulting from decisions in recent years made by the Supreme Court of Canada. I am aware of the Crown's legal obligation to consult with First Nations regarding asserted rights and title in a manner proportional to the strength of their claimed interests and the degree to which the decision may impact these interests. In this regard, I will consider any information brought forward respecting First Nations' aboriginal interests, including operational plans that describe forest practices to address First Nations' interests. As I am able, within the scope of my authority under section 8 of the *Forest Act*, I will address those interests. When aboriginal interests are raised that are outside my jurisdiction, I will endeavour to forward these interests to other decision-makers for consideration.

The AAC that I determine should not be construed as limiting the Crown's obligations under the Court's decisions in any way, and in this respect it should be noted that my determination does not prescribe a particular plan of harvesting activity within TFL 25. 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 Act*, *Forest Practices Code of British Columbia Act* (the Code) and under the *Forest and Range Practices Act* (FRPA).

Because the new regulations of the *Forest and Range Practices Act* are designed to maintain the integrity of British Columbia's forest stewardship under responsible forest practices, it is not

expected that the implementation of the legislative changes will significantly affect current timber supply projections made using the Code as a basis for the definition of current practice.

The role of the base case

In considering the factors required under Section 8 of the *Forest Act* to be addressed in this AAC determination, I have been assisted by timber supply forecasts provided to me by the licensee as part of the MFR Timber Supply Review program.

For each AAC determination 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 model, a series of timber supply forecasts is produced. These include sensitivity analyses to assess the timber supply effects of uncertainties or changes in various assumptions around a baseline option, normally referred to as the 'base-case' forecast.

The base-case forecast may incorporate information about which there is some uncertainty. Its validity, as with all the other forecasts provided, depends on the reliability of the data and assumptions incorporated into the computer model used to generate it. Therefore, much of what follows in the considerations outlined below is an examination of the degree to which all the assumptions made in generating the base-case forecast are realistic and current, and the degree to which its predictions of timber supply must be adjusted, if necessary, to more properly reflect the current situation.

These adjustments are made on the basis of informed judgment, using current information available about forest management, which may well have changed since the original information package was assembled. Forest management data are particularly subject to change during periods of legislative or regulatory change, or during the implementation of new policies, procedures, guidelines or plans.

Thus it is important to remember, in reviewing the considerations which lead to the AAC determination, that while the timber supply analysis with which I am provided is integral to those considerations, the AAC determination itself is not a calculation but a synthesis of judgment and analysis in which numerous risks and uncertainties are weighed. Depending upon the outcome of these considerations, the AAC determined may or may not coincide with the base-case forecast. Judgments that may in part be based on uncertain information are essentially qualitative in nature and, as such, subject to an element of risk. Consequently, once an AAC has been determined, no additional precision or validation may be gained by attempting a computer analysis of the combined considerations to confirm the exact AAC determined.

Timber supply analysis

Area-based analysis: In 2002 an amendment was made to the *Forest Act* enabling trials to establish AACs on the basis of harvested area, rather than harvested volume, to determine if area-based AACs could provide a viable alternative for regulating harvest levels in BC. The trial program would investigate whether simplifications to the process could result in less onerous informational requirements and processing without loss of reliability in the result. On October 19, 2004, prior to the preparation of the information package and timber supply analysis in support of this AAC determination, WFP and MFR agreed to include TFL 25 in a pilot program.

As a result of considerations subsequent to the analysis the licensee requested termination of the trial agreement for TFL 25. In a letter to the deputy chief forester dated November 6, 2006, the licensee cited difficulties related to: managing multiple TFLs held by the licensee under both area-based and volume-based AACs; the implementation of EBM which could lead to increased reliance on partial cutting with associated modelling difficulties under area-based analysis; and a lack of anticipated operational efficiencies in planning and analysis. The Lieutenant Governor in Council terminated the trial program for TFL 25 on December 14, 2007.

The timber supply analysis prepared by the licensee generated projections in terms of achievable *areas* of annual harvest. Though not a requirement under the area-based AAC trial program, the licensee also tracked the volume harvested each decade in its analysis. For administrative and decision-making purposes, in this document the associated average annual volume harvested during the first 20 years of the area-based base-case and sensitivity analyses for each block are reported and I have used these volumes in my considerations for determining a volume-based AAC.

The 2003 timber supply analysis was modelled using Complan 3.2006, a spatially explicit harvest model developed by Olympic Resources Management Ltd. and now maintained by Timberline Resources Inventory Consultants. The Complan model has been benchmarked with the MFR's Forest Service Simulation Model (FSSIM) and has been accepted by staff of the MFR Forest Analysis and Inventory Branch for use in timber supply analysis in British Columbia.

Using this model, the availability of timber in the TFL was analysed spatially and projected throughout the 250-year forecast period from 2002 to 2252 for each of the five blocks of TFL 25. Since the Complan model was originally designed for simulating timber flow using volume regulation of harvest levels, area regulation was analysed by requesting a high volume harvest in each period and using an areal constraint to limit the harvest to the specified yearly amount. As in volume-regulated simulations, the areal constraint was changed incrementally until an optimal, constant, annual area of harvest was attained. A constraint to impose balanced harvesting across eligible analysis units was also applied to ensure that harvesting was close to the inventory profile and that disruptive oscillations in harvested volumes were not induced by the area-regulation.

Where feasible, the Complan model projected the timber supply implications of current environmental protection and management practices—including operational requirements of the Forest Practices Code (FPC), FRPA and other regulations and guidelines—in spatially explicit form. Sensitivity analyses were performed to investigate the implications of various management options, and to evaluate the relative importance of specific assumptions. For area-regulated scenarios the area harvested annually was modelled to remain constant throughout the 250-year forecast period.

The base case provided by the licensee reported the following non-declining area-based harvest levels and associated short-term harvest volumes:

Block	Location	Area (hectares/year)	Associated volume (cubic metres/year)	Contribution (percent)
Block 1	Jordan River	290	164 534	23
Block 2	Loughborough Inlet	123	90 234	10
Block 3	Naka Creek	87	68 342	7
Block 5	Swanson Bay	491	284 258	40
Block 6	Haida Gwaii	251	140 873	20
Base Case		1242	748 241	100
NRL*		8	3700	
Total		1250	751 941	

*The base harvest forecast for each of the five blocks of TFL 25 shown in this table does not exclude non-recoverable losses (NRLs). The licensee estimates NRLs at 8 hectares per year overall, resulting in a total AAC proposed by the licensee of 1250 hectares, with an associated volume of 751 941 cubic metres.

The proposed AAC consists of the sum of the harvest levels allocated by block. Sensitivity analysis shows that removing the allocation by block permitted an increase in the harvest level of 2 percent. However, the licensee notes that presenting the harvest forecast for each individual block is a more accurate reflection of the operational management on the TFL, where each block is administered separately.

I have reviewed each of the five base-case projections in detail, including the implications of the changes in each block throughout the 250-year projection period, in respect of:

- the age-class structure of the forest on and outside the timber harvesting land base, together with the contributions of the age classes to the timber supply including the timing of the transition to harvesting in managed stands, as well as the extent of retained older forest;
- the mean volume per hectare and the mean tree diameter at breast height of the merchantable growing stock;
- the overall harvestable area, the area harvested annually, and the implied average rotation in years;
- the average volumes harvested per hectare;
- the point in time at which the harvestable area is most restricted—a defining limitation on the sustainable area harvest level;
- the areas and volumes assumed to be harvested by helicopter.

I conclude from my review of the characteristics of the five base-case harvest projections that the analyses individually and in combination generally provide an adequate reference for my assessment of the timber supply available over time in TFL 25.

The licensee also provided a sensitivity analysis for each block, projecting the timber supply under volume-based regulation. When the agreement was reached to conclude the trial project for area-based regulation, I decided in consultation with MFR staff not to use these volume-

based analyses as base cases for reference in this determination. The volume-based analyses were not originally intended for this purpose and therefore were not reviewed to the same rigorous standards as those applied in reviewing the area-based analyses. Nonetheless, the volume-based analyses have provided helpful information from which—acknowledging inherent uncertainties—I have taken some guidance in my determination, as noted in ‘*Alternative harvest flows*’ and ‘*Reasons for decision*’.

In the main body of my considerations set out below, I document my detailed examination of the validity of the base-case projections in respect of the correlation between the assumptions incorporated in the analyses and specific aspects of current land use and operational practice. In some cases, where I have concluded that an assumption was appropriately modelled in a base case, I have noted my agreement with the approach as already documented in the licensee’s analysis report, but I have not reiterated the associated details. Conversely, I have explained in detail my consideration of any assumption which I have found to be of concern for any reason, such as lack of clarity in the analysis report, apparent divergence from current management practice, or where a high level of input has been received from the public or from a First Nation.

In ‘*Reasons for decision*’ I have noted and further discussed specific considerations which I have drawn from my review of the respective base-case projections and which I have taken into account in my determination.

Consideration of factors as required by Section 8 of the *Forest Act*

Section 8 (8)

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

- (a) the rate of timber production that may be sustained on the area, taking into account**
 - (i) the composition of the forest and its expected rate of growth on the area**

Land base contributing to timber harvest

General comments

Consistent with standard AAC determination procedure for all management units in British Columbia, unless otherwise noted all of the land base figures referenced and discussed in the following considerations refer to the data on which the timber supply analysis was based—in this case the 2002 data supporting the 2003 analysis. As noted earlier, since the analysis the land base contributing to the timber harvest in TFL 25 has been reduced by the removal in January, 2007 of all private land, and by the establishment in April, 2007 of conservancies under the LRMP processes. The AAC implications of these factors, which are briefly noted in ‘*History of the AAC*’, and are considered in ‘*removal of private land*’ and ‘*conservancies*’, are accounted for in ‘*Reasons for decision*’.

For TFL 25 as a whole and for each block within the TFL, the gross area, the area of productive forest, and the area considered suitable and available for inclusion in the THLB are noted above in ‘*Description of Tree Farm Licence 25*’, where the total THLB area (prior to the removal of private land) is identified as 138 077 hectares, or 29 percent of the total TFL area at that time.

The total area of the TFL considered in the 2003 analysis is 480 149 hectares, compared to 458 446 hectares in the 1996 analysis. This change reflects the following factors:

- removal of Block 4 (31 300 hectares);
- addition of Block 6 (53 364 hectares);
- addition of crown land in exchange for the designation and withdrawal of the Juan de Fuca Marine Trail (which caused no net change in the TFL land base);
- expansion of the Robson Bight Ecological Reserve, which resulted in the removal of 123 hectares from Block 3; and
- mapping refinements to the TFL which included boundary revisions along heights of land as defined by Terrain Resource Information Mapping (TRIM) data.

In deriving the THLB in the analysis, deductions were made from the productive forest area to account for inoperable areas and for other factors as discussed below. While productive forests that are excluded from the timber harvesting land base for these reasons do not contribute to timber supply directly, the cover they provide does contribute to meeting objectives for many resources other than timber, including wildlife habitat, visual quality and biodiversity.

In deriving the THLB in the 2003 analysis, 49 percent of the productive forested land base was excluded, in comparison to 55 percent in the 1996 analysis. The difference is primarily attributable to revised operability mapping in Block 5 and a review of provisions for riparian management.

Land base exclusions

In deriving the current THLB used in the analysis, land base deductions were applied block by block in respect of: non-forested areas; non-productive forest; non-commercial forest cover; sites of low productivity; riparian reserves; areas considered economically or physically inoperable; and unclassified roads, trails and landings. From the 'current' THLB so derived, deductions were then applied for future roads, and an allowance was applied for partial retention in cut-blocks for future wildlife tree patches and biodiversity objectives, to derive the long-term THLB. In sequencing the deductions, care was taken to avoid any potential double-counting with overlapping objectives.

The exact deductions applied for each of these considerations, for the TFL as a whole and for each of the five blocks, are listed in Tables 5 through 10 of *WFP Tree Farm Licence 25 Timber Supply Analysis Information Package, MP #10, Revised, March 2003*, which was accepted by MFR Forest Analysis and Inventory Branch in April, 2003. I have reviewed and considered each of these deductions and the methodologies employed in their derivations, including any assumptions made. From this review I am in agreement with the methods used and the results obtained, such that I consider the timber supply to have been satisfactorily modelled and projected for each deduction, with the specific exceptions and qualifications noted in the following sections.

It should be noted that some of the land base deductions—riparian reserve areas for example—include aspects of factors that are required to be considered under section 8(8)(a)(v) of the *Forest Act*, respecting constraints on the timber supply resulting from management for resources other than timber. While factors of this nature are accounted for at least in part by an exclusion

of productive forest area from the timber harvesting land base, which I have accepted or addressed in this or immediately following sections, where appropriate they are also further discussed under '*Integrated Resource Management objectives*', below.

- deciduous species - alder

Under current market conditions for alder products, alder stands are commonly harvested in many areas on the coast. At the time of the 2003 analysis for TFL 25, alder sawlogs were routinely utilized only in Block 1, although the licensee anticipated an increased interest in the future in harvesting alder in the remainder of the TFL. Therefore, to avoid discouraging their potential harvest, all stands with red alder as the dominant component were assumed to contribute to the timber supply in all blocks. A total of 1737 hectares of brush and non-commercial deciduous cover were subsequently excluded in deriving the THLB for the analysis.

Sensitivity analysis confirmed that in Block 6, alder stands contributed 20 hectares (7.9 percent) to the long-term area harvest level. The licensee noted in the analysis report that:

...alder needs to be a significant proportion of the harvest profile in the short term. The annual volume harvest from stands with an alder component should be at least 15,000 m³/year in the short term and build to higher levels thereafter as the transition to second growth proceeds.

Since the timber volumes in all alder stands are assumed to contribute to the projected harvest level in each block, it is important for the actual operational harvesting performance in each block to correspond in reasonable proportion to the contribution assumed in the analysis. If harvest performance in alder stands is lower than assumed, it will impose a disproportionate level of the harvest on softwood stands. This applies particularly to Block 6 with its relatively large assumed deciduous contribution. However, current harvest performance data show that Block 1 continues to be the only area where alder is harvested in any quantity on the TFL. In a recent communication with MFR staff, the licensee has indicated it has no current interest in beginning harvesting alder on Block 6. The continuing assumption that alder stands will contribute to the overall harvest level determined for this block is therefore questionable, and I have accounted for this in my determination, as discussed in '*Reasons for decision*'.

- economic and physical operability

The licensee classified the operability of timber on areas throughout TFL 25 with respect to the most suitable harvesting system, the quality and volume of timber, the stability of the terrain, and its economic accessibility. Following these criteria, the licensee identified a total of 137 374 hectares considered to be inoperable.

- application of operability mapping criteria

The criteria used to determine operability were reviewed and accepted by MFR Coast Region staff in October. However, Campbell River Forest District staff have expressed concern with the application of the approved operability criteria based on a 2003 review by the MFR geomorphologist of the applicability of the criteria for assessing harvest potential on unstable and potentially unstable terrain. The 2003 review found areas on blocks 2 and 3 in which, while natural landslides were appropriately delineated as inoperable, the surrounding areas occupying the same landforms as those within which the landslides occurred were deemed fully operable.

Presumably this was based on the assumption that the terrain surrounding the landslide is different from the landslide area. In standard procedure, areas adjacent to an area showing evidence of threshold amounts of landslide activity is classified as 'unstable' or 'potentially unstable', and is then subject to the appropriate reduced contribution to the THLB.

This alternative procedure by the licensee was found to have appropriate application on a similar project completed for TFL 19, but based on the geomorphologist's review of blocks 2 and 3 of TFL 25, district staff concluded that 330 hectares of naturally unstable, unlogged terrain had been inappropriately included within the operable area. The review also identified 256 logged hectares with post-harvest landslides, which had been included in the operable land base although polygons that exceed a post-harvest landslide rate of 0.2 landslides per hectare are recommended for exclusion.

From this, district staff have concluded that at least 538 hectares, or just under 4 percent of the THLB in Block 2 (and 53 hectares in Block 3, essentially an insignificant fraction of the THLB) are in fact inoperable. The geomorphologist further indicated that harvesting with helicopters would not significantly reduce the likelihood of landslide occurrences.

The criteria used to classify the operability of the land base could not be applied to Block 5 as terrain stability and ecosystem mapping were not complete for the majority of the block at the time of the analysis. Sites with sensitive soils and areas difficult to regenerate were removed from the THLB on Block 5 based on environmentally sensitive area mapping completed in March, 1984.

While I accept that MFR staff originally reviewed and approved the methodology on which the operability mapping was based, I have addressed the emerging concern related to its application in the field on Block 2, in '*Reasons for decision*'.

- areas accessible by helicopter

Sensitivity analyses showed that on some of the blocks in the TFL the timber supply is very sensitive to the amount of area considered harvestable only by helicopter. In the sensitivity analyses, the removal of the helicopter-accessible component reduced the harvest in respective blocks as follows: Block 1, 2.1 percent; Block 2, 18.5 percent; Block 3, 9.1 percent; Block 5, 17.9 percent; Block 6, 15.4 percent. In blocks 2 and 6, the helicopter-accessible land base alone is assumed to initially support almost 19 percent and 12 percent respectively of the projected total harvest level. As noted in '*Actual harvest level*', current performance in these stands is very low, and whether the assumptions in the base case will prove realistic in periods of unfavourable market economics is uncertain. I have discussed this further and accounted for the implications for specific blocks in '*Reasons for Decision*'.

Ministry of Environment staff have expressed concern over the increasing amounts of harvesting carried out by helicopter in areas classified as inoperable which MoE considers of importance to wildlife. I am also concerned about the erosion of opportunities for providing habitat for wildlife; however this issue is best resolved during operational planning. The outcome can then be reflected as current performance in analyses that will be used for future determinations.

- *marginally economic stands*

During operability mapping, significant areas of timber were identified as uneconomic for harvest during average market conditions. In the timber supply analysis this ‘marginally economic’ timber was assumed to be inoperable and was excluded from the THLB. The definition for inclusion or exclusion in the THLB of areas with marginally economic operability is of concern to the licensee, due to cycles and uncertainties in market conditions. A sensitivity analysis showed that including marginally economic stands would affect the timber supply projection most in blocks 5 and 6, adding (by area) 3.9 percent and 3.1 percent respectively, and the licensee suggested in the analysis report that consideration should therefore be given to establishing a harvest ‘partition’ specifying a particular harvest level attributable to marginally economic stands. However, I consider this to be of no material advantage at this time, since the likelihood of general market conditions becoming sufficiently favourable to warrant use of such a partition during the effective period of this AAC—particularly given the current market outlook for hemlock—appears even less today than at the time of the analysis.

- *riparian reserves*

- *streams and lakes*

Riparian mapping is an ongoing process on TFL 25 in which data are primarily collected by the licensee from operational stream inventories conducted during harvest planning. Streams are classified as S1 to S6 under the *Forest Planning and Practices Regulation* (FPPR), or ‘Unclassified’ if the stream width and presence of fish are not known. In blocks 2 and 3 the stream classification has been completed, with no remaining unclassified streams.

In the analysis, riparian reserve zones were applied to all lakes and classified streams in accordance with the FPPR. The area of riparian reserves for unclassified streams was calculated using a multiple-stage process aimed at estimating the proportion of unclassified streams that are likely fish-bearing. For the calculation the licensee used stream gradient information from a terrain model and proportions of fish bearing streams derived from the information known for classified streams. Following a review of the procedures for determining the required buffers, in consultation with MFR staff, I am satisfied that the procedures used and the assumptions incorporated in the analysis are both reasonable and satisfactory in accounting for land base exclusions related to riparian reserves for each class of stream and lake.

For blocks 2 and 5, where EBM objectives related to high-value fish streams are currently being implemented as described under ‘*Central and North Coast LRMP areas*’, to the extent possible, I have accounted for the incremental effect on timber supply of this practice under ‘*Reasons for decision*’.

- *wetlands*

No specific allowances were made in the analysis for riparian buffers for the various classes of wetlands. Under FRPA these areas are required to receive protection from forestry operations by the retention of riparian reserves and management areas, through buffers with widths dependent on the size of the system.

For blocks 2 and 5 it is not yet clear what the extent will be under EBM of riparian management areas specifically attributable to marsh and fen wetlands and forested swamps. Until operational experience in the implementation of EBM has clarified the extent of the area requiring protection, the associated timber supply implications remain uncertain. Under '*Implementation*' I have expressed my expectation that further inventory work will be conducted and field experience with EBM gained to provide for the representation of any outstanding management zone requirements for these aquatic habitats in the next timber supply analysis, for consideration in the next AAC determination.

For this determination I have remained mindful of the uncertainty associated with the lack of accounting for this factor, as noted in '*Reasons for decision*'.

Provisions for the riparian management areas outside riparian reserves are discussed below in '*stand-level biodiversity*'

- environmentally sensitive areas

For all blocks except Block 5, land base exclusions for environmentally sensitive areas were accounted for in the analysis in respect of operability classes (for terrain stability and soil sensitivity) and riparian reserves, or by applying area reductions for future wildlife tree patches.

In Block 5, terrain stability and ecosystem mapping were unavailable for the majority of the area. Here, Environmentally Sensitive Area (ESA) mapping completed in March, 1984 was used to identify areas of unstable terrain and areas where extended regeneration delays are expected after harvesting. This mapping for Block 5 identified 28 641 hectares of sensitive areas in respect of which, after land base exclusions for other objectives, a reduction of 3592 hectares was made.

While unavoidably differing methodologies were applied as a result of the information constraints, nonetheless these provided the best information available from which to identify and exclude environmentally sensitive areas on all blocks, and I find no basis from which to differ with the projected timber supply on this account.

- harvest profile

One of the licensee's stated operational objectives is to match the harvest profile to the inventory profile. However, the licensee acknowledged in September, 2006 that the harvest of cedar has recently been disproportionately greater than its occurrence in the inventory. From 1994 to 2003, cedar comprised 42 percent of the harvest in the TFL, while stands predominated by cedar occupy only 35 percent of the inventory. This difference has potential implications for the ongoing provision of cedar with characteristics suitable for First Nations' cultural use, which I have considered under '*cedar for cultural and traditional purposes*'.

Existing forest inventory

- general comments

The status and reliability of the inventory for TFL 25 vary between blocks. At the time of the 2003 timber supply analysis, blocks 1 and 6 had been completed to Vegetation Resources Inventory (VRI) standards—Block 1 in 1999 and Block 6 in 2000—but the Phase II volume ratio

adjustment processes were still under review. For blocks 2 and 3, the forest cover inventories for both of which dated from 1971, the VRI process had commenced in September 2001 but was not complete at the time of the analysis. Net volume adjustment factors (NVAF) for the VRI had been determined from destructive sampling but were also still under review and were therefore not applied. For Block 5, with a 1985 forest cover inventory, the VRI process had begun in 2000, but was deferred by the licensee pending resolution of land use issues. No audits have been conducted on the inventories of blocks 2, 3 or 5.

For the analysis, the inventories for all blocks were updated both for natural and harvesting depletion, and for reforestation, to January 1, 2001. Operational harvesting that took place in 2001 was accounted for such that the analysis data was current for harvesting to 2002.

Currently, the licensee notes that VRI Phase II sampling has now been completed for all blocks, but the Phase II data are under various stages of review by MFR inventory staff and none of the data have yet been used to adjust the inventories.

From this I conclude that the inventories on which the 2003 analysis was based were generally of dated and potentially unreliable quality, particularly those for blocks 2, 3 and 5 which were based on aerial photography from the 1960's and 1970's. While this was the best information available at the time of the analysis, and while the inventories have since been upgraded, the age and condition of the data imply uncertainties in all steps of the land base exclusion process for deriving the THLB, and for growth and yield projections.

In my determination I have been mindful of the introduced uncertainty, as discussed in '*Reasons for decision*'. I expect that for the next AAC determination completed results of the VRI process for all blocks will be available and this will considerably improve the quality of the inventory supporting the analysis. I have included an instruction to this effect in '*Implementation*'.

- ecosystem mapping

The licensee uses an independently developed ecological classification system. Mapping under this system has been completed for all blocks except Block 5. The licensee deferred the process for Block 5 prior to conducting the analysis due to land base uncertainties, but work has now been resumed, funded by the Forest Investment Account.

For the purposes of applying site index that is correlated to the provincial Biogeoclimatic Ecosystem Classification system (SIBEC) in the analysis, the licensee developed a conversion table between its ecological classes and the nearest equivalent Biogeoclimatic Ecosystem Classification (BEC) site series. Research Branch staff reviewed this conversion table and found it reasonable. However, staff indicate that while the licensee's classification system was accepted in the past, current standards for use of ecosystem mapping in Timber Supply Review require an accuracy assessment of the mapped information and until this is done, the accuracy of the information is unknown.

I am concerned that using the licensee's ecological classification system without the standard accuracy assessment typically required before SIBEC values can be applied introduces uncertainty in yield predictions. I urge the licensee to work with Research Branch staff to facilitate this assessment before the next determination. I have discussed the consequent uncertainty further below, under '*site productivity estimates*'.

- *aggregation procedures*

In modelling and projecting timber supplies it is necessary to aggregate information on individual forest stands to reduce the complexity of the description of the forest conditions that must be simulated. In the aggregation process, to avoid obscuring biological differences in stand productivity, stands are grouped into analysis units on the basis of similar species and site productivities. To avoid obscuring differences in management objectives and prescriptions, stands are grouped into landscape units and resource emphasis zones on the basis of similarity of management objectives.

I have reviewed the aggregation procedures applied in TFL 25 for each block and I am satisfied that the procedures used are suitable for use in this determination.

- *Volume estimates for existing natural stands*

Estimates of the timber volumes in existing natural immature stands aged 40 to 140 years were projected using yield tables produced by the Variable Density Yield Prediction (VDYP) batch program Version 6.6d4. For blocks 1 and 6 the inventory site index was used to generate a yield curve for each existing natural stand polygon, and the yield tables were then area-weighted to produce one average yield curve for each analysis unit. For blocks 2 and 3, the ecosystem-based site index (SIBEC) was used in place of the questionable site index information derived from the dated inventories to prepare volume projections for these younger existing stands. For Block 5 no ecological mapping was available and therefore the licensee based the projections for these young stands on the site classes (good, medium, poor and low) included in the 1985 inventory and refined them using permanent sample plot data collected in Block 5. I will discuss this in more detail below under '*site productivity estimates*'.

The method used to project timber volumes for existing mature stands of at least 140 years of age in blocks 1 and 6 was the same as for stands aged 40 to 140 years described above. For blocks 2, 3 and 5 volumes were projected in the analysis based on area-weighted average volume lines (AVL) derived from inventory plots located in these stands. The underlying assumption when using AVLs is that the annual growth in mature stands roughly approximates losses to decay, resulting in no net change in existing volume.

As noted in '*deciduous species – alder*', all alder volumes in pure or mixed stands were included in the volume estimates used in projecting the base case. All other deciduous species were removed from volume estimates. The implications of including alder in the volume estimates are potentially of concern, since stands of predominantly alder comprise roughly 3.1 percent of the long-term THLB of the TFL as a whole while at the time of the analysis, alder was being utilized only on Block 1. I have considered these implications above, in '*deciduous species – alder*', and in '*Reasons for decision*'.

I understand that the licensee considered the procedure for blocks 2, 3 and 5 to provide the best available information, in respect of the quality of the inventory for these blocks. The use of SIBEC data as an input to VDYP is unconventional, and the use of AVLs is an outmoded approach in current timber supply analysis procedures. However, I concur with the acceptance by MFR staff of the yield figures so derived in this case, in view of the inferior quality of the alternative information contained in the old inventories. For the purposes of this determination, I therefore accept the natural stand yield curves as generated and used in the base-case projections

for those blocks, but as noted in *'Implementation'* I have requested work to improve site productivity information.

- *Coastal log grades*

On April 1, 2006, new log grades were implemented for the BC Interior. Under the previous grade system, logs were assessed according to whether the trees they came from were alive or dead at the time of harvest. Under the new system, a log is graded based on size and quality at the time it is scaled or assessed, without regard to whether it was alive or dead at harvest. All 'dead potential' trees (i.e. dead trees that are potentially merchantable) must now also be considered in AAC determinations.

On the BC Coast, logs from dead trees are already harvested, scaled and charged to the licence. Dead western redcedar and old growth Douglas-fir stems may remain sound and suitable for milling for many years. However, they are currently not included in the inventory and have therefore not been accounted for in past AAC determinations. With the recent change in the BC Interior grade system it is now appropriate to account for this 'dead potential' volume in AAC determinations for coastal units as well.

For TFL 25, the estimates of timber volumes used in the base case did not include the contribution from 'dead potential' logs. According to the March 2006 MFR report, *Summary of dead potential volume estimates for management units within the Coastal Forest Region*, possible sources of data for assessing the 'dead potential' volume in TFLs include inventory audit plots, VRI Phase II ground samples, permanent sample plots, and temporary sample plots. According to the report, the most reliable estimates for 'dead potential' can be derived from inventory audit plots.

For TFL 25 no audit information is available. The only available information was the VRI Phase II data submitted for review by MFR inventory staff, and this included information for blocks 1, 2 and 6, and samples for which the applicable block was not specified. The weighted average of the data provided in the March 2006 summary showed that the proportion of 'dead potential' timber present in stands on TFL 25 is 11.5 percent.

In the report the author cautions that 'dead potential' estimates derived using the VRI Phase II plots appear to be higher than when using the other three methods of estimation. According to the author, the method used to collect dead tree data during Phase II sampling may inflate the estimates of 'dead potential' volume.

Having reviewed the available information about the estimates of 'dead potential' volume on TFL 25, I note the considerable uncertainty in the reported estimates. However, given the magnitude of these estimates, I find it likely that in the base case for each block the existing mature stand volumes have been underestimated by a significant unknown amount, and I have considered this in *'Reasons for decision'*. To reduce the uncertainty in this factor, under *'Implementation'* I have recommended that the licensee and MFR staff work together to determine an appropriate method of tracking actual utilization of 'dead potential' volumes so that this factor can be more accurately reflected in the next determination.

Expected rate of growth

- site productivity estimates

Inventory data include estimates of site productivity for each forest stand, expressed in terms of a site index. The site index is based on a stand's height as a function of its age. The productivity of a site largely determines how quickly trees grow. This in turn affects the time seedlings will take to reach green-up conditions, the volume of timber that can be produced, and the ages at which a stand will satisfy mature forest cover requirements and reach a merchantable size.

The most accurate estimates of site productivity come from stands between 30 and 150 years of age. The growth history of stands less than 30 years of age is often not long enough to give accurate measurements of site productivity. Estimates derived from older stands underestimate site productivity as these stands are often well past the age of maximum height growth and have often been affected by disease, insects and top damage as they reach advanced age. The underestimate of site productivity based on forest inventory estimates for older stands has been verified in several studies (e.g. Old-Growth Site Index or OGSi study) in the province. These studies have confirmed that when old stands are harvested and regenerated, the site productivities realized are generally higher than those predicted for older stands from estimated site indices based on inventory data.

For the 2003 analysis for TFL 25, the method of derivation of site indices varied block by block. For blocks 1 and 6, the VRI was used to derive site indices for all existing and regenerating stands.

For blocks 2 and 3, since the licensee considered the 1971 forest cover inventories insufficiently reliable for deriving site indices, ecologically based SIBEC estimates were used for existing immature stands (younger than 141 years) and for future managed stands. For mature stands (older than 140 years), no productivity estimates were assigned, since these were modelled using the AVLs estimated from inventory plot data as described above under '*volume estimates for existing natural stands.*'

For Block 5, the quality of the 1985 forest cover inventory was also considered too low for site index derivation, but because ecological mapping for this block was not complete, SIBEC could not be used. For immature and future managed stands in Block 5 the licensee based site index estimates on the available inventory site classes of 'good', 'medium', 'poor' or 'low', and refined these with data collected from permanent sample plots (PSPs) in Block 5. Again, no productivity estimates were assigned to the mature stands, since these were modelled using AVLs estimated from inventory plot data.

I am concerned about the derivations of site indices for all blocks, for several reasons. The SIBEC information used for blocks 2 and 3 is best used in situations where the site productivity is poorly represented by the attributes of the existing stand. For example, SIBEC is applied to very young managed stands and to future managed stands regenerated on sites currently occupied by very old stands (as well as for stands that are not suitable for other methods). The practice of using SIBEC information to derive site index estimates for existing stands aged from about 40 to 140 years is not generally accepted. SIBEC is considered an appropriate source for providing site index estimates for *managed* stands only (i.e. in conjunction with the Table Interpolation Program for Stand Yields (TIPSY) model).

In any case, I have noted earlier, in *'biogeoclimatic ecosystem mapping'* that site productivities provided from SIBEC information are not typically relied upon unless correlated with approved PEM or TEM, which did not occur in this case.

With respect to Block 5, it is not commonly accepted practice to use local PSP data for deriving site indices, as there is no guarantee that a sample plot provides representative data unless it is a component of a project designed to improve inventory site index information.

For blocks, 1, 5 and 6, the site indices were not adjusted from local data to reflect the general provincial trend toward higher site indices in regenerating stands after harvest as indicated in studies like the OGSi study. The future managed stand yields for blocks 1 and 6 therefore may well be underestimated, although I am advised that the indices for Block 5 do in fact appear comparable with SIBEC values. The varying levels of retained forest cover under EBM may in any case affect the consistency with which the actual, future regenerated timber volumes will match the gains to be expected from the generalized OGSi findings.

In short, there is much uncertainty about the site productivities on TFL 25, and it is not known whether the values and methodologies used lead to under- or overestimations in the timber supply in various periods. The implications of inaccuracy in the site productivity estimates are potentially very significant on some blocks. Sensitivity analyses indicate that if the site indices for age classes 1 and 2 and future stands were in fact overestimated by 3 metres on each block, the annually harvestable areas for blocks 1, 2, 3, 5 and 6 would be reduced by 19.2 percent, 14.5 percent, 19.3 percent, 11.8 percent and 30.7 percent, respectively. The implications for timber supply of site indices being underestimated by a similar amount would likely be an increase of a similar magnitude.

Since uncertainty in site index values affects not just predicted yield volumes but also the time required to meet green-up and mature forest cover objectives and merchantable ages, I have instructed the licensee to carry out work to significantly improve the site productivity information on the TFL before the next analysis, as noted in *'Implementation'*. In the current determination I have remained mindful of this uncertainty, as discussed in *'Reasons for decision'*.

- volume estimates for regenerated managed stands

In the analysis, the standard MFR growth and yield program, Table Interpolation Program for Stand Yields, or TIPSy (Batch Version 3.0), was used to estimate the timber volumes for regenerated managed stands. A yield table was calculated for each polygon and the results were area-weighted to produce an average, managed-stand yield curve for each analysis unit.

All yields were estimated based on regeneration to an establishment density of 1000 stems per hectare after clear cutting, with no adjustment for juvenile spacing or past fertilization. Potential effects of future fertilization are considered below, under *'gains from fertilization'*.

Regeneration delay was accounted for in the timber supply model.

All TIPSy projections of volume yields for managed stands are initially based on ideal conditions, assuming full site occupancy and the absence of pests, diseases and significant brush competition. However, certain operational conditions, such as a less-than-ideal distribution of trees, the presence of small non-productive areas, endemic pests and diseases, or age-dependent factors such as decay, waste and breakage, may cause yields to be reduced over time. Two

operational adjustment factors (OAFs) are therefore applied to yields generated using TIPSy, to account for losses of timber volume resulting from these operational conditions. OAF 1 is designed to account for factors affecting the yield curve across all ages, including small stand openings, uneven tree distribution, endemic pests and other factors. OAF 2 accounts for factors whose impacts tend to increase over time such as decay, and waste and breakage.

For TFL 25, the standard provincial reductions of 15 percent for OAF 1 and 5 percent for OAF 2 were applied to blocks 2, 3 and 5, but for blocks 1 and 6, the licensee performed an evaluation of forest cover gaps using the aerial photos from the VRI. The licensee estimated that, for these two blocks, the standard 15-percent reduction for OAF 1 was overestimated by 4 to 9 percent, and therefore applied an OAF 1 of 11 percent to the yields for managed stands in these blocks. MFR analysis staff considered that in view of the limitations inherent in the scale of the photography, an OAF of 12 or 13 percent would have been more appropriate, but eventually accepted the procedure.

For OAF 2, MFR analysts required an increase in OAF 2 to 12.7 percent for stands of predominantly Douglas-fir in the CWHxm2 BEC zone in Block 1, to account for the *Phellinus* root rot. This adjustment was applied through area-weighted OAF 2 values to the areas containing these stands.

Accepting that efforts were made to refine the volume estimates in the above noted ways, it must also be remembered that the reliability of managed stand yield volume estimates is directly affected by uncertainty in the site index information. MFR staff are concerned, and I concur with the concern, that the application of SIBEC productivity estimates in blocks 2 and 3, in combination with assumptions about volume gains expected from the use of select seed with improved genetic traits, which I have considered below, in '*gains from the use of select seed*', may have led to overestimation in the managed stand yields estimates for blocks 2 and 3. As noted in '*site productivity estimates*', I have instructed the licensee to significantly improve the site productivity information for the next analysis, which will bring needed reliability to these volume estimates.

One other factor that will introduce uncertainty into the yield estimates for managed stands is the as yet unknown extent of the effects of partial retention of forest cover, under EBM procedures, on rates of growth in new stands on blocks 2 and 5. Since the magnitude of this uncertainty cannot be known at this stage, as I have also noted below, under '*Silvicultural systems*', to improve the availability of appropriate information for projecting the timber supply in the next analysis, particularly under regimes of partial cutting or variable retention, in '**Implementation**' I have recommended monitoring of the stand volumes that may be expected to be achieved over time in response to various management regimes, as well as the regeneration response to planting under the remaining stand after first harvest. I have considered related matters under '*Ecosystem Based Management*.'

For this determination, I have accepted the yield estimates as they were provided as being the best information available for incorporation in the analysis, but I have remained mindful of the noted uncertainties, as discussed further in '**Reasons for decision**'.

- minimum harvestable ages

In timber supply modelling, the lowest age at which a forest stand is assumed to have grown to a harvestable condition is usually expressed in terms of a 'minimum harvestable age'. The minimum harvestable age assumption mainly affects when a second-growth stand will be available for harvest within the model. This, in turn, affects how quickly existing stands may be harvested such that a stable flow of timber harvest may be maintained. In practice, many forest stands will be harvested at much higher ages than the minimum harvestable age, due to economic considerations or forest cover constraints on harvesting that arise from managing for such values as visual quality, wildlife and water quality.

In analyses for TFL 25, minimum harvestable ages have been based on the ages at which the trees in forest stands meet product objectives by attaining an economic minimum mean diameter as defined by the licensee. In the analysis for the 1996 AAC determination, the minimum criteria for harvesting forest stands were based on a target 'quadratic mean diameter' ('DBHq'). The minimum DBHq was defined as 45 centimetres, 40 centimetres, and 35 centimetres, respectively for sites of good, medium, and poor productivity.

In the 2003 analysis, the minimum harvestable criteria varied by block, with the minimum DBHq set at 40, 35 and 30 centimetres for good, medium and poor sites respectively in low-cost, southerly operations in Block 1. The minimum DBHq was increased to 47, 42 and 37 centimetres respectively in higher-cost operations in the two most northerly blocks.

Sensitivity analyses investigated the effect on the projected timber supply of increasing and decreasing the DBHq for each stand by 3 centimetres. Increasing the requirement reduced the area based harvest levels projected for blocks 1, 2, 3, 5 and 6 respectively, by 18.2 percent, 15.3 percent, 15.9 percent, 8.9 percent, and 21.3 percent. Decreasing the requirement by 3 centimetres increased the projected harvest levels by a corresponding 5.8 percent, 14.5 percent, 14.8 percent, 13.6 percent, and 11.4 percent. Thus the timber supply is quite sensitive to both increases and decreases in the minimum harvestable criteria in all blocks.

In general, the minimum harvest criteria applied by the licensee in the analysis for TFL 25 are more constraining on the projected timber supply than those assumed by most other operators on the coast. Elsewhere, the criteria are often set as the age when a stand has reached 95 percent of the age at which its maximum mean annual increment (MAI) of growth is reached, that is, its 'culmination age'. Using the 95-percent of maximum MAI criterion generally results in younger stands being assumed to be available for harvest than the ages that would be required to meet the DBHq criteria applied by the licensee.

I note that predicting the age at which stands will be available for harvest many years in the future is difficult, although more young stands are currently being harvested on the coast and this should lead to more reliable estimates of minimum harvestable ages. For this analysis the licensee refined its estimates of minimum criteria it assumed to be necessary for stands to be available for harvest, and these criteria are based on piece size, an important determinant in the viability of harvesting operations. I encourage the licensee to continue to refine its estimates for future determinations. For this determination I consider the minimum harvest criteria as applied in the analysis to be adequate and appropriate.

- *gains from the use of select seed*

The use of select seed with improved genetic traits can increase the timber volumes in managed stands in the long term and can shorten the time required for a forest stand to reach a green-up height or the minimum harvestable age. The quantity and quality of select seed available in the province have increased in the past decade, and are projected to increase further. Licensees are required to use select seed when available.

For TFL 25, the licensee maintains its own private seed orchards and tree breeding programs. In the analysis, genetic gains were modelled by applying factors for each species for which seed is available. Gains were applied at one level for existing managed stands and a higher level for future managed stands. These assumptions were accepted by MFR Research Branch staff in 2003.

I am advised that MFR staff consider the licensee's seed program to be of good quality. Having reviewed this factor with MFR staff, I am generally satisfied that volume gains from the current use of select seed are adequately accounted for in the base-case analysis. However, as noted earlier, in '*site productivity estimates*', I remain concerned that their application in combination with the use of SIBEC productivity estimates in blocks 2 and 3 may have led to some overestimation in the managed stand yield estimates for these two blocks. I am also concerned that under the practice of EBM in blocks 2 and 5, with various amounts of retained cover, the assumption that 100 percent of the planted seedlings will manifest 100 percent of the assumed gain associated with the select seed may result in an overestimate of timber supply. I have discussed these concerns further in '*Reasons for decision*'.

- *gains from fertilization*

In TFL 25, the licensee has maintained a fertilization program in Block 1 and Block 6 (as the former TFL 24) since 1990.

In the analysis, the implications for timber supply resulting from the fertilization of Douglas-fir mixed stands late in the rotation was modelled by applying the default fertilization gain of 30 cubic metres per hectare in the TIPSY program. The fertilization of predominantly cedar stands on productivity group C sites, to out-compete salal growth, was modelled by assuming a shift in the productivity to the next highest productivity group.

The fertilization assumptions were reviewed and accepted by MFR research and analysis staff at the time of the analysis, and for the purpose of this determination I conclude that the timber supply implications of the associated volume gains have been appropriately accounted for in the timber supply projections.

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

Regeneration delay

Regeneration delay is the period between harvesting and the time at which an area becomes occupied by a specified minimum number of acceptable, well-spaced seedlings. Changes in regeneration delay—either lengthening or shortening—can affect the timber supply by altering

both the time at which a stand reaches green-up in order to satisfy adjacency requirements, and the time at which it reaches a minimum harvestable age.

In current operational practice in TFL 25, regeneration delays are estimated to average roughly two years or less. In the analysis, a three-year regeneration delay was modelled for all naturally regenerated stands, but the licensee believes that the practice of applying fertilization at the time of planting reduces the regeneration delay to effectively equal one year, which was therefore modelled for all planted stands.

District staff confirm that these assumptions are a reasonable reflection of the licensee's history of planting performance on the TFL, and I conclude that regeneration delays have been adequately accounted for in the timber supply projection.

Impediments to regeneration

I am advised that regeneration problems occur in TFL 25 in some areas of heavy spot accumulations of yarding slash along roads and areas with both heavy concentrations of slash and salal competition. In these areas, spot piling, burning and broadcast site preparation are performed to minimize the problem. Where competition from vegetation is anticipated, larger trees are planted, which in combination with fertilization at the time of planting speeds development. Brush control is regularly used to ensure that the time to 'free-growing' is minimized.

The licensee notes anecdotally in the analysis report that OAF 1 (see above, '*volume estimates for regenerated stands*') may be underestimated to some extent for Block 5, where brush problems abound and where herbicide use is restricted. In that case, regeneration may not be as complete as assumed. However, and conversely, the OAF 1 may be overestimated in blocks 1, 3, and 6, where stocking tends to be very good. I have noted earlier that OAF 1 was in fact reduced to 11 percent in blocks 1 and 6.

In the absence of specific quantification from which to judge the relative impacts of these two opposing effects, it is reasonable to assume that neither one more than offsets the other, with no net under- or overestimation in the timber supply projection.

I am advised that in some areas hemlock is being felled and left on the ground as slash, which could lead to local regeneration problems, but I have no quantifiable information from which to assess any implications for the timber supply on any particular block.

I am also advised that the licensee considers, and MFR staff agree, that no significant impediments to regeneration exist that require specific accounting in the timber supply model. Therefore, since efforts were made to adjust the OAFs to more closely reflect local conditions, I am satisfied that impediments to regeneration are adequately accounted for in the base-case timber supply projections. Potential regeneration issues related to EBM in Block 5 are considered below in '*Ecosystem Based Management*'.

Not-satisfactorily-restocked areas

Not-satisfactorily-restocked (NSR) areas are areas where timber has been removed, either by harvesting or by natural causes, and a stand of suitable trees and stocking has yet to be

established. Where a suitable stand has not been regenerated and the site was harvested prior to 1987, the classification is 'backlog' NSR. All other NSR is considered 'current' NSR.

In TFL 25 at the time of analysis the total area of NSR was recorded as 2980 hectares, of which 2625 hectares were in the THLB. Of this area, 51 hectares were classified as 'backlog', and natural NSR areas from blow-down and from old slash-fire escapes accounted for 194 hectares.

In the timber supply analysis it was assumed that all 'backlog' NSR and natural NSR areas were in fact fully stocked; these areas were assigned to existing managed stand analysis units with an assumed age of 10 years. All 'current' NSR was assumed to be accounted for in the regeneration delay period.

MFR staff agree that the licensee does attempt operationally to re-stock harvested areas within two years of harvest, and the licensee has confirmed that harvested stands are regenerated within one year of harvest unless delay is imposed by weather. From discussions with MFR staff I am satisfied that the base-case timber supply projections reflect a reasonable equivalency between the modelled assumptions and operational practice.

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

Silvicultural systems

At present the majority of the TFL is harvested using clearcuts with reserves or by group retention harvest methods. Currently there is no significant selection harvesting or partial cutting with dispersed retention, except in some riparian management zones.

On blocks 2 and 5, in consistency with the Agreement In Principle under the North and Central Coast LRMPs (see below, '*Ecosystem-Based Management*') the licensee has committed to implementing Ecosystem Based Management (EBM) and has been gradually doing so since 2004. However, at the time of the 2003 analysis, the implementation of EBM was only in the early stages of negotiation; for this reason, in the absence of definitive information on the implications for management practices, the analyst avoided speculating on the possible timber supply implications of EBM. The analyst noted specific concern for the lack of growth-and-yield data, and the lack of modelling tools to reliably predict the timber supply available from uneven-aged, managed stands, particularly with further complication from the modelling of the timber supply under area-based regulation.

I am satisfied that the assumptions incorporated in the analysis in respect of the silvicultural systems appropriately represent their use at the time, and that the base-case projections therefore reliably represent the available timber supply under those conditions. For blocks 2 and 5, however, with the onset and development of EBM, and the July 27, 2007 *South Central Coast Order* that applies for Block 2 and the December 19, 2007 *Central and North Coast Order* that applies to Block 5, significant changes in the application of various silvicultural systems are to be expected. Details of the consequent implications for timber supply will only emerge over a period of time as familiarity with the new techniques improves, as expertise is developed, and as field monitoring of the results produces information suitable for incorporation in timber supply modelling. To ensure the availability of appropriate information for use in the next analysis, particularly under regimes of partial cutting or variable retention, in '*Implementation*', I have recommended monitoring of the stand volumes. Monitoring should observe stand volumes that

may be expected to be achieved over time in response to various management regimes, as well as the regeneration response to planting under the remaining stand after first harvest.

Further implications of EBM are considered under '*Ecosystem Based Management*', below.

Incremental silviculture

In general, incremental silviculture includes activities such as commercial thinning, juvenile spacing, pruning and fertilizing that are not part of the basic silviculture obligations required to establish a free-growing forest stand following timber harvesting.

I have considered the implications of fertilization earlier, under '*gains from fertilization*'.

In the 1996, Section 8 AAC determination for TFL 25, the harvest attributable to Block 1 included an attribution of 10 000 cubic metres for commercial thinning, to provide an opportunity for a prospective harvest. The licensee has now indicated it has no more current interest in commercial thinning; the partition for commercial thinning therefore has no more utility, and in my determination is removed, as noted in '*Reasons for decision*'.

Since the volume implications of the fertilization program were accounted for, I am satisfied that the base-case projections adequately reflect current practice in the TFL with respect to incremental silviculture.

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

Utilization standards

I have reviewed the information describing utilization standards and am satisfied that standards consistent with the coastal practices used in TFL 25 were incorporated in the analysis.

Decay, waste and breakage

I have reviewed the information describing the allowances for decay, waste and breakage used in the base-case forecasts for TFL 25, and I note that MFR technical staff reviewed and approved them. I am satisfied that these losses were appropriately accounted for in the base-case analysis.

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

Integrated resource management objectives

The Ministry of Forests and Range is required under the *Ministry of Forests and Range Act* to manage, protect and conserve the forest and range resources of the Crown and to plan the use of these resources so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated. Accordingly, the extent to which integrated resource management (IRM) objectives for various forest resources and values affect timber supply must be considered in AAC determinations.

- adjacency, green-up, and forest cover requirements

To aid in managing for resources such as water, wildlife habitat, soil stability, and scenic areas, and to avoid concentrating harvesting-related disturbance in particular areas, operational practices limit the size and shape of cutblocks, and the maximum permissible disturbance—that is, the area covered by stands of less than a specified minimum ‘green-up’ height required for regeneration on harvested areas before adjacent areas may be harvested. The adjacency, green-up and forest cover objectives guide harvesting practices to provide for a distribution of harvested areas and retained forest cover in a variety of age classes across the landscape.

In TFL 25, blocks 1 and 3 are subject to the VILUP and associated Higher Level Plan; these specify a 3-metre green-up height in both the ‘General’ and the ‘Special’ Resource Management Zones, while a 1.3-metre green-up height is specified for ‘Enhanced’ Resource Management Zones. These green-up heights are applicable to all areas in these zones unless an area is also subject to visual quality objectives, in which case the more constraining requirement is applied; these rules were applied in the 2003 timber supply analysis. For blocks 2, 5 and 6, a green-up height of 3 metres was modelled for all areas not subject to other restriction. The model was run in a fully spatial mode for the entire projected time horizon, and therefore adjacency criteria were evaluated by the model prior to every simulated harvest.

I have discussed with MFR timber supply analysts the approach used by the licensee to model requirements for green-up and adjacency, and I am satisfied that the approach appropriately reflects both operational practice and land use planning requirements.

- recreation

In previous analyses for TFL 25, no land base exclusions were applied specifically to account for recreation. At the time of the 2003 analysis, recreation inventory mapping for blocks 1, 2, 3, and 6 was being updated. Established campsites in blocks 1, 3 and 6 covering a total of 13 hectares were identified, and in the analysis were excluded from the THLB.

The 6.3 hectare Jordan River Recreation Site in Block 1 was removed in the recent withdrawal of private land from the TFL by the licensee. In addition, the Juan de Fuca Marine trail, formerly within Block 1, was designated with provincial park status and removed from the TFL prior to the analysis being conducted with no net loss of land base due to an exchange of Crown land.

Block 1 still includes the Kludahk Trail following ridgeline meadows. It now lies in a Special Management Zone, the objectives for which were met in the analysis by applying a cover constraint requiring at least 50 percent of the productive forest to be over 140 years of age.

Campbell River Forest District staff advise that a new recreation features order establishes six new features in blocks 2 and 3 which were not accounted for in the analysis but which affect only six forest cover polygons with only negligible overall additional constraint on the timber supply. I am therefore satisfied that all implications for timber supply associated with management for recreation features are adequately accounted for in the base-case projections.

- wildlife habitat

TFL 25 provides habitat for numerous wildlife species including Grizzly Bear, Kermode Bear, Elk, Deer, Mountain Goat, Marbled Murrelet, Bald Eagle, Queen Charlotte Goshawk and more.

The Conservation Data Centre of BC maintains forest district tracking lists naming those species and plant associations which are considered to be at risk and which are known to occur, are strongly expected to occur, or have occurred in the past, within a given forest district. The Identified Wildlife Management Strategy (IWMS) addresses habitat management for specific identified wildlife species considered to be at risk.

Prior to the 2003 analysis, the licensee had undertaken or broadened a number of wildlife inventories for TFL 25 in an effort to identify and classify potential wildlife habitat areas suitable for identified species. To that date, however, as the licensee noted in the Information Package, there had been no formal establishment of any designated wildlife habitat area requiring removal from the THLB. In the analysis therefore, it was assumed that the majority of critical wildlife habitat associated with mature forest would be met by achieving the old-growth targets required to meet landscape-level biodiversity objectives, with supplemental critical habitat needs being met by the retention of wildlife tree patches at the stand level. No other specific provision for wildlife habitat was modelled and the analysis did not account for identified wildlife species. MFR forest district staff have since expressed concern over the application of only a generalized, aspatial land base exclusion instead of specifically mapped habitat areas. In 2003, the Pacheedaht First Nation expressed concern to the licensee over the need for more Ungulate Winter Range (UWR) and Wildlife Habitat Areas (WHA) on Block 1; this concern should be at least partially addressed in the next paragraph.

Since the analysis, a number of advancements have been made in identifying areas for wildlife requiring management consideration. The licensee and the Ministry of Environment have worked together to prepare WHAs for Block 1 that are now ready for the Deputy Minister of Environment's decision. These areas include about 25 hectares of THLB for red-legged frog and 116 hectares of THLB for Marbled Murrelet. WHAs are also being developed for Block 2, but the process has not progressed as much as for Block 1.

The ungulate winter ranges totalling 316 hectares that were established for Block 1 in November, 2004 were revised following the removal of private land from the TFL in January 2007. A new 78-hectare winter range for black-tailed deer was recently established on Crown land in exchange for the 240-hectare winter range for Roosevelt Elk that was on private land. According to MOE staff, the new winter range on Crown land overlaps class IV and V terrain and riparian management areas and therefore constitutes a relatively small reduction of the THLB. The area also contributes to Marbled Murrelet habitat objectives.

Under Section 7 of the *Forest Planning and Practices Regulation*, Forest Stewardship Plans must include a result or strategy with respect to wildlife when the minister responsible for the *Wildlife Act* gives notice indicating the amount, distribution, and attributes of a required habitat for a species of concern. The only Section 7 notice specific to TFL 25 was for Block 2, which provided instruction to protect appropriate habitats in the amounts of 256 hectares for black-tailed deer and 4280 hectares for mountain goats, with a combined total impact on the THLB not to exceed 707 hectares. In May, 2006, under the Government Actions Regulation (GAR), a total of 3747 hectares of new UWRs were established for black-tailed deer and Mountain Goat on Block 2, with only a minor overlap with the THLB. This order exempts person(s) required to prepare forest stewardship plans from the obligation to prepare results or strategies in relation to the objectives set out in section 7(1) of the FPPR for the winter survival of ungulates in TFL 25, Block 2. The GAR order replaces the section 7 notice.

In 2004, Section 7 notices were also created for each forest district, setting goals for protecting habitat, with associated limits on the THLB, for a range of wildlife including Queen Charlotte Goshawk, Marbled Murrelet, Scouler's Corydalis, Red Legged Frog, Keen's Long-Eared Myotis, Coastal Tailed Frog, Great Blue Heron, and Grizzly Bear.

As an indication of the kinds of requirement conveyed by Section 7 notices, the notice for Marbled Murrelet in the North Coast Forest District protects all suitable habitat in the non-THLB forest plus a maximum of 375 hectares of mature forest on the THLB. MFR district staff advise that the large amounts of good habitat remaining in some blocks on TFL 25 suggest that the TFL may be required to provide a disproportionately large reserve area to meet the targets set at the forest district level.

Schedule 6 of the *South Central Coast Order* contains a map of sensitive Grizzly bear habitat and some of this habitat is located in Block 2. The final map was included in the order in November of 2007. Ministry of Environment staff indicate that the majority of this Class 1 habitat is located in non-forested areas such as estuaries and that the overall impact on the THLB of the area covered by the order is about 1.4 percent. I note that in Block 2 current estimates are that 136 hectares, or about one percent of the THLB, are included in Grizzly habitat. In accordance with the order, Grizzly bear habitat must be maintained and when planning harvesting in these areas a registered professional biologist must confirm that the activity will not cause material adverse impact to the suitability of the habitat. Forest managers must also implement adaptive management, monitoring, and engage in information sharing or consultation with First Nations.

From all of this, my conclusions with respect to managing and accounting for wildlife habitat in TFL 25 are as follows. While no specific provision was included in the analysis for maintaining forest cover for habitat for any identified wildlife, more recent events make it clear that appropriate provisions for wildlife habitat are now being made and must be accounted for. The noted habitat requirements in Block 2 which already have legal status and to a large extent quantified associated areas, can now be accounted for directly in this determination, and I have done so as discussed in '*Reasons for decision*'. Other habitat requirements which are still being identified will most probably achieve legal status eventually, but their associated areas and timber supply implications remain unquantified and speculative at this time. In '*Reasons for decision*' I have addressed these requirements in a more general way in the context of other and potentially significantly greater risks.

- *visually sensitive areas*

The Code and FRPA enable scenic areas to be designated, and visual quality objectives (VQO) to be established, so that the visible evidence of forest harvesting may be kept within acceptable limits.

At the time of the 2003 analysis, for all blocks other than Block 3, visual quality was managed to the recommended visual quality class (rVQC) established in a Visual Mitigation Strategy conducted by the licensee in 1998. For Block 3, a revised inventory was completed in December, 2001, which identified revised rVQCs based on existing landscape conditions and management goals. In the analysis, the rVQCs were modelled in the standard way with maximum permissible disturbance constraints of one percent for 'Preservation', five percent for 'Retention', 15 percent for 'Partial Retention', and 25 percent for 'Modification'; the constraints were set at the upper

end of the allowable disturbance range. For blocks 5 (visible from the Inside Passage) and 6 (on the Queen Charlotte Islands) a six-metre visually effective green-up (VEG) height was modelled, with a five-metre VEG height for all other blocks.

Since the analysis, VQOs have been legally established on all blocks, and a review by MFR district staff found generally only very small changes from the rVQCs and constraints modelled.

From my review of the constraints applied to achieve visual quality management in the TFL I am satisfied that appropriate efforts have been made to take inventory of the sensitive areas. I note that in Block 5 alone over 3227 hectares of the THLB are identified for a maximum of 5-percent modification under the 'Retention' classification, and a total of 14 300 hectares for a maximum of 15-percent modification under the 'Partial Retention' classification. These were unusually large areas assigned to such constraints, in this case in respect of the Inside Passage tourism industry. I am also satisfied that, with VQOs now established on all blocks, the small changes indicate that the rVQCs as modelled are still representative of current visual management, and the timber supply implications for visually sensitive areas are thus adequately represented in the base-case harvest level projections.

- stand-level biodiversity

Wildlife tree patches (WTPs) and coarse woody debris are important to the conservation of biodiversity at the forest stand level. FRPA provides for the retention of wildlife trees in harvested areas.

In the analysis, to represent the area reserved for stand-level biodiversity objectives, the model included an aspatial volume reduction factor applied at the time of harvest for each stand intended to meet objectives for the following values: future wildlife tree patches; the preservation of culturally modified trees (CMT) not located in WTPs; riparian management zones (which were not spatially modelled); partial retention harvest systems under EBM (noted below in '*assessing the implications of EBM for timber supply*'); and an additional precautionary factor added by the licensee to address uncertainty. The resulting volume-reduction factor was 5 percent except for Block 5 where a factor of 8.5 percent was applied to reflect the uncertainty associated with riparian management and dispersed retention under EBM.

I have reviewed the licensee's method of calculating the allowance required for WTPs as described in the Information Package, which in itself appears reasonable. I note that the portion of the volume adjustment factor that pertains to riparian management and dispersed retention as well as the precautionary factor was tripled in Block 5 in an attempt to also reflect uncertainty in extrapolating riparian requirements from the short history of stream mapping in that block, and as a response to the expected need for higher levels of partial retention management under EBM. I further note that no additional volume adjustments were made for Block 2, and now EBM must be practiced there in accordance with the *South Central Coast Order*. I have discussed the implications of EBM for the timber supply of Block 2 below under '*assessing the implications of EBM for timber supply*'.

For this determination I have concluded that, at the time of the analysis, the application of such a generalized reduction was probably a reasonable response to the emerging variety of land use uncertainties, and I will accept that the resultant overall reduction appears to be an adequate means of accounting for biodiversity objectives and related uncertainties at the stand level.

Nonetheless, the combination of all of these factors into one reduction renders assessment of the individual uncertainties difficult and, for the next analysis I expect the licensee will clarify the provisions for the component objectives by more specific means, rather than under this global approach.

- *riparian management areas*

Riparian management areas (RMA) along lakes, wetlands, streams and rivers provide key habitat for fish and wildlife and help conserve water quality and biodiversity. The Code and the FRPA provide for RMA which include riparian reserve zones (RRZ) that exclude timber harvesting and riparian management zones (RMZ) where constraints are placed on timber harvesting. Riparian reserves and management areas are considered in this rationale earlier under '*riparian reserves*', and immediately above, under '*stand-level biodiversity*'.

- *Landscape-level biodiversity*

Conserving landscape-level biodiversity involves maintaining forests with a variety of patch sizes, seral stages, and forest-stand attributes and structures, across a variety of ecosystems and landscapes. In the delineation and formal designation of Landscape Units, for establishing biodiversity management objectives, three biodiversity emphasis options (BEO)—'lower', 'intermediate' and 'higher'—are identified. Each option is designed to provide a different level of natural biodiversity, and a different risk to the maintenance of elements of natural biodiversity, when finding an appropriate balance between biodiversity and timber supply in establishing the objectives.

Together with other forest management provisions that provide for a diversity of forest stand conditions, the retention of old forest is a key landscape-level consideration. Old forest retention to meet biodiversity objectives can be achieved through the location of Old-Growth Management Areas (OGMAs). Through the landscape unit planning process, as described in the *Landscape Unit Planning Guide*, OGMAs are identified, wherever possible, in forests that are already unavailable for timber harvesting for other environmental or economic reasons. Old forest retention requirements are only met by establishing new reserves in the THLB where these requirements are not met in areas already excluded from the THLB for other reasons. Where this is done, areas with high biological value should be identified. In general, where possible, reserves of productive forest for land-base exclusions are established for overlapping values, which helps to optimize their contribution to the non-timber values they are designed to protect, while also reducing impacts on timber supply.

In TFL 25, at time of the 2003 analysis, the mapping of Landscape Units and assignment of BEOs was not finalized for blocks 1, 3 and 6, and interim BEOs were used (which have since been finalized as part of the June 30, 2004 provincial *Non-Spatial Old Growth Order*). For blocks 2 and 5, since the licensee considered the land use planning in the Central Coast to be uncertain and the assigned BEOs unreliable, the *Biodiversity Guidebook* default proportions of 10 percent 'higher', 45 percent 'intermediate', and 45 'lower' BEO, were applied in the base case. Also, in these two blocks, which have a long history of harvesting, the option (now provided for in the *Non-Spatial Old Growth Order*) to draw down the required retention of old forest to one third of the listed requirement in areas of low BEO (where a timber supply impact is noted) was employed. In accordance with the guidelines, the constraint was increased to two thirds after 70 years, and fully restored after 140 years.

My assessment of the modelling of provisions for landscape-level biodiversity is as follows. For blocks 1, 3 and 6, the old-growth retention targets modelled were the same as those now in the *Non-Spatial Old Growth Order* and, in Block 1, OGMA's are planned for locations with no impact on the THLB. Sensitivity analyses for blocks 2 and 5 showed only low sensitivity in the timber supply to changes in the constraints applied to meet biodiversity objectives. Management for biodiversity on these two blocks will be altered significantly in the future under EBM, which is discussed below, under '*Ecosystem-Based Management*'. For the purposes of this determination, I conclude that the requirements for landscape-level biodiversity existing at the time of the analysis were appropriately incorporated in the base-case timber supply projection for each block, and that any further, currently discernible considerations attributable to EBM are accounted for in accommodations I have made in the determination, as discussed in '*Reasons for decision*'.

- *disturbance in the non-timber-harvesting land base*

One other factor affecting the adequacy of modelling for landscape-level biodiversity is natural disturbances—such as from fires or insects—in the forest cover on the non-harvestable land base. These disturbances can affect the contribution made by this land toward the retained forest cover required to meet biodiversity objectives, which in turn can affect the projected timber supply. This factor was a relatively new consideration at the time of the 2003 analysis for TFL 25, in which no attempt was made to model the related implications. Consequently, the age-class projections show ongoing accumulations of the oldest age classes on non-THLB lands when in reality these lands would be subject to some degree of natural disturbance. Disturbances in the non-THLB land base could lead to the need to find more retained old forest on the THLB to meet landscape-level objectives, particularly on blocks 3 and 6. However, this factor has more significance for forests in the BC Interior, where proximity to more frequent incidences of larger, naturally disturbed areas is greater. Therefore, while the absence of modelling of this factor may have minor implications for the projected timber supply, I consider that the inclusion of a representation of this factor in the next analysis will suffice to remove any associated risk in the projection.

- *cultural heritage resources*

Section 1 of the *Forest Act* defines a cultural heritage resource as

an object, a site or the location of a traditional societal practice that is of historical, cultural or archaeological significance to British Columbia, a community or an aboriginal people.

Government has set the following cultural heritage resource objective in Section 10 of the *Forest Planning and Practices Regulation*, for which FSPs must include a strategy or result:

to conserve, or, if necessary, protect cultural heritage resources that are:

- (a) the focus of a traditional use by an aboriginal people that is of continuing importance to that people, and
- (b) not regulated under the *Heritage Conservation Act*.

In TFL 25, sixteen First Nations have asserted traditional territories overlapping the TFL area. These First Nations are:

On Block 1, the T'sou-ke, Malahat, Scia'new, and Pacheedaht;

On Block 2, the Wewaiwai (Cape Mudge), Wei Wai Kum (Campbell River), Homalco, Da'naxda'xw/Awaetlala, and K'omoks;

On Block 3, the Tlowitsis, Wewaiwai (Cape Mudge), and Wei Wai Kum (Campbell River),

On Block 5, the Heiltsuk, Haisla, Gitga'at, Kitasoo, and Kitkatla;

On Block 6, the Haida.

An archaeological overview assessment for the Central Coast was completed in 1999 and it provided some general information on potential archaeological sites and resources and indicates where evidence of past human activities is most likely to be found. In 2000 a more detailed assessment was conducted for Block 5. In 2007 another AOA was initiated for the Campbell River Forest District which includes blocks 2 and 3 of TFL 25 but this assessment has not been completed to date. When using AOAs for harvest planning, areas with high likelihood of past cultural activities, most often found along larger waterways and the shoreline, are subject to field reconnaissance and inventory.

An AOA has also been completed that covers Block 6, however district staff indicate that there is some debate between MFR and the Haida over use of the existing AOA. District staff consider it to be some of the best or most current information available and it is used for day-to-day operations' review of blocks. They indicate however that the Haida are concerned that reviews may be limited to just the AOA, and assert that the reviews should account for more recent information the Haida have developed. District staff further indicate the Haida are concerned with sharing the information due to the sensitive nature of the identified values and their locations.

Traditional Use Studies (TUS) have been carried out for the Pacheedaht on Block 1, and the Haisla and Kitasoo on Block 5. TUSs were also conducted for the Homalco near Block 2 and Kitkatla near Block 5, however those study areas overlap no area on TFL 25.

I am advised by the licensee that with the specific exceptions noted below, protection of cultural heritage resources has to date been achieved within areas already reserved to meet other objectives, such as riparian areas and wildlife tree patches, without the need for further, specific reductions to the THLB. For this reason, in the 2003 analysis, features such as Culturally Modified Trees (CMT) were considered to be accounted for in areas already excluded from the THLB, and no explicit accounting was included for cultural heritage resources. One exception is on Block 1 where the licensee asserts assessments for CMTs have been conducted for six years and in that time CMTs were found in only one cutblock where 8 hectares of low-volume cypress hemlock within the THLB required protection. This area comprises such a small portion of the THLB as not to have a significant impact on timber supply.

On Block 6 WFP indicates that reserve areas for cultural, including monumental, cedar have been identified, but it had no specific information on the incremental amount of THLB that was required to protect these resources. Now BCTS operates on Block 6 and it also had no specific information relating to Block 6. According to Queen Charlotte Island Forest District staff, the current estimate for CMTs on Haida Gwaii is about six percent and for monumental cedar an additional 5 percent. However, recent mapping of areas where concentrations of cultural cedar are located shows much fewer polygons on Moresby Island than on Graham Island. As described under 'Queen Charlotte Islands' below, in the Haida Gwaii Strategic Land Use

Agreement an area on Block 6 is identified where cedar management objectives apply. From this I conclude that in the base case the timber supply for Block 6 has very likely been overestimated on this account, but to an unknown extent and I will discuss this further in '*Reasons for decision*'. With the noted potential exception of cultural cedar—considered above for Block 6 and discussed below—the information available to me suggests that the accounting in the base case is adequate for all other currently known cultural heritage resources.

- cedar for cultural and traditional purposes

Cultural cedar: An important cultural heritage resource for many coastal First Nations is a continuing supply of mature cedar with attributes suitable for purposes such as bark stripping, small dugout canoes, poles, carving, or root collection.

As part of the 2003 analysis the licensee tracked the volume of mature cedar on each block of TFL 25, and estimated that the timber supply would provide for cultural uses of cedar over the entire 250 years modelled. However, the licensee now acknowledges that the growth and yield data for second growth cedar is not sufficiently detailed to provide certainty that future, regenerated cedar trees will have desirable attributes for some cultural purposes.

I have reviewed the licensee's projection of future cedar harvest volumes for each block of the TFL through the next 250 years, and I note the licensee's assessment that although there are modest declines in the cedar harvest on blocks 2 and 3, the cedar growing stock never falls below 82 percent of current harvest levels. For the general cultural cedar purposes noted, given the strategies and provisions noted below, I anticipate that with suitable communication between First Nations and the licensee, an ongoing supply of cedar trees appropriate for cultural purposes can be maintained, with the following significant caution related to 'monumental cedar'.

'Monumental cedar'—meaning very large, good quality cedar suitable for large dugout canoes, very large poles, split beams and planks—is also used by First Nations. The licensee has anticipated that suitable cedar trees will be available from reserved areas, including riparian reserves, WTPs, and other inoperable forests. However, the Pacheedaht First Nation, which has asserted traditional territory overlapping Block 1, in input to this AAC determination process has expressed concern for the long-term supply of cedar for cultural purposes. The Pacheedaht First Nation plans for cultural cedar over a 300-year horizon, and wishes to ensure that potential cultural cedar trees are identified at the forest-stand level to ensure ongoing recruitment from older, second-growth cedar stands of high productivity. The Pacheedaht provided a list of assumptions and characteristics describing their needs for cedar, including estimates related to the age at which cedar meets requirements for cultural use; the wood volumes in suitable logs; the number of cedar trees needing to be conserved to meet the First Nation's future demands for cultural uses; mortality rates in cedar; the number of suitable trees to be located in parks, OGMAs, and other reserves; and specifications for canoe logs. Management for monumental cedar requires particular consideration, and in making my assessment of potential implications for timber supply I have carefully reviewed the processes and strategies in place to accommodate this cultural resource for the various blocks of TFL 25, as follows.

For Block 6, the new strategic land use agreement between the Haida and the Province has set objectives for cultural cedar. For Block 2, the *South Central Coast Order*, and for Block 5, the *Central and North Coast Order* also provide objectives for cultural cedar.

For the Coast Forest Region, the Province's January, 2005 *Guidelines for Managing Cedar for Cultural Purposes* were developed to ensure a consistent approach is undertaken across the region when working with First Nations regarding the management of cedar for traditional and cultural purposes. These are intended to provide guidance in the consideration of First Nations' interests in cedar, on the assessment of cultural cedar needs, and in assessing the current supply of available cedar. They are also intended to provide assistance in the development of results or strategies for managing cedar for traditional and cultural purposes in forestry operational planning to meet the cultural heritage resource objective set by government (noted above in '*cultural heritage resources*'). Guidance is provided on management considerations including the need for a collaborative approach in providing for appropriate short-term access to, and long-term recruitment of cedar. These guidelines are applicable to blocks 1 and 3, and will remain complementary to the noted guidelines developed for blocks 2, 5 and 6.

BCTS, which currently carries out all operational activity on blocks 3 and 6, has developed for its operations in the Strait of Georgia Business Area the BCTS *Strait of Georgia Business Area Cedar Strategy*. This strategy applies in Block 3 and is intended to

ensure that both red and yellow cedar are maintained on the landscape in numbers and distribution similar to pre-harvest condition and that a suitable number are able to grow to a size appropriate for First Nations' traditional and cultural uses.

Components of the strategy include identifying representative samples of monumental cedar to be retained, mapped and tracked. Monumental cedar is defined as being

2 metres in diameter or greater above the butt flare with a log at least 12 metres long with a top diameter of at least 1.7 metres and relatively limb-free in at least 2-3 quadrants.

The strategy refers to mapping larger concentrations of suitable red cedar, preferentially retaining cedar in reserves and wildlife tree patches, planting cedar where appropriate, maintaining its proportions on the landscape, and other measures. BCTS commits to tracking the supply and demand of cedar where the applicable First Nation voluntarily supplies the information to BCTS. Chinook Business Area staff indicate that in Block 6 BCTS is now leaving monumental cedar standing on cutblocks.

As I noted earlier in '*harvest profile*', the licensee has provided statistics indicating that the cedar harvest in TFL 25 has been disproportionately greater than its representation in the inventory. The licensee explains that this has been occurring largely in Block 5, and reflects the market-driven, economic realities of the North Coast. The licensee notes that this overutilization of cedar is offset by its underutilization in the past, and that on Block 6 the licensee has worked to regenerate cedar and to protect new seedlings from deer browse. Staff of MFR corroborate the licensee's effective regeneration of cedar. The licensee is also testing on Block 5 a new technique of thinning out hemlock to allow light for cedar, but the effectiveness of this practice is still uncertain.

Some licensees on the coast are leaving 'monumental cedar' trees behind for First Nations. I note that the 2006 Cortex analysis (see below, '*assessing the implications of EBM for timber supply*') included a small volume reduction in respect of provisions for cultural cedar, and I am confident that as a result of the *Central and North Coast Order*, the *South Central Coast Order* and the *Haida Gwaii Strategic Land Use Agreement*, cultural cedar will receive appropriate attention and provision, which will be reflected in future analyses. The current indications of disproportionate

harvest of cedar on this TFL are a matter of some concern, but I am advised that the licensee is paying close attention to the issue. Monitoring should continue to ensure the appropriate ongoing provision of this resource.

For the specific case of the Pacheedaht in Block 1, I understand that on March 31, 2005, in a Forest and Range Agreement, (FRA), namely, the *Pacheedaht First Nation Forestry Interim Measures Agreement*, government agreed to consult with the Pacheedaht during the term of the agreement regarding its interests in the management of cedar. In return, the Pacheedaht agreed to provide information regarding its interests with respect to management of cedar to licensees early in the operational planning process. I therefore recommend ongoing close cooperation between the licensee and the First Nation to review and consider the information provided by the Pacheedaht regarding their need for cedar and to identify appropriate trees for consideration, and as I noted earlier, any emerging implications for timber supply will be accounted for, as appropriate, in future AAC determinations. Similar communication with licensees may also be helpful to other First Nations seeking to ensure ongoing supplies of monumental cedar for cultural purposes.

Other First Nations issues are addressed below, in '*First Nations consultation*'.

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

Other information

- area-based AACs

The *Tree Farm Licence Area-based Allowable Annual Cut Trial Program Regulation* became effective on November 1, 2004. This regulation provided for trials with TFL holders who had expressed an interest in the area-based AAC trial program. An area-based AAC defines the magnitude of an area of land from which timber may be harvested annually, rather than determining an allowable, annually harvestable volume of timber.

The intent of these trials was to determine whether area-based AACs could provide a viable alternative for regulating harvest levels in BC. One of the anticipated benefits was that an area-based AAC could be more readily related to the land base than a volume-based AAC. An area-based approach to harvest regulation was also expected to complement land-use planning and forest management practices, since many values and resource targets are typically measured by area rather than volume. The possibility for simplifications and efficiencies to arise in information management was also considered. As noted earlier, in '*Timber supply analysis*', prior to the preparation of the information package and timber supply analysis in support of this AAC determination for TFL 25, the licensee and MFR agreed, as subsequently confirmed in documentation on October 19, 2004, to include TFL 25 in the pilot program.

As a result of considerations subsequent to the analysis, in a letter to the deputy chief forester dated November 6, 2006, the licensee requested termination of the trial agreement for TFL 25, citing difficulties related to: management of multiple TFLs using different methods of harvest regulation; the implementation of EBM which could lead to increased reliance on partial cutting with associated modelling difficulties under area-based analysis; and—to date—the lack of

anticipated operational efficiencies in planning and analysis. The Lieutenant Governor in Council has agreed to this request and the trial was terminated on December 14, 2007.

-removal of private land

Effective January 31, 2007, all private land was removed from TFL 25 at the licensee's request. Block 1 contained 11 938 hectares (gross), while blocks 2 and 5 included respectively just 13 and 186 hectares of private land. Blocks 3 and 6 contained no private land. In view of the relatively small amounts of private land in blocks 2 and 5, in accounting for the timber supply implications to the TFL as a whole from removing the private land, the deputy chief forester reduced only that portion of the AAC which was attributed to Block 1 in his May 9, 2007 AAC adjustment.

To inform this decision the licensee provided a sensitivity analysis which modelled the effects of removing the private land from Block 1 where the THLB was now reduced by 34 percent. The sensitivity analysis was conducted in relation to the base case of the area-based analysis provided for this determination. When the private land was removed, the harvest level was reduced from the 290 hectares per year attained in the base case to 180 hectares per year, a reduction of 38 percent. An equivalent reduction to the 175 000 cubic metres of the TFL 25 AAC attributed to Block 1 in the last determination is 66 500 cubic metres, resulting in a harvest level for Block 1 of 108 500 cubic metres per year. Due to productivity considerations, this AAC reduction was slightly greater proportionally than the area of private land removed from the THLB of the whole block. I have accounted for this land base change and the associated reduction to the projected timber supply as discussed in '*Reasons for decision*'.

The removal of private land also affects UWR that was designated for TFL 25, after the analysis, in 2004. I have discussed this above under '*wildlife habitat*'.

I am aware that in removing the private land, the licensee agreed to conditions that were made by the Minister of Forests and Range respecting the need to retain adequate forest cover on the land base as reduced by the withdrawal, to permit the continuity of responsible management of community watersheds during harvesting on the Crown land remaining in the TFL.

- planning processes

The following planning processes affect land use and forest management practices on TFL 25 with implications for timber supply which are accounted for in this determination:

Vancouver Island Land Use Plan

The Vancouver Island Land Use Plan (VILUP) higher level plan order came into effect December 1, 2000, establishing resource management zones and objectives on areas including blocks 1 and 3 of the TFL, and the licensee is currently addressing the objectives operationally.

As noted earlier, the green-up heights specified in the VILUP for General, Special and Enhanced Resource Management Zones were appropriately applied in the 2003 timber supply analysis for TFL 25, and it was assumed that other plan objectives would be met through the modelling of biodiversity and visual management objectives. This approach is reasonable and I am satisfied

that the timber supply implications of the VILUP for TFL 25 are adequately accounted for in the base-case projections for these two blocks.

Central and North Coast LRMP areas

The February 7, 2006 provincial government's land use announcement on the Land and Resource Management Plans for the North Coast (NCLRMP) and Central Coast (CCLRMP), committed to protecting large areas of temperate rain forest, and also provided for the implementation of EBM. In TFL 25, these plan areas cover blocks 2 and 5.

The recommended areas for protection were designated under Part 13 of the *Forest Act* and the chief forester temporarily reduced the AAC under Section 173, effective September 28, 2006. While the timber supply analysis for TFL 25 predated these coastal decisions, an interim decision of the Central Coast Land and Coastal Resource Management Plan (CCLCRMP, which was later replaced by the NCLRMP and CCLRMP) was announced on April 4, 2001, to protect 'more pristine' areas, to defer logging in other areas pending completion of the plan, and to commit to EBM. For this reason the licensee's 2003 analysis included a generalized volume adjustment intended in part to account for planning uncertainties related to EBM (see above, '*stand-level biodiversity*'). At the time the CCLCRMP was generally endorsed by government but it had to go through government to government negotiations prior to government approval.

On December 9, 2003, an 'Agreement-in-Principle' was reached between licensees and environmental non-governmental organizations, which included the adoption of seven principles for implementing EBM (see below in that section).

Draft Orders by the BC Minister of Agriculture and Lands, released in December 2006 and January 2007 for public review proposed land use legal objectives for many specified resource values in these coastal planning areas (see below in '*ministerial orders*'). Subsequently, on July 27, 2007 the Minister of Agriculture and Lands signed the *South Central Coast Order* and on December 19, 2007 the *Central and North Coast Order*. Currently, the Province, First Nations and stakeholders are engaged in implementing the Coast Land Use announcement through the establishment of Plan Implementation and Monitoring committees, Land and Resource Forums, and an EBM Working Group. Further, government is working with First Nations on 15 Detailed Strategic Plans (DSP's) based on First Nations asserted territory covering the plan area to tie key components of the Orders to a map. The BC government has committed to full implementation of EBM in the coastal planning area by March, 2009.

- conservancies

In April 2006, the Park Act was changed to create a new designation of protected area called a 'conservancy'. Conservancies prohibit logging, mining, and hydro electric power generation, except for run-of-the-river projects, but differ from Class A Parks in allowing for social, ceremonial and cultural uses by First Nations and for low impact, compatible economic opportunities. In the two coastal LRMP areas, 24 conservancies were established in April 2006, and 41 conservancies were established in April 2007. All conservancies within blocks 2 and 5 of TFL 25 have now been established except one, the 'Europa East' in Block 5, which does not affect the THLB of TFL 25.

I note that the amount of THLB overlapping the conservancy in the Stafford Estuary in Block 2 is about 200 hectares. Following designation of this area under Part 13 of the *Forest Act*, the chief forester made no reduction to the AAC attributed to Block 2 under section 173 of the *Forest Act* due to this relatively small reduction to the THLB. However, as explained in '*Reasons for decision*', the deletion of this area from the TFL adds to the other land base uncertainties associated with this block and I have therefore accounted for it in my decision.

The conservancies were deleted from the TFL under *Bill 24, Parks and Protected Areas Statutes Amendment Act, 2007* and I have accounted for the timber supply implications as discussed in '*Reasons for decision*'.

Queen Charlotte Islands

On October 17, 2006 the provincial government specified two areas on Block 6 as designated areas under Part 13 of the *Forest Act*. Subsequently, effective September 8, 2006 the chief forester ordered an AAC reduction of 8500 cubic metres to be applied to Block 6, as noted under '*History of the AAC*'. According to the Strategic Land Use Agreement (SLUA) described in more detail below, this reduction will continue until two years after the date of the signing of the agreement. I have addressed this further below and in '*Reasons for decision*'.

A draft Strategic Land Use Agreement that covers Block 6 was initialled by the provincial government and the Council of the Haida Nation on May 31, 2007. Following public review, on December 12, 2007 the Haida Gwaii Strategic Land Use Agreement was signed by the two parties. The intent of the agreement is to confirm strategic land use zones and EBM objectives and provide a framework for its collaborative implementation by the Parties including: the use of interim and permanent protection measures; the analysis, testing, subsequent verification, and establishment of land use objectives implementing EBM; and the establishment of appropriate management structures, including structures to oversee the implementation of EBM on Haida Gwaii. Highlights of the agreement include:

- Identification of land use zones including New Protected Areas, Operating Areas and Special Value Areas.
- New Protected Areas totalling 254 000 hectares including a total of 945 hectares on Block 6 affecting 94 hectares of the THLB.
- Special Value Areas comprised of areas of critical nesting habitat for Queen Charlotte Goshawk, Saw-Whet Owl, and Great Blue Heron, to be designated as 100% timber retention area. The total area is approximately 2,750 ha, or 0.3% of the land planning area. No Special Value Areas have been identified on Block 6.
- On the Operating Areas forestry operations will be subject to ecosystem-based management regimes. These will be used to achieve management objectives detailed in the agreement for Haida traditional forest resources and traditional heritage features, monumental cedar, Western yew, western red and yellow cedar, culturally modified trees, aquatic habitats, biodiversity and wildlife habitat.

On Block 6 a small area is identified where cedar management objectives apply. In addition, the entire area currently designated under part 13 of the *Forest Act* is identified as Marbled Murrelet habitat where the stated objective is to maintain nesting habitat for this species.

- A set of Ecosystem-Based Management (EBM) objectives for forestry will be further tested and refined through detailed strategic planning before being legally established as requirements for timber harvesting.
- A commitment to an economic timber opportunity of at least 800 000 cubic metres per year.
- A number of key implementation steps including finalizing the boundaries of the New Protected Areas and Special Value Areas, development of strategic plans for Special Value Areas, establishment of an implementation and monitoring committee and EBM working group and New Protected Area management planning and associated marine foreshore and nearshore planning.

I acknowledge that at this date no legal objectives or land-use designations have been enacted reflecting the objectives set out in the SLUA. Nevertheless, the provincial government, through signing of the SLUA, has indicated its intention to reach a final agreement which incorporates permanent protection of areas from industrial resource use and ecosystem-based management. The SLUA and ongoing discussions between the provincial and Haida governments introduces substantial uncertainty into determining timber supply for TFL 25, Block 6. While the magnitude of the impacts on timber supply of permanent protection and EBM is uncertain, based on analysis of various forms of EBM conducted for the Central and North Coast LRMPs, if anything, timber supply will be reduced on Block 6 compared to management under the FRPA. I am aware that BCTS is now operating on Block 6 and that it is currently planning harvest blocks in accordance with the SLUA to the extent possible. Therefore, in this case I will deviate somewhat from my *'Guiding principles'* – as provided for in those principles – and account in a general way for the uncertainties associated with the Haida Gwaii/Queen Charlotte Islands land use process including the likely implementation of some level of EBM. My considerations in regard to these uncertainties are noted in *'Reasons for decision'*.

Regarding the designated areas on Block 6, according to the SLUA when they cease to be designated there will be harvest activity permitted in the areas in accordance with the management objectives set for Marbled Murrelet nesting habitat. In addition New Protected Areas have been identified on the block and according to the SLUA these will be designated. These two factors cause further uncertainty for this AAC determination, as I will note in *'Reasons for decision'*.

- ecosystem-based management (EBM) on the Central and North Coast

The CCLRMP process began in 1996. In April 2001, an interim agreement led to the creation of a completion table which achieved consensus in December 2003 and presented final recommendations to the Province and First Nations in May 2004.

The NCLRMP process began in February 2002. A conditional agreement was ratified by table members in June 2004 and final recommendations were presented to the Province and First Nations in February 2005.

The North and Central Coast LRMP table recommendations informed government-to-government discussions between the Province and First Nations with interests in the North and Central Coast. Those discussions resulted in the Provincial government and First Nations land

use announcement ‘*A New Vision for Coastal BC*’ on February 7, 2006, followed by the signing of government-to-government agreements.

In the announcement, government committed to supporting the finalized North Coast and Central Coast LRMPs, announced the creation of the conservancies, and committed to moving forward on Ecosystem-Based Management, EBM, a new approach to planning and resource management and a key recommendation from the tables and government-to-government discussions. EBM is defined as ‘an adaptive approach to managing human activities that seeks to ensure the coexistence of health, fully functioning ecosystems and human communities’.

As I noted above, through its signing of the SLUA for Haida Gwaii, government has also confirmed its intention to establish objectives to implement EBM on Haida Gwaii.

In view of these commitments by government, on May 18, 2007 the Coast Forest Region released the *Coast Forest Region Administration Bulletin, Planning and Practices Options to Facilitate Transition to Central Coast, North Coast and Haida Gwaii - Queen Charlotte LRMP Land Use Objectives* providing forest agreement holders with options available to transition operational plans and practice to address land use objectives anticipated to be established under these plans.

- *seven key principles of EBM*

The CCLRMP Agreement-in-Principle, reached on December 9, 2003, included the adoption of seven key principles of EBM, which are detailed in the agreement:

- *Maintain ecological integrity*
- *Recognize and accommodate Aboriginal Rights, Title and Interest*
- *Promote human well-being*
- *Sustain cultures, communities and economies within the context of healthy ecosystems*
- *Apply the precautionary principle*
- *Ensure planning and management is collaborative*
- *Distribute benefits fairly*

The April, 2001 interim agreement for the CCLRMP, which was ratified by stakeholders, announced to the public and accepted by the provincial government, contained land use recommendations for designation of Candidate Protection Areas and “Option” Areas, and a commitment to define and implement EBM in the planning area. While this agreement occurred prior to the 2003 timber supply analysis for TFL 25, many aspects of the agreement remained too undefined for incorporation in the analysis. Sensitivity analyses incorporated to investigate possible implications for timber supply are now outmoded by subsequent events.

The 2006 Provincial-First Nation land use agreements include a commitment to establish a North Coast Plan Implementation and Monitoring Committee (NC PIMC), a Central Coast Plan Implementation and Monitoring Committee (CC PIMC) and an EBM Working Group (EBM WG). The provincial government, First Nations and stakeholders are currently engaged in implementing the Coastal Land Use Decision. Three land and resource forums, made up of

participating First Nations and the Province, have been created to oversee implementation of the strategic land use agreements, the Provincial land use decision and EBM.

In December, 2006, the BC Minister of Agriculture and Lands released, for public review, a draft order proposing Land Use Legal Objectives for EBM relating to the South Central Coast of BC. As I noted above, on July 27, 2007 the Minister of Agriculture and Lands signed the *South Central Coast Order*. It incorporated changes from the draft order to reflect comments received during the public review.

In January, 2007, a draft order was released for public review relating to the North and Central Coast of BC and on December 19, 2007 the Minister of Agriculture and Lands signed the *Central and North Coast Order*.

- *applying the transitional elements of EBM*

Ecosystem-Based Management in British Columbia is distinguished by requiring special consideration for particular aspects of forest values, management, and practices, including: biodiversity; ecosystem representation; seral stage distribution; stand level retention; red- and blue-listed plant communities; riparian management; high value fish habitat; upland streams, wetlands and forested swamps; active floodplains; and landscape- and watershed-level planning. The EBM objectives are to be implemented through legislative tools where appropriate, and by the use of signed agreements and protocols with First Nations on the implementation of land use planning that includes an EBM zoning system.

In the December 9, 2003 Agreement-in-Principle, the difficulties of attempting to implement EBM rapidly were acknowledged, and it was agreed to begin implementation with seven transitional elements which are now being applied, as follows:

1. *Representation*: This is similar to but more constraining than 'old seral' biodiversity objectives developed under the Forest Practices Code and currently implemented under FRPA. A proportion of stands older than 250 years must be maintained, with retention targets based on the Range of Natural Variation defined by ecologists. The targets are intended to be applied for each BEC site series, but due to a lack of detailed biogeoclimatic inventory information for the area, site series surrogates are being used. Targets are set according to the rarity of the units.

In TFL 25, the licensee has identified appropriate units by rarity, with about 5 percent of the land base in rarer units, and 95 percent in the more common units. The licensee reports no difficulty in meeting the required retention targets on Block 5, due to the large amount of old growth on the block, about 40 percent of which is now protected.

2. *Red Listed Ecosystem*: One hundred percent of ecosystems 'red listed' by the BC Conservation Data Centre must be reserved as part of the overall retention. The licensee for TFL 25 reports that these areas are identified and reserved by professional foresters operationally during the layout of cutblocks.
3. *Stand Level Retention*: This requires a minimum of 15-percent retained forest cover within or adjacent to cutblocks, inclusive of existing WTPs, riparian reserves and partial retention.

The licensee reports that areas are retained within and adjacent to new cutblocks during partial retention harvesting.

4. *Mid-Seral Cap*: This requires that, in each landscape unit, less than 50 percent of the forest cover of each site series surrogate may be between 40 and 80 years of age, to avoid the accumulation of large proportions of younger forest.
5. *Estuaries*: More than 90 percent of the natural riparian forest in estuarine areas must be maintained.
6. *Swamps and Gullies*: More than 50 percent of the natural riparian land base adjacent to alluvial fans, forested swamps, and small, steep streams must be maintained.
7. *High Value Fish Habitat*: High value fish streams must be buffered by a reserve zone equal in width to 1.5 times the height of the trees.

The licensee has advised MFR staff that, beginning in 2004, all of the above measures have been gradually introduced and are now implemented as current practice on blocks 2 and 5 of TFL 25; I have been mindful of this in my determination as discussed in '*Reasons for decision*'.

- ministerial orders

The objectives in the *South Central Coast Order and the Central and North Coast Order*, were developed from government-to-government negotiations and go beyond those of the transitional elements from the 2003 Agreement-in-Principle in proposing objectives for: First Nations' traditional forest resources; First Nations' traditional heritage features; culturally modified trees; monumental cedar; stand level retention of Western red and Yellow cedar; important fisheries watersheds; high value fish habitat; fish streams; lakes and wetlands that are not high values fish habitat; forested swamps; upland streams; active fluvial units; landscape level biodiversity; red-listed and blue-listed plant communities; stand level retention; and critical grizzly bear habitat.

Some specific targets are increased; for example, the 50-percent retention for forested swamps is increased to 70 percent, riparian reserves are increased for aquatic habitat that is not high value fish habitat, and the blue-listed ecosystems requirement is anticipated to increase retention requirements. But there is also flexibility in other respects, to reflect different operating histories; for instance, provisions are included for recruiting old seral retained forest cover over up to three rotations, and these are applied to trees of 180 years on Block 2, and trees of 250 years on Block 5. Riparian provisions also include some flexibility. In more southerly areas, some targets are moderated to ensure a degree of economic activity.

- assessing the implications of EBM for timber supply

Many aspects of EBM, including some of the objectives, remain to be fully defined and the training of resource managers in the practice of EBM has only recently begun. Implementation on blocks 2 and 5 is certainly underway, but much remains to be done before the full timber supply implications of the land use agreement and orders can be known. Not only must practices be understood and applied by properly trained professionals operationally, there must also be monitoring over a sufficient time period to collect adequate data for incorporation in timber supply analysis and AAC determination to account for EBM. Moreover, some of the strategic objectives of EBM are inherently difficult to model.

Nonetheless, attempts have been made to assess potential timber supply impacts. Since the 2003 analysis—which did incorporate a generalised, 'dispersed retention' factor attributed in part to partial cutting under EBM—the licensee has conducted its own rough analysis of the expected

impacts of implementing EBM. Noting that the retention objectives overlap with protected areas to reduce the overall anticipated impacts, the licensee estimated that the transitional elements will lead to a 6.5-percent reduction in harvest levels on blocks 2 and 5, and that protected areas will reduce the harvest of TFL 25 by 13.5 to 14 percent.

Cortex Consultants Inc. generated a series of timber supply forecasts for the CCLRMP area, including a pre-LRMP base case, EBM scenarios reflecting targets and objectives as specified in the 2003 Agreement-in-Principle, and later, analysis in support of the 2005 government-to-government negotiations, which very roughly reflects the ministerial orders.

In the Cortex analyses, a strategic-level approach was applied which inevitably incurred uncertain assumptions about growth, yield, forest practices and harvest flow generalized broadly across eight management units. Given these and other uncertainties, complexities and time constraints, and given the limited history of practice with EBM, these forecasts are naturally somewhat less reliable than standard timber supply analyses supporting AAC determinations.

Potentially significantly, the Cortex forecasts do not reflect impacts on the operability of areas that are likely to be subject to increased harvesting costs associated with the practice of EBM. The Ministry of Agriculture and Lands' Strategic Land Policy and Legislation Branch prepared a report titled *Economic Implications of Stand Level Retention Recommendations Developed for the Central Coast LUP Planning Process* in which it reviewed with licensees the potential operability impacts associated with these costs. According to the report, operating costs for the South Central Coast where Block 2 is located are expected to increase as a result of EBM to the extent that the operable timber supply will be reduced by about 5 percent. For Block 5, which lies partially within the Lower North Coast and the Outer Central Coast areas, the operable timber supply will be reduced by about 14 percent and nine percent respectively.

The Cortex forecasts, which assumed protection for all Designated Areas, concluded that the EBM objectives could be applied to both Block 2 and Block 5 without impact in either case for a decade. In addition, for both blocks the harvest forecast for every scenario modelled increased over the first three decades. This is largely explained by the fact that based mostly on new operability mapping since the 1996 analysis, the THLB on Block 2 was increased by about 14 percent and on Block 5 by about 29 percent. After the third decade the forecasted harvest levels gradually declined over the next four decades in all scenarios for Block 5 and over the next six decades in the most constrained scenarios for Block 2. These results suggest that maintaining current harvest levels on blocks 2 and 5 pose a relatively low risk to attaining EBM objectives. Significant remaining uncertainties include: the effects of maintaining particular forest stand characteristics to provide for supplies of monumental cedar; the amount of harvestable land associated with buffers for High Value Fish Habitat; a lack of inventory information on floodplains, alluvial fans and forested swamps; limited data on the Range of Natural Variation among ecosystem types; the effects of natural disturbances in forests outside the THLB; and uncertainty in watershed boundaries and the application of hydrologic green-up targets.

The results of the analyses discussed here provide only a very general indication of the range in which the implications for timber supply resulting from implementing EBM may reasonably be expected to lie. The accuracy with which these results will reflect the actual, experienced implications on particular areas and portions of the plan or TFL areas cannot be accurately

predicted until a good deal more information has been acquired and analysed, and the implementation process has become further advanced than at present.

As noted earlier, training is already underway to familiarise forest managers, planners, and associated professionals with the methods for implementing EBM principles in daily practice in order to achieve the objectives. This will be of necessity a somewhat iterative process, as the objectives themselves are undergoing refinement and needed areas of research in support of practices designed to achieve EBM are still being identified.

For the immediate purpose of determining this AAC, I have taken guidance from these analytical results, from government's commitment to full implementation of EBM by 2009, and from the two ministerial orders. In making my determination I have reasoned from this information as set out in '*Reasons for decision*'. I have also made instructions related to the gathering of information for use in future analyses and determinations, respecting the effects of partial cutting, under EBM procedures, on regeneration responses to planting after harvesting, on volumes and rates of growth in the new and residual stands, and on biodiversity objectives, as noted in '*Implementation*'.

- First Nations consultation

As noted in '*cultural heritage resources*', sixteen First Nations have asserted traditional territories within TFL 25. These include the Scia'new, Malahat, Pacheedaht, T'sou-ke, Wei Wai Kum (Campbell River), Wewaiwai (Cape Mudge), Homalco, Flowitsis, Da'naxda'xw/Awaetlala, K'omoks, Gitga'at, Kitasoo, Haisla, Heiltsuk, Kitkatla and Haida First Nations. The consultation process differed for some of these First Nations as I will describe in detail below. In addition to the above-noted First Nations the Hamatla Treaty Society provided comment on this process as I will also describe below.

Several of the above-noted First Nations did not respond during this process. These include the Scia'new, Malahat, Wei Wai Kum, Da'naxda'xw, K'omoks, Gitga'at, Kitasoo, Wewaiwai, Homalco, and Kitkatla First Nations.

Letters were sent by the licensee on May 24, 2003 to the Scia'new, Malahat, Campbell River, Da'naxda'xw, K'omoks, Gitga'at, and Kitasoo First Nations, attaching the timber supply analysis and information package, notifying recipients of the chief forester's intent to consider this information in a forthcoming AAC determination, attaching a map of the licensee's understanding of the First Nations' traditional territory, pointing out the chief forester's need to consult with First Nations to address potential interests related to aboriginal rights and title, indicating intention to pass on to the chief forester for his consideration in the determination any comments received from First Nations in meetings or written submissions, and asking for written input by July 31, 2003. No responses were received.

Letters were also sent by MFR on May 26, 2003 to the same recipients, advising that information was being gathered to assist the chief forester in his determination, offering to meet or receive written input, and identifying WFP as the contact. No responses were received.

Letters were sent by MFR on April 22, 2005 to the same First Nations, advising that the timber supply review (TSR) was in progress for TFL 25 that would culminate in an AAC determination in 2005. The letters detailed the process to date; gave background on AAC determinations as well as the TSR backgrounder document; described the relevant legislation for AAC

determinations, AAC determination postponements, and area-based AAC determinations; indicated the intention to determine an AAC on an area basis; requested information on how First Nations aboriginal interests might be affected by the AAC determination for TFL 25; indicated that this information would be provided to the deputy chief forester to be considered and addressed as appropriate; and offered to meet with or receive written information from the First Nations. No responses were received.

Follow-up letters were sent by MFR on May 24, 2005, with no response.

Further follow-up letters were sent by MFR on May 22, 2007, indicating the new schedule for the determination; describing the process to date; advising of the licensee's request to withdraw from the area-based trial program with its reasons; advising of the Lieutenant Governor in Council's forthcoming decision on that request; and describing the various reductions made to the AAC since the last determination. The letters also requested information on the First Nations' aboriginal interests, the specific location of such interests and how these may be affected by both the AAC determination for TFL 25, and by the possible decision to cancel the area-based trial program for TFL 25, so that the First Nations' input could be conveyed to the deputy chief forester and the Lieutenant Governor in Council for consideration. The administrative adjustment reducing the TFL 25 AAC as a result of the removal of private land from the TFL was attached to this letter. No response was received.

The consultation process differed for the Wewaikai, Homalco, and Kitkatla First Nations, none of which replied to any letters from the licensee or the MFR.

The licensee did not write to the Wewaikai, who's asserted traditional territory was not known to cover TFL 25 until the Wewaikai signed an Interim Forestry Agreement in March of 2005. The MFR sent two letters to the Wewaikai, the initial one on May 24, 2005, and the final one on May 22, 2007 as for all the other First Nations. No response was received.

The licensee wrote a letter to the Homalco First Nation on January 28, 2005 after it was established in the November 23, 2004 *Xwémalhkwi First Nation Interim Forest Agreement* that the Homalco asserted traditional territory over parts of Block 2 of TFL 25. The licensee's letter contained the same information and offers to receive information and meet that were included in the letters sent to the other First Nations in 2003. The MFR wrote a letter to the Homalco on April 22, 2005 and then follow-up letters, as were sent to the first group of First Nations noted above.

On May 11, 2007, the MFR also sent a letter to the Kitkatla First Nation, which had inadvertently been missed during the earlier consultation process, including an apology for the oversight, as well as the analysis, information package, background material and a request to provide information or meet as soon as possible, to allow the process to complete by July, 2007. No response was received.

The consultation process differed for the T'sou-ke, Pacheedaht, Tlowitsis, Heiltsuk, Haisla and Haida First Nations in that they provided input into this process. As I noted above, the Hamatla Treaty Society also provided input.

The Pacheedaht and Heiltsuk First Nations and the Hamatla Treaty Society responded to the initial letter sent by the licensee. The MFR received no response from these First Nations or the treaty society.

The Pacheedaht First Nation responded on July 22, 2003 to the licensee's May 24, 2003 letter, indicating the concerns for cultural cedar which I have addressed in '*cultural heritage resources*', and for UWRs and WHAs, addressed in '*wildlife habitat*'. The MFR sent letters to the Pacheedaht on the same dates described above for the other First Nations. In these letters the MFR committed to bring the cedar and wildlife issues to my attention.

For the Heiltsuk First Nation, a similar process was followed, but on August 1, 2003, an unsigned letter was sent from the Heiltsuk to the licensee, WFP, requesting postponement of the AAC determination until completion of the Heiltsuk's land use plan, estimated for December 31, 2003, and indicating interest in a presentation by the licensee and a discussion of the timber supply review, with a view to negotiating a protocol with WFP for the Heiltsuk's stewardship goals, including a sustainable harvest level. The licensee responded, noting its jurisdictional limitations over such policy. In September 2004, WFP enquired about the plan and was advised that the Heiltsuk were reviewing it internally. The MFR wrote to the Heiltsuk on April 22, 2005 and again on May 22, 2007, communicating the same information that was sent to other First Nations and acknowledging the previous input to WFP, requesting a copy of the Heiltsuk land use plan, and offering to convey it to the deputy chief forester. No response was received to either letter.

The Hamatla Treaty Society did not receive the May 24, 2003 letter sent to individual First Nations, but responded to the licensee based on a referred copy on June 5, 2003, noting that the Society had not been consulted directly, that the interests of its member nations are strong throughout the territory, that it was not able to conduct an adequate investigation, that the referral would be processed if MFR paid the costs in advance, and that it did not consider the letter to constitute consultation. On April 22, 2005, MFR sent the Society a letter similar to that sent to the First Nations acknowledging the Society's stated indication of not being able to adequately investigate the referral. Further letters were sent on May 24, 2005 and on May 22, 2007, with no response.

The T'sou-ke, Tlowitsis and Haisla First Nations responded to letters sent by the MFR but not to those sent by the licensee.

Responding on November 18, 2005 to the letter from the MFR of May 24, 2005, the T'sou-ke expressed concern about the licensee's withdrawal of private land from the TFL and the potential impact on the T'sou-ke's traditional territory. These concerns were reiterated in a further letter from the T'sou-ke of November 28, 2005, in which the First Nation asserted the need for an AAC reduction to account for the removal of the private land. The MFR wrote again to the T'sou-ke on May 22, 2007, including information similar to that sent to the other First Nations who did not respond, an offer to meet, a description of the consultation process followed with the T'sou-ke to that date, and information on the adjustment made to the TFL 25 AAC to account for the removal of the private land from the TFL. No further response was received from the T'sou-ke.

For the Tlowitsis First Nation, the identical consultation process as that for other First Nations was followed up to the May 24, 2005 letter, and on October 19, 2005, the Tlowitsis responded to the MFR, noting its separation from the Hamatla Treaty Society, expressing a desire to meet with MFR to discuss its interests, and requesting that MFR contact its office. On May 22, 2007, MFR wrote to the Tlowitsis offering to meet and requesting further information on Tlowitsis aboriginal interests and how they might be affected by the AAC determination or the conclusion

of the area-based trial, and offering to bring the input to the deputy chief forester and the Lieutenant Governor in Council. The Tlowitsis did not respond.

For the Haisla First Nation, the consultation was the same as for First Nations who did not respond to MFR letters, except for the following. In a telephone call with MFR staff, on June 6, 2007, in response to the May 22, 2007 MFR letter, the Haisla's land and resources representative noted the relatively small overlap between Haisla asserted traditional territory and TFL 25, and sought and received clarification on the cancellation of the area-based trial program.

Subsequently, at a conference in Victoria on June 12-14, 2007, this representative noted the Haisla's concern over the high rate of cut in some valleys in its asserted traditional territory, and the desire for restrictions on rates of cut in watersheds in its asserted territory to protect the integrity of the watersheds. No further input was received from the Haisla First Nation.

In response to the Haisla's concern I note that much of the area of TFL 25, Block 5 that overlaps with the Haisla asserted traditional territory has now been established as conservancy where harvesting will be minimal, as I described in my guiding principles. In addition, EBM is being practiced on Block 5 and the nature of those practices is to reduce the harvesting footprint on the landscape. If the Haisla continue to find rates-of-cut that causes them concern, I encourage them to contact the licensee and review harvest plans with the licensee.

For the Haida First Nation, the consultation process was the same as for the First Nations who did not respond, with the following exceptions. On September 19, 2003 the Haida First Nation responded to WFP's letter of May 24, 2003, detailing the Haida's objectives for land use planning and objectives for forest management. The Haida then provided specific comments on the timber supply review for Block 6. They expressed concern about WFP's attempt at modelling the availability of monumental cedar noting WFP should have discussed the modelling with the Haida first to ensure it was based on appropriate criteria. The Haida were also concerned about the old growth on the THLB being projected to be virtually eliminated in 50 years; the lack of accounting for cultural sites in the analysis; the modelling of availability of cultural cedar; clearcutting and its effect on fisheries; protection of biodiversity; protection of goshawks; and ecosystem-based planning. The letter included several questions to WFP about these issues, as well as questions about the methods used to account for these issues spatially in the timber supply analysis and plans for harvesting second growth.

On November 18, 2003, WFP responded to the Haida's letter providing answers to the questions raised in the Haida's letter and noting that broader issues could be discussed at a meeting that would take place on November 21, 2003, with the Haida, WFP and MFR staff attending. In the letter, WFP indicated that culturally significant sites, culturally modified trees, monumental cedar, cultural plants and rare sites are protected at the operational plan level and that for timber supply analysis WFP assumes they can be protected in wildlife tree patches, riparian reserves and marine zone buffers. Therefore no specific accounting was made for these values in the analysis. WFP further described the provisions in the analysis for protecting wildlife, biodiversity, riparian habitat, unstable terrain and in-block retention, and I have described these in the appropriate sections above. WFP described how the spatial Complan model identifies constrained and unconstrained areas geographically and only places cutblocks in unconstrained areas. Finally, WFP provided information on the amount of area and volume of second growth on the operable land base, its age class distribution, and the volume of second growth projected to be harvested in the model by five-year period over the next 20 years.

At the meeting on November 21, 2003, the Haida requested inventory information from WFP to assist them in developing a model for monumental cedar. WFP indicated that new forest cover inventory could be made available to the Haida. Area exclusions for cultural values were discussed. Topics covered included culturally modified trees, Marbled Murrelet, riparian zones, wildlife strategies, old growth, variable retention harvesting, ecosystem-based management and second-growth harvesting. The Haida provided information on their 1000-year cedar plan, and WFP indicated it would arrange to follow up on this meeting and move forward on the cedar question. WFP described the Doman restructuring process. The Haida also recommended that WFP review the Haida land-use vision (HLVS) maps prepared for Teal-Jones' tenures on Haida Gwaii to gain a better understanding of the impact of the HLVS

On June 7, 2005, the Haida responded to the MFR's letters of April 22, and May 24, 2005, and notified MFR that on May 11, 2005 the Council of the Haida Nation, the Ministry of Forests and Range and the Treaty Negotiations Office had signed an Understanding which committed the MFR to undertake a timber supply review to set an AAC for Haida Gwaii, and to work with the Haida to ensure the AAC takes into account the Haida interests and is culturally, ecologically and economically sustainable. The Haida further indicated that 'in light of this upcoming comprehensive review for all of Haida Gwaii, we do not believe this is appropriate to make an independent determination regarding the AAC for TFL 25 at this time'. On July 3, 2005, Guujaaw, President of the Council of the Haida Nation, e-mailed the MFR's Forest Analysis and Inventory Branch, indicating that: 'the lands and timber in TFL 25 Block 6 are all within the ancestral lands of the Haida Nation and subject to a Title lawsuit. TFL 25 might be a part of the accommodations that we are involved in'.

The MFR wrote to the Haida on May 31, 2007, reiterating the Haida's concerns expressed in the June 7, 2005 letter and the July 3, 2005 e-mail and indicating that the chief forester is committed to conducting a timber supply review as agreed in the letter of understanding (LOU). The MFR further indicated that in the *Forest Act* there is no mechanism for determining an AAC for only part of a TFL, that Block 6 would be removed from TFL 25 and added to the Queen Charlotte TSA by the end of 2007, and that this area would then form part of the analysis being conducted under the LOU. In a meeting with the regional executive director of the Coast Forest Region, the Haida's main concerns regarding Block 6 of TFL 25 was that the Haida would like to see the area converted to a community forest agreement, that the area is encumbered by a title dispute between the Haida and the Crown and that 'if apportionment decisions proceed, it would preclude areas for Haida tenure and community forest licence.' The May 31, 2007 letter from the MFR also described the cancellation of the area-based trial program, similar to the letters sent on May 22, 2007 to the other First Nations.

On July 11, 2007 the Haida responded to the June 7, 2007 letter from the MFR, indicating that 'these lands are encumbered by recent court decisions and are part of a title dispute that exists between the Council of the Haida Nation and the Crown.' The Haida further recommended a sustainable harvest level based on geographical area and offered to work with the MFR 'to do this assessment and determination.'

The MFR responded to this letter on July 24, 2007, noting that the deputy chief forester would be considering 'the rate of timber production that can be sustained on the area' as provided for under section 8 of the *Forest Act* and the 'economic and social objectives of the government' as expressed in the letter from the Minister of Forests and Range to the chief forester attached to

this rationale. In the letter the MFR reiterated the intention to remove Block 6 from TFL 25 and add it to the Queen Charlotte TSA, and that MFR staff would continue to work with the Council of the Haida Nation on the timber supply review agreed to in the LOU.

The Haida responded to this letter on July 27, 2007, indicating their general intention that all forests on Haida Gwaii be brought to a sustainable harvest level. They further indicated that the Haida are only concerned with the area of TFL 25 that falls on Haida Gwaii and that in view of Block 6 currently being managed as if separate from TFL 25, the removal of this block from the TFL should be expedited. The Haida requested that, in lieu of this occurring, ‘the determination be duly considerate of the SLUPA and the EBM objectives contained therein as they apply to Block 6, to the greatest extent possible, as BCTS is actively planning in this area.’ In addition, the Haida asked that ‘the AAC determination clearly partition the cut attributable to Block 6’. No further correspondence was received from the Haida.

For this determination I have partitioned a harvest level attributable to each block of TFL 25 and I have been mindful of the effects that EBM may have on the harvest level for Block 6, though the regime that will eventually be practiced is as yet uncertain. As I have noted in ‘**Reasons for Decision**, should Block 6 remain in TFL 25 when the timber supply review agreed to in the LOU is completed, the AAC for TFL 25 may have to be revisited.

From the volume and content of the correspondence, I am satisfied that MFR and the licensee have made considerable attempts to engage in consultation with First Nations. In the case where a specific, AAC-related issue was identified that may be directly considered under Section 8 of the *Forest Act*—notably the availability of cultural cedar, as raised by the Pacheedaht—I have addressed the issue in ‘*cedar for cultural and traditional purposes*’. I am also aware of the eleven Forest and Range Agreements (FRAs) and the three Forest and Range Opportunities (FROs) in place for the First Nations on the various blocks, and the archaeological overview assessments and Traditional Use Surveys as I described above under ‘*cultural heritage resources*’.

In conclusion, I am satisfied all reasonable effort has been applied to engage First Nations in advancing their concerns related to the AAC determination for TFL 25.

- twenty-year plan

Twenty-year plans for the blocks of TFL 25 were submitted to the five MFR district offices on December 17, 2002, as components of MP No. 10. These plans essentially duplicated the findings of the fully spatial timber supply analysis. The licensee noted that all harvest operations in blocks 6 and 3 are currently managed by BCTS. Staff of BCTS have confirmed that their harvesting in TFL 25 follows the objectives of the current management plan, and that the Forest Stewardship Plan for Block 6 follows the guidelines in the management plan. This assures me that the AAC I determine for the effective period of this plan will be appropriate for management under either the TFL licensee or BCTS.

- harvest sequencing rules

In timber supply analysis, the order in which eligible stands are assumed to be harvested can affect the projected timber supply in a number of ways. Differences between the modelling assumptions made and the order in which stands are actually harvested in operational practice must be examined and accounted for.

For TFL 25, the harvest sequencing rules applied in the model were to ‘minimize growth loss’ and to harvest the oldest available stands first, except in Block 1, where the ‘minimize growth loss’ rule only was applied, since operations there include significant levels of second-growth harvesting.

To explore the reasonableness of the general approach, a sensitivity analysis was conducted for Block 2 in which the ‘oldest-first’ and ‘minimize growth loss’ constraints were turned off; the result was an essentially insignificant 0.8 percent increase in the annually harvestable area.

To the extent possible, in the modelled simulation, the actually existing forest development plan blocks were scheduled for harvest in the initial years of the projection.

I am satisfied from this that the harvest sequencing rules applied in the model are a reasonable representation of operational practice, and are suitably applied in the base-case projection.

- actual harvest level

Cut control data show good harvest performance on the TFL from 1996 until 1999. From 2002 to 2006 inclusive, the average percentages of the AAC harvested on each block were: Block 1, 98 percent; Block 2, 94 percent; Block 3, (for 2002 – 2004 only, prior to BCTS operations) 44 percent; Block 5, 15 percent, and Block 6, (2002 – 2004 only, prior to BCTS operations) 51 percent.

For the TFL as a whole, since 1999, the overall harvesting performance has averaged about 64 percent of the AAC available to the licensee, with the largest shortfalls occurring in Blocks 5 and 6. The licensee attributes the low performance in recent years partly to land use planning issues coupled with the currently depressed market for hemlock.

I have also reviewed the harvesting performance by operability class, noting the generally very low performance reported in stands operable only by helicopter; this amounted to roughly one percent or less of the harvest in each year, except on Block 6, where the average was higher, at about 9 percent. On blocks 3 and 6 it seems likely that BCTS will continue to operate and its staff have indicated that they plan to harvest about 5000 cubic metres annually in helicopter-operable areas on Block 3 (about ten percent of the current AAC attributed to Block 3). On Block 6, within the next 4 years BCTS plans to harvest 130 000 cubic metres in helicopter operable areas. I have considered and accounted for these performance rates, block by block, in *‘Reasons for decision’*.

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

Alternative harvest flows

The area-based timber supply analysis I have used for reference throughout this determination also included for each block an analysis of the timber supply—including implications for average harvest ages, the transition to harvesting in second-growth stands, average volumes per hectare and more—with the harvest level request set at 10 percent higher, and at 10 percent lower, than the base-case level. These alternative harvest flows have been helpful in establishing the appropriateness of each of the base-case harvest levels selected.

The area-based analysis for each block also included an analysis of the availability of the timber supply under volume-based regulation. For reasons noted earlier in *'Timber supply analysis'*, I have chosen not to use these volume-based projections as referent base cases; however, as further discussed in *'Reasons for decision'*, the information provided by these alternative analyses has been of considerable assistance in assessing the risks posed, by a number of management considerations, to the operational achievement of the projected base-case harvest levels.

- *community dependence on forest industry*

In MP No. 10, the licensee listed the following communities as receiving direct benefits of forestry employment from TFL 25: Campbell River, Jordan River, Sooke, Port Renfrew, Sayward, Sandspit, Bella Bella, Klemtu, Hartley Bay and Kitimat, and noted that jobs are also supported in other Vancouver Island and south Lower-Mainland coastal communities.

The licensee listed the following person-days (pd) of direct employment created by these listed activities related to TFL 25: planning and harvesting, 38 343 pd; silviculture and integrated use, 8856 pd; administration, 1953 pd, for a subtotal of 49 152 person days, with an additional 23 174 pd in manufacturing, for a total of 72 326 person days. These figures were current to 2003 and are likely to have changed considering the recent poor harvest performance noted above in *'actual harvest level'*.

The licensee believes there is a close relationship between the economic viability of TFL 25 forest operations and the prosperity of the associated resource based communities. Indeed, when the AAC of TFL 25 is being harvested to near its full extent, it is clear that the TFL is an important source of economic activity and employment for coastal BC, though much of the associated benefit will inevitably be experienced in southern BC.

(c) **the nature, production capabilities and timber requirements of established and proposed timber processing facilities;**

This section of the *Forest Act* was repealed in 2003. [2003-31-2 (B.C. Reg. 401/2003)]

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

Minister's letter

The Minister of Forests and Range has expressed the economic and social objectives of the Crown for the province in a letter to the chief forester dated July 4, 2006 (attached as Appendix 3). This letter replaces the July 28, 1994 letter and the February 26, 1996 memorandum to the chief forester regarding economic and social objectives.

The July 4, 2006 letter stresses the importance of a stable timber supply while being mindful of other forest values. The letter also notes that the coast of BC is experiencing a period of significant change and transition, and urges that the nature of timber supply that can maintain a competitive and sustainable forest industry, while reflecting decisions made in land and resource management plans, be considered in AAC determinations.

In those regards, the harvest flow objective in the analysis, of projecting a non-declining, even flow, area based, base-case harvest level, was designed to help provide stability in the timber flow over the entire projected horizon. I have taken this and related analyses into account

throughout my determination, and I believe that the AAC I have determined accounts for the need for stability in the long-term timber supply while accommodating objectives for all forest resources and reflecting objectives in applicable land use plans as closely as is reasonably possible.

The minister's letter also refers to local objectives, which are considered in the following section.

Local objectives

The Minister's letter of July 4, 2006 suggests that the chief forester should consider important social and economic objectives that may be derived from the public input in the timber supply review where these are consistent with government's broader objectives as well as any relevant information received from First Nations.

In the process leading to the approval in October 2003, of MP No. 10 for TFL 25, in 1999 WFP made MP No. 9 available to the public for review so they could provide comments and recommendations for MP No. 10. Then, in June and July of 2001, the licensee held five open houses and met with stakeholders and First Nations in 19 separate sessions to review Draft MP No. 10. I have described the process followed and input received from First Nations above in '*First Nations consultation*'. With respect to the particular concerns raised by the Pacheedaht First Nation, I have addressed these specifically in '*wildlife habitat*' and '*cultural heritage resources*'.

In my determination I have assumed that the very extensive planning processes completed for the land use plans on the Coast have provided, and continue to provide, adequate opportunity for incorporating locally derived objectives related to land use and forest management. I have accounted for these objectives as they relate to the various factors that I have considered in my determination.

Based on this, I believe my accounting for local objectives and First Nations information has appropriately addressed the Minister's request.

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

Non-recoverable losses

I have reviewed the information regarding non-recoverable losses and am satisfied that the assumptions made and documented in the analysis in accounting for this factor represent the best available information and are appropriate for use in support of this determination.

Reasons for decision

In reaching my AAC determination for TFL 25 under Section 8 of the *Forest Act*, I have made all of the considerations documented above, and have reasoned from them as follows.

To accommodate the extensive geographical separation and disparate natures of the five blocks in the TFL, in these Reasons I have addressed the factors affecting the projected timber supply block by block in relation to the respective analyses provided for that purpose.

As detailed earlier in ‘*Timber supply analysis*’ and ‘*Area-based AACs*’, this AAC determination was originally intended, as part of a trial program, to identify an allowable annual timber harvest for the TFL under *area*-based regulation, rather than under the *volume*-based regulation which has been the primary standard for almost all AACs determined in BC to date. Accordingly, the main components of the licensee’s 2003 timber supply analysis were carried out, and the analysis was carefully reviewed by MFR staff, with the objective of assisting the deputy chief forester to determine an *area*, rather than a volume, of timber that could be harvested annually on TFL 25, under current land use and forest management practices.

As also detailed in ‘*Timber supply analysis*’, subsequent to completion of the analysis, the licensee requested that this trial for TFL 25 be concluded, and that a volume-based AAC be determined instead. Consequently, in selecting a base-case forecast for use as a starting reference in my considerations for each block, I considered not just the area-based base cases provided in the analysis, but also the volume-based assessments generated for each block as part of the analysis. In this consideration I noted that the production of these volume-based results was not the primary purpose of the analysis and that the applicability of the data, the assumptions, and the methodologies used in producing these volume results were not reviewed and examined by MFR staff to the same rigorous standards as those applied in reviewing the area-based analyses which were intended for use as referent base cases. From my considerations I have therefore decided, in consultation with MFR expert staff, to rely in my determination primarily on the volume equivalents derived through the area-based analysis for each block, since obtaining these area results was the primary focus and target of investigation in each analysis. Nonetheless, the volume-based analyses do provide secondary sources of helpful, complementary information which has been of great assistance in my assessment of some of the risks inherent in relying on the area-based projections of the timber supply.

Considerations appropriate to determining AACs typically include identification of factors that, considered separately, indicate reasons why the timber supply may be either greater or less than 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 this determination the conversion of area-based findings into volume-based information inevitably introduces a degree of uncertainty to the projected timber supply, as do the complex and differing but interrelated harvesting histories of the blocks and the outcomes of the various land-use planning processes and management regimes to which the blocks are severally subject. Therefore small adjustments of the kind more typically applied in AAC determinations to correct minor inconsistencies in specific factors contribute less precision when weighed against the overriding uncertainties affecting the assessment of timber supply in this very complex TFL.

In this situation, the determination process has of necessity involved less reliance on small quantifiable factors, and more reliance on assessing for each block a more general level of risk as to whether the projected base case harvest level in the analysis can be supported by the timber supply during the effective period of the determination and over the longer term. For each block

I have therefore assessed this general level of risk and have explained how I have taken it into account.

I have noted that no specific allowances were made in the analysis for riparian buffers for the various classes of wetlands, which are required to receive protection by the retention of riparian reserves and management areas. I expect—and have expressed this expectation under ‘*Implementation*’—further inventory work and field experience to provide for the representation of any outstanding forest cover requirements for these aquatic habitats in the next timber supply analysis—particularly in blocks 2 and 5 where current practice includes providing additional buffers for marsh and fen wetlands, forested swamps and high value fish habitat, as required by the two ministerial orders. For the current determination, I expect that any specific overestimations in the projected timber supply due to unaccounted riparian areas of all kinds will be accounted for within the significant accommodations I have made in respect of the major uncertainties identified on each block.

Block 1

For Block 1, the area-based, base-case forecast projected an annual harvest of 292 hectares with an associated average annual volume over the first 20 years of the projection of 164 534 cubic metres. In assessing the general level of risk to the operational achievability of this projection, I note that the point of highest constraint on the timber supply in the projection—which limits the maximum attainable non-declining, even-flow area harvest throughout the entire forecast period including the present—does not occur for another 70 years. Also, the volume-based analysis projected a starting harvest level of 185 000 cubic metres, 12 percent higher than the portion of the AAC currently attributed to Block 1, rising over time to a long-term level of about 240 000 cubic metres.

The inventory information for this block is comparatively recent and to VRI standards, although the Phase II ground samples, which have since been obtained, were not available in time to be applied as adjustments for use in the analysis, and in fact have yet to be applied. In addition, for Block 1 the site indices were not adjusted from local data to reflect the general provincial trend toward higher site indices in regenerating stands. Therefore the future managed stand yields for this block may well be underestimated,

I am also mindful of the likely underestimate in the mature inventory volume related to ‘dead potential’ trees, however, as I noted under ‘*coastal log grades*’, the uncertainty in the reported estimates is considerable. Given the magnitude of these estimates, I find it likely that in the base case for each block the existing mature stand volumes have been underestimated by a significant but unknown amount.

From all of this I conclude that the general level of risk to the projected initial harvest level in the base case for this block is relatively low in comparison with the clearer risks shown for some of the other blocks.

Having established this, some significant further considerations must be applied.

First, in the 1996, Section 8 AAC determination for TFL 25, a harvest level of 175 000 cubic metres was determined for Block 1, which included a partition of 10 000 cubic metres specified as attributable to commercial thinning to provide an opportunity for a prospective harvest. The timber supply analysis for that determination showed that the block’s total harvest level could be

achieved by conventional harvesting and helicopter harvesting whether or not any commercial thinning took place. Since the licensee has now indicated it has no more current interest in commercial thinning, partitioning a portion of the AAC to commercial thinning has no more utility and is hereby removed with no implication for the validity of the currently projected base-case harvest level.

Second, on January 31, 2007, all private land was removed from the TFL. Consistent with a sensitivity analysis provided by the licensee, the AAC partitioned as attributable to Block 1 was reduced by the deputy chief forester from 175 000 cubic metres to 108 500 cubic metres, i.e. by 66 500 cubic metres or 38 percent. This is the AAC which has been attributed to Block 1 since that time. Applying the same percentage reduction to the currently projected base-case harvest level of 164 534 cubic metres for Block 1 leaves a projected harvest level of 102 011 cubic metres. This adjusted harvest level is slightly lower than the current partition of 108 500 cubic metres. The UWRs recently established on Crown land and the WHAs that are not yet established in Block 1 may also reduce timber supply to a small extent though it is not certain if a reduction would be required in the short term. I am also mindful that the volume-based analysis showed a 12-percent higher initial harvest level than the base case.

For this determination, given the range of uncertainty present, I do not believe determining such small changes in AAC can be justified. For this block I have therefore decided to maintain the AAC at the currently existing level of 108 500 cubic metres.

The 1998 determination also included a harvest partition of 6000 cubic metres specified as attributable to stands in areas classified as operable only by helicopter. With the private land removed, this partition would also be proportionately reduced. In recent years, the average performance in areas operable by helicopter has not been significant in this block. However, the licensee still considers this area operable and, with the partition reduced to about 3700 cubic metres, the risk of over-harvesting the conventionally operable terrain would be sufficiently low that I see no utility in maintaining a partition of this size for areas operable by helicopter on the now significantly reduced land base of Block 1. The partition is therefore removed.

Block 2

For Block 2, the area-based, base-case forecast projected an annual harvest of 124 hectares with an associated average annual volume over the first 20 years of the projection of 90 234 cubic metres. In assessing the general level of risk to the operational achievability of this projection, I note that on the positive side the most constrained period does not occur until the year 2122, and that the volume-based analysis projected an 11- percent higher starting harvest level of 102 000 cubic metres per year, rising after 2122 to a long-term level of about 120 000 cubic metres per year.

On the other hand, several factors indicate substantial risks to the reliability of the projection. First, the licensee must now manage Block 2 in accordance with the *South Central Coast Order*. In fact, since 2004, the licensee has been gradually applying the seven key principles set out in the December 9, 2003 Agreement in Principle for implementing EBM so certain elements are already incorporated in current performance and more are imminent.

At the time of the analysis, the licensee did not anticipate that the coastal land-use planning process would extend down from the North Coast—the location which had been popularly

named the “Great Bear Rainforest” and about which the licensee felt great planning uncertainty—to include the Central Coast and Block 2. Therefore, for Block 2 the licensee did not apply the larger, generalized, volume reduction applied in the analysis for Block 5 to partly account for EBM, as well as other objectives. An analysis conducted by Cortex Consultants found that the timber supply impacts could be deferred but would become significant in later decades.

As discussed in my Guiding Principles, the full timber supply implications of implementing the *South Central Coast Order* will only become reliably clear over time as managers become suitably trained and as experience is accumulated that leads to measurable results on the landscape that can be monitored to acquire appropriate data for incorporating in timber supply analyses. For this determination I have considered the available information including the harvest forecasts provided in the Cortex analysis and I have concluded that some reduction to the timber supply projected for Block 2 in the base case will inevitably result over the longer term from implementing EBM. For this determination I am particularly mindful of the expected effect the higher operating costs associated with EBM will have on the operable land base. Under ‘*assessing the implications of EBM for timber supply*’ I noted that the operable timber supply for Block 2 is expected to be reduced by about five percent on this account and this was not accounted for in the Cortex analysis.

The second risk factor for the validity of the base-case harvest projection for Block 2 is the poor currency of the forest cover inventory for this block which dates from 1971; the age and condition of the data imply uncertainty for all steps of the land base exclusion process. Moreover, the application of SIBEC productivity estimates without the benefit of standard accuracy checks and to stands aged from 40 years to 140 years, in combination with potentially optimistic assumptions about full occupancy and genetically improved stock under partial cutting, indicates the possibility of overestimated volume yields for managed stands in this block. The now outmoded use of Average Volumes Lines (AVLs) also introduces uncertainty into the volume estimates for existing, unmanaged stands. One mitigating factor is the likely underestimate of mature stand volumes resulting from lack of accounting in the inventory for ‘dead potential’ trees. As I noted under ‘coastal log grades’, the uncertainty in the reported estimates is considerable. However, given the magnitude of these estimates, I find it likely that in the base case for each block the existing mature stand volumes have been underestimated by a significant but unknown amount.

A third, and significant risk factor arises from the high dependence of the projected base-case harvest level—as much as 40 and 50 percent in early decades—on harvesting from stands classified as operable only by helicopter. In practice, from 2002 to 2006, although the overall harvest from the block has averaged 94 percent of the AAC attributed to the block, only 5 percent of the harvest has been from the helicopter-operable stands, and most of this took place in 2004. Sensitivity analyses demonstrated that, if the terrain operable only by helicopter were removed from the THLB in the analysis, the base-case harvest level would be reduced by 18.5 percent.

This is already a matter of operational concern since the current AAC of 92 000 cubic metres for Block 2 includes a partition specifying 22 000 cubic metres as attributable to stands operable by helicopter, such that nearly 24 percent of the harvest should be coming from the helicopter-operable stands. The figures suggest significant over-harvesting in areas operable by

conventional means. The licensee has advised that a number of business factors have contributed to the low harvest in helicopter-operable stands and that the intention is still to ‘ramp up’ the harvesting in these areas. In recent years helicopters have been used primarily to harvest in areas of conventional operability or in ‘inoperable’ areas—where 34.9 hectares were harvested in 2004, a matter of some concern to the Ministry of Environment in regard to assumptions about wildlife habitat in ‘non-contributing’ areas.

A fourth risk factor in Block 2 described under ‘*application of operability mapping criteria*’ arises from the conclusion by MFR district staff that at least 538 hectares of land adjacent to landslides—just under 4 percent of the THLB in Block 2—are inoperable and should have been excluded from the THLB.

Under ‘*riparian reserves*’ I described a fifth risk factor, the incremental effect on timber supply of the implementation of EBM objectives related to riparian management areas for streams, lakes and wetlands.

A sixth risk factor concerns wildlife habitat. A total of 3747 hectares of new Ungulate Winter Range were established for Block 2 in May, 2006 under the *Government Actions Regulation* (B.C.Reg. 582/2004) with a minor reduction to the THLB. In addition, Schedule 6 of the *South Central Coast Order* includes a map of Grizzly habitat that in Block 2 covers 136 hectares, or about one percent of the THLB. While these areas are relatively small, they contribute to the uncertainty in the timber supply projected in the base case.

Finally, as described in ‘*Conservancies*’, the Stafford Estuary has been deleted from the TFL and as a result the THLB is reduced by about 200 hectares, further adding to the uncertainty in the timber supply.

Considering all the uncertainties inherent in these seven risk factors, and in particular the downward risks associated with the reduced economically operable land base under EBM and with harvesting in helicopter-operable areas, I find it reasonable to determine a reduction to the projected timber supply in the general order of 10 percent to 80 000 cubic metres per year.

Given the licensee’s stated interest to ‘ramp up’ the harvesting in the helicopter-operable areas, I will continue to provide an opportunity for the licensee to demonstrate the operability of these stands by harvesting in them, but only up to a significantly reduced amount. Given that the base-case harvest level is reduced by 18.5 percent with the helicopter operable land base excluded, I find it reasonable to attribute 15 000 cubic metres per year of the harvest to the stands classified as operable only by helicopter.

Block 3

For Block 3, the area-based, base-case forecast projected an annual harvest of 88 hectares, equivalent to a volume harvest of 68 342 cubic metres. In assessing the general level of risk to the operational achievability of this projection, I note on the positive side that the period when timber supply is most limited occurs more than 7 decades from now, in 2082, and that the volume-based analysis projected a 7-percent higher starting harvest level of 73 000 cubic metres.

On the other hand, as in Block 2, the forest cover inventory information for Block 3 dates from 1971, implying the same uncertainty for all steps of the land base exclusion process. Moreover,

the outdated use of AVLs, and the application of unchecked SIBEC productivity estimates in combination with the application of these estimates to stands aged from 40 years to 140 years and the potentially optimistic assumptions about the establishment of genetic stock also introduces uncertainty. I noted under 'coastal log grades' that it is now appropriate to account for 'dead potential' volume in AAC determinations. I also noted that mature stand volumes have likely been underestimated in all blocks on TFL 25 on this account by a significant, but unknown amount. This mitigates to an unknown extent factors that may result in potential overestimates in timber supply on TFL 25.

Another concern is the recent avoidance of harvesting on the helicopter-operable land base; a sensitivity analysis showed that without this land base the sustainable harvest level on Block 3 was reduced by about 9.1 percent, and the base-case projection itself showed roughly a 12-percent dependence on the helicopter-area contribution in the short term. In the 1996 AAC determination a partition of 2000 cubic metres for helicopter-operable areas was included in the 55 000-cubic-metre AAC attributed to this block.

From all of this I conclude as follows. The 2003 analysis indicates a potential for the harvest level on this block to be increased somewhat from the current level determined under the 1996 AAC. Before I can place my full confidence in the current availability of this potential, however, I must have more reassurance that the productivity estimates and yield volumes used are sufficiently reliable, and that the uncertainties inherent in the age of the inventory data are satisfactorily resolved. Moreover, before considering such an increase, I must also be reassured of performance on the helicopter-operable land base. The licensee has shown no performance on the helicopter lands in recent years, and there was no performance there in either 2005 or 2006 under management by BCTS. Under '*actual harvest level*' I noted that BCTS appears most likely to continue administering the harvest here, and that BCTS staff plan to harvest about 5000 cubic metres annually in helicopter-operable areas on Block 3.

Given the uncertainties mentioned above and the lack of recent performance in helicopter-operable areas I have decided to maintain the harvest level for Block 3 at 55 000 cubic metres. Also, given the margin between this harvest level and the higher level projected in the base case, I am confident that harvesting may proceed at this rate for the duration of this AAC without a risk of over-harvesting on the conventionally operable land base. If BCTS attains its goal of harvesting 5000 cubic metres annually on helicopter-operable areas over the next five years, this can be accounted for in a future determination.

I noted earlier a small area, about 53 hectares, adjacent to landslides, which MFR district staff have concluded are inoperable on Block 3 and that should have been excluded from the THLB. However, any inaccuracy in the projected timber supply conveyed by the inclusion of this area is outweighed by the significant uncertainties I have noted in the data and information for this block.

Block 5

For Block 5, the area-based, base-case forecast projected an annual harvest of 492 hectares, equivalent to a volume harvest of 284 258 cubic metres. In assessing the general level of risk to the operational achievability of this projection, I note on the positive side that the period when

timber supply is most limited occurs many decades from now in 2142, and that the volume-based analysis projected an almost 25-percent higher starting harvest level of 355 000 cubic metres.

Since the analysis, nine conservancies affecting the THLB of Block 5 were formally established and the areas deleted from the TFL. These areas were previously specified as Designated Areas under Part 13 of the *Forest Act*. As a result, under section 173(2) of the *Forest Act*, the chief forester reduced the AAC attributable to block 5 by 84 000 cubic metres from 255 000 cubic metres to 171 000 cubic metres. (The Europa East conservancy remains to be established on this block, but does not overlap the THLB and so poses no unresolved risk to the timber supply.)

The section 173(2) reduction applied to Block 5 amounted to 32.6 percent. When this same proportional reduction is applied to the 2003 base-case harvest level projection, the adjusted harvest level is reduced from the projected base-case level of 284 258 cubic metres per year to 191 590 cubic metres per year, and I find this to be a reasonable starting level for my considerations in this section.

The inventory for this block used in the analysis was from 1985. A new inventory to VRI standards was started in 2000 but was not completed until after the analysis. Site index productivity information was estimated from the old inventory site classes of 'good', 'medium', 'poor' and 'low', and then refined with data from the sample plots. . In addition to this, the potentially optimistic assumptions applied in the base case that in areas subject to partial cutting stands would attain full occupancy and yields consistent with current estimates for genetically improved stock leads to uncertainty in growth and yield projections. However, given the preponderance of old growth stands on this block, the consequent uncertainty in the productivity of managed stands will be not be of significant influence in the validity of the timber supply projection for some time; whether or not the projected longer-term volume increases actually materialize will not affect the reliability of the projection in the short term. I have also identified a further uncertainty related to the inventory, and that is the likely underestimate of mature stand volumes resulting from lack of accounting in the inventory of 'dead potential' trees. As I noted under 'coastal log grades', the uncertainty in the reported estimates is considerable, however, given the magnitude of the estimates, I find it likely that in the base case for each block the existing mature stand volumes have been underestimated by a significant but unknown amount.

In my determination I have also accounted for two issues of immediate concern: the helicopter-operable land base; and the implications of EBM, which the licensee has gradually been implementing since 2004 and must now incorporate in operations in accordance with the *Central and North Coast Order*.

Sensitivity analysis for Block 5 showed that without the contribution of the helicopter-operable stands, the timber supply could only support a harvest level almost 18 percent lower than that projected in the base case, and the base-case projection itself showed a reliance in the short term of about 12 percent on the helicopter-operable stands. Yet the performance figures for Block 5 show that from 2002 to 2006 inclusive, only 0.6 percent of the harvest has come from these stands on average and in the best year, 2006, only one percent. When considering these helicopter performance statistics, I acknowledge that the overall harvest performance on Block 5 was also low at 15 percent of the AAC available during the same period, and therefore the conventional land base was not over harvested.

To support the projected harvest level for the block, based on the sensitivity analysis, the harvest attributable to the helicopter stands should be about 18 percent. With a starting harvest level of 191 590 cubic metres per year after accounting for the deleted conservancies, the harvest attributable to the helicopter stands should therefore be about 35 000 cubic metres per year.

The other large uncertainty affecting the timber supply in Block 5 is EBM. As I outlined in my reasons for Block 2, some reduction to the timber supply will inevitably result from implementing EBM over the longer term. I note that a larger generalized volume reduction was applied in the licensee's base case for Block 5 compared to the other blocks to partly account for EBM as well as other objectives. However, other EBM objectives such as those for streams, lakes and wetlands were not fully accounted for in the base case. In addition, as I described under '*assessing the implications of EBM for timber supply*', the higher operating costs associated with EBM are expected to reduce the operable timber supply by from nine to 14 percent.

I also have available to me harvest projections provided in the Cortex analysis. One forecast was provided that was based on EBM assumptions and did not include as contributing the area that was expected to be protected at the time the analysis was conducted. According to that forecast the harvest level for Block 5 could be increased in the short term from the initial harvest level attained in the base case of the 2003 analysis - about 284 000 cubic metres per year - but after three decades the harvest level declined to a long term harvest level of about 175 000 cubic metres per year.

For this determination, considering all of the above, I am very concerned about the considerable uncertainty in some of the factors available for my consideration, in particular the age of the inventory, site productivity estimates, assumptions about genetic gain, definition of the operable land base, and the effects of EBM on timber supply including the associated higher operating costs. I am also aware that the harvest performance on Block 5 has been very low. In view of these uncertainties I believe it is appropriate to maintain the AAC attributed to this block at the current level, that is, 171 000 cubic metres. This level accounts for the deletion of the conservancies from Block 5.

I have also considered the amount of volume that should be attributable to helicopter-operable areas. I note that a harvest level of 171 000 cubic metres per year is about 20 000 cubic metres per year less than the starting harvest level of 191 590 cubic metres per year derived above. Given the low performance in helicopter-operable areas, I find it reasonable to attribute the entire difference to this area. Above I also reasoned that, with a starting harvest level of 191 590 cubic metres per year, the harvest attributable to the helicopter-operable stands should be about 35 000 cubic metres per year. Therefore, within the 171 000 cubic metres of the AAC that I have attributed to Block 5, I will partition 15 000 cubic metres attributable to harvesting in stands classified as operable with helicopters. .

Block 6

For Block 6, the area-based, base-case forecast projected an annual harvest of 254 hectares, equivalent to a volume harvest of 140 873 cubic metres. In assessing the general level of risk to the operational achievability of this projection, I note on the positive side that the volume-based analysis projected a roughly 10-percent higher starting harvest level of 158 000 cubic metres. In

addition, the inventory for this block is to VRI standards, although Phase II adjustments were not applied for use in the 2003 analysis. The site index figures, derived from the VRI, may also be considered reasonable, although potential longer-term gains from OGSi adjustments were not incorporated in the projections. Under ‘coastal log grades’ I have identified an uncertainty related to the inventory that likely represents an underestimate of mature stand volumes resulting from lack of accounting in the inventory of ‘dead potential’ trees. The uncertainty in the reported estimates is considerable, however, given the magnitude of the estimates, I find it likely that in the base case for each block the existing mature stand volumes have been underestimated by a significant but unknown amount.

Balanced against these positive factors are the following indicators of risk: the period when timber supply is most limited is in the relatively near future for this block, in 2042, implying a somewhat higher level of risk on this account than in the other four blocks. The base-case forecast presupposes a continuing contribution of almost 8 percent from stands predominated by alder when the only block on which any performance in alder stands is evident to date is Block 1. The alder stands were also included in the timber supply analysis for the 1996 AAC determination, and in 2002 the licensee had expressed interest in harvesting alder, although no partition for their harvest was included in that determination. However, in a recent communication with MFR staff, the licensee indicated no current interest in beginning harvesting alder on this block, and the continuing assumption that these stands will contribute to the overall harvest level determined for this block is no longer valid.

Another concern on Block 6 is the mismatch between the actual harvesting on the helicopter-operable land base and the contribution it is assumed to make in the timber supply analysis. In the base-case projection, roughly 25 percent of the harvest is assumed to come from helicopter stands in the first two decades, and a sensitivity analysis showed that without the helicopter land base the sustainable harvest level on this block was reduced by over 15 percent. In the base-case projection, the helicopter land base was relied on to sustain 12 percent of the harvest. In practice, from 2002 through 2005, the actual performance on this land base provided just nine percent of the scaled volume. BCTS, the current operator on Block 6, harvested no volume in helicopter stands in 2006, however it plans to harvest 130 000 cubic metres of timber in these stands over the next four years.

I have also acknowledged under ‘*cultural heritage resources*’ the uncertainty related to the lack of accounting for cultural heritage resources in the base case for Block 6, particularly culturally modified trees and monumental cedar. I indicated that on this account timber supply has likely been overestimated in the base case by an unknown amount.

Another factor lending uncertainty to the achievability of the base-case projection is the Haida Gwaii Strategic Land Use Agreement, which includes, among other things, the intentions to establish New Protected Areas, Special Value Areas and Operating areas where EBM objectives will be implemented as described under ‘*Queen Charlotte Islands*’. In that section I indicated that I find it likely that some level of EBM objectives will be implemented on Block 6, and BCTS is planning harvest blocks in accordance with the SLUA to the extent possible. I therefore consider this factor as a source of considerable uncertainty in this determination, and this uncertainty will likely result in a reduction in timber supply but currently to an unknown extent.

The AAC reductions totalling 8500 cubic metres currently in effect under Part 13 (section 173(2)) of the *Forest Act* in respect of the Haida Gwaii/Queen Charlotte Islands designated areas will remain in effect until the designated areas expire in 2008. According to the SLUA, when they cease to be designated there will be harvest activity permitted in the areas in accordance with the management objectives set for Marbled Murrelet nesting habitat. Another action flowing from the SLUA is that the New Protected Areas will also be designated under Part 13 of the *Forest Act*. When this occurs, the AAC may be reduced on that account under section 173(2) of the *Forest Act*. These two factors cause further uncertainty in this determination.

Before the section 173(2) reduction, the portion of the AAC attributed to Block 6 in the last determination was 115 000 cubic metres, against which the base-case projection of a harvest level of 140 873 cubic metres represents a significant increase. The reasonableness of determining such an increase at this time has to be weighed against the significant uncertainties now identified in the projection. Without the contribution from alder stands which represent about 8 percent of the projected harvest, and without the helicopter-operable stands with an assumed ongoing contribution of 15 percent of the projected harvest level, the operationally achievable harvest level would be approximately 23 percent lower than projected in the base case, i.e. about 108 500 cubic metres. Since the licensee has shown some level of performance in the helicopter-operable areas, and BCTS plans to continue operations in these stands, I find it reasonable to assume that they will contribute somewhat to the harvest over the next five years. Therefore, instead of reducing the AAC for the block to 108 500 cubic metres, I will account for some contribution from helicopter-operable stands and maintain the AAC attributable to Block 6 at 115 000 cubic metres. Within this attributed AAC I will attribute 15 000 cubic metres to be harvested within stands classified as being operable with helicopters.

With respect to the likely practice of EBM on Block 6 and the other noted uncertainties, I note that in the sensitivity analysis projecting the timber supply under volume-based regulation the initial harvest level is ten percent higher than in the base case and the forecasted harvest increases dramatically after two decades. Given the time required to develop and implement EBM practices on the ground, I consider that the significant reduction to 115 000 cubic metres per year already applied as discussed in the preceding paragraph should also provide adequate accommodation for the implications likely to arise from the development of EBM over the effective period of this AAC. I am further reassured in this conclusion by the fact that following the relatively long harvest history on this block, many stands are already in advanced second growth, with the transition to harvesting in these stands already underway. Although local information was not available for incorporating in the analysis with respect to the potential for future productivity gains to be realized in consistency with the trends indicated by OGS studies, it is nonetheless likely that such gains will be experienced on this block as elsewhere on the coast, and that their contribution to the timber supply will be realized earlier here due to the already advanced second-growth stands.

I am aware that an understanding has been reached with the Haida First Nation on the future establishment of an AAC for the Queen Charlotte Islands. In this Section 8 AAC determination for TFL 25, I am statutorily bound to determine a harvest level for all parts of the TFL including Block 6 on the Queen Charlotte Islands. Should this block remain in TFL 25 when the timber supply review agreed to in the Letter Of Understanding is completed, the AAC for TFL 25 may have to be revisited. For this determination I have partitioned a harvest level attributable to each

block of TFL 25 and I have been mindful of the effects that EBM may have on the harvest level for Block 6, though the regime that will eventually be practiced is as yet uncertain.

Determination

I have considered and reviewed all the factors as documented above, including the risks and uncertainties in the information provided. It is my determination that a timber harvest level that accommodates discernible objectives for all forest resources during the next five years and that reflects current management practices as well as the socio-economic objectives of the Crown can be best achieved on TFL 25 at this time by establishing an AAC of 529 500 cubic metres for the entire TFL, specified as attributable to the individual blocks as follows:

Block	Harvest level (cubic metres)	Partition	Notes
1	108 500	No partition	
2	80 000	15 000 cubic metres are attributed to stands classified as being harvestable only by helicopter.	
3	55 000	No partition	
5	171 000	15 000 cubic metres are attributed to stands classified as being harvestable only by helicopter.	
6	115 000	15 000 cubic metres are attributed to stands classified as being harvestable only by helicopter.	Reduction of 8500 cubic metres to be applied under section 173(2), Part 13 of the Forest Act. Net AAC for this block will then be 106 500 cubic metres

This determination is effective February 1, 2008 and will remain in effect until a new AAC is determined, which must occur within five years of the effective date of this determination or as otherwise permitted in the *Forest Act*.

The AAC for TFL 25 having now been determined under Section 8 of the *Forest Act*, and having accounted for the timber supply implications of areas specified by government as Designated Areas in the Central Coast Designated Area No. 2 (B.C. Reg 82/2006) which are now removed from the TFL by formal establishment as conservancies, the AAC reduction of 84 000 cubic metres ordered by the chief forester under Section 173(2) of the *Forest Act* effective September 28, 2006, for Block 5 of TFL 25, is now rescinded in full.

The AAC reduction of 8500 cubic metres under section 173(2) of the Forest Act pursuant to the Haida Gwaii/Queen Charlotte Islands Designated Area (B.C. Reg 210/2005) and Haida Gwaii/Queen Charlotte Islands Designated Area No. 3 (B.C. Reg 251/2006) is still in effect. Therefore the effective AAC for TFL 25 is 521 000 cubic metres.

Implementation

In the period following this decision and leading to the subsequent determination, I encourage the licensee and/or MFR staff to undertake the tasks noted below that I have also described further in the appropriate sections of this rationale. These projects are important to help reduce the risk and uncertainty associated with key factors that affect the future timber supply in TFL 25. I therefore request that the following be completed before the next determination:

- I expect the licensee to carry out work to significantly improve the site productivity information on TFL 25 before the next analysis.
- I expect the licensee to collect information to quantify the area of marsh and fen wetlands and forested swamps in blocks 2 and 5, and wetlands in the other three blocks, so that the management of riparian management areas for these aquatic habitats can be fully accounted for in the next determination.
- I expect that for the next AAC determination the quality of the forest inventory supporting the analysis will be considerably improved by the completed results of the VRI process for all blocks.
- I expect the licensee and MFR staff to work together to determine an appropriate method of tracking actual utilization of dead potential volumes so that this factor can be more fully accounted for in the next determination.
- I expect the licensee to initiate an ongoing assessment of the effects of various levels of partial cutting under EBM procedures on:
 - regeneration responses to planting under the remaining stand after first harvest;
 - volumes and rates of growth over time in new and residual stands;
 - the meeting of biodiversity objectives.
- I expect the licensee to perform in areas classified as operable with helicopters and to report its performance annually to the Regional Executive Director of the Coast Forest Region.



Craig Sutherland, R.P.F.
Deputy Chief Forester

February 1, 2008



Appendix 1: Section 8 of the *Forest Act*

Section 8 of the *Forest Act*, Revised Statutes of British Columbia 1996, c. 157 Consolidated to October 21, 2004, reads as follows:

Allowable annual cut

- 8 (1) The chief forester must determine an allowable annual cut at least once every 5 years after the date of the last determination, for
- (a) the Crown land in each timber supply area, *excluding tree farm* licence areas, community forest areas and woodlot licence areas, and
 - (b) each tree farm licence area.

(2) If the minister

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

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

- (c) within 5 years after the order under paragraph (a) or the amendment or entering into under paragraph (b), and
- (d) after the determination under paragraph (c), at least once every 5 years after the date of the last determination.

(3) If

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

the chief forester must determine an allowable annual cut at least once every 5 years from the date the allowable annual cut under subsection (1) of this section is effective under section 9 (6).

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

- (a) by written order may postpone the next determination under subsection (1) to a date that is up to 10 years after the date of the relevant last determination, and

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

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

- (a) by written order may rescind the order made under subsection (3.1) and set an earlier date for the next determination under subsection (1), and
 - (b) must give written reasons for setting the earlier date.
- (4) If the allowable annual cut for the tree farm licence area is reduced under section 9 (3), the chief forester is not required to make the determination under subsection (1) of this section at the times set out in subsection (1) or (2) (c) or (d), but must make that determination within one year after the chief forester determines that the holder is in compliance with section 9 (2).
- (5) In determining an allowable annual cut under subsection (1) the chief forester may specify portions of the allowable annual cut attributable to
 - (a) different types of timber and terrain in different parts of Crown land within a timber supply area or tree farm licence area, and
 - (b) different types of timber and terrain in different parts of private land within a tree farm licence area,
 - (c) [Repealed 1999-10-1.]
- (6) The regional manager or district manager must determine an allowable annual cut for each woodlot licence area, according to the licence.
- (7) The regional manager or the regional manager's designate must determine a an allowable annual cut for each community forest agreement area, in accordance with
 - (a) the community forest agreement, and
 - (b) any directions of the chief forester.
- (8) In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider
 - (a) the rate of timber production that may be sustained on the area, taking into account
 - (i) the composition of the forest and its expected rate of growth on the area,
 - (ii) the expected time that it will take the forest to become re-established on the area following denudation,
 - (iii) silviculture treatments to be applied to the area,
 - (iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area,
 - (v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production, and
 - (vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber,
 - (b) the short and long term implications to British Columbia of alternative rates of timber harvesting from the area,
 - (c) Repealed [2003-31-02]
 - (d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia, and

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

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

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

Purposes and functions of ministry

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

Document attached:

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.

Page 1 of 2

Minister of
Forests and Range
and Minister Responsible
for Housing

Office of the
Minister

Mailing Address:
PO Box 9049 Stn Prov Govt
Victoria BC V8W 9E2
Telephone: 250 387-6240
Facsimile: 250 387-1040

Location:
Parliament Buildings
Victoria BC V8V 1X4
e-mail: FOR.Minister@gov.bc.ca



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