

Appendix V. Chief Forester's Rationale for AAC
Determination

To be added by January 2006.

**BRITISH COLUMBIA
MINISTRY OF FORESTS AND RANGE**

Tree Farm Licence 37

Western Forest Products Inc.

Rationale for Allowable Annual Cut (AAC) Determination

Effective October 1, 2006

**Henry Benskin
Deputy Chief Forester**

Table of Contents

Objective of this Document	1
Description of Tree Farm Licence 37	1
History of the AAC	2
New AAC determination	2
Information sources used in the AAC determination	2
Role and limitations of the technical information used	4
Statutory framework	5
Guiding principles for AAC determinations	5
The role of the base case	8
Timber supply analysis	8
Consideration of Factors as Required by Section 8 of the Forest Act	11
Land base contributing to timber harvest	11
- general comments	11
- non-forest and non-productive forests	12
- uneconomic forests	12
Existing forest inventory	14
- coastal log grades	15
Expected rate of growth	16
- site productivity estimates	16
- volume estimates for existing natural stands	17
- volume estimates for regenerated managed stands	18
- operational adjustment factors	18
- gains from the use of select seed	20
- minimum harvestable ages	20
Regeneration delay	21
Not-satisfactorily-restocked areas	21
Incremental silviculture	22
Integrated resource management objectives	23
- riparian management areas	23
- karst landscapes	24
- ungulate winter ranges	24
- species at risk	25
- Queen Charlotte goshawk	25
- marbled murrelet	25
- Keen's long-eared myotis	26
- old growth management areas	26
- landscape-level biodiversity	28
- wildlife tree retention/ecosystem-based harvesting	28
- visual resources	29
Other information	31
- harvest sequencing	31
- twenty-year plan	31
- land use plan and landscape unit planning	32
- sustainable forest management plan	32
- First Nations considerations and cultural heritage resources	32
Alternative harvest flows	36
Minister's letter and memorandum	36
Local objectives	37

Reasons for Decision.....38
Determination.....41
Implementation.....41
Appendix 1: Section 8 of the *Forest Act*43
Appendix 2: Section 4 of the *Ministry of Forests and Range Act*.....45
Appendix 3: Minister’s letter of July 4, 2006.....45

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 37. This document also identifies where new or better information is needed for incorporation in future determinations.

Description of Tree Farm Licence 37

Tree Farm Licence (TFL) 37 is held by Western Forest Products Inc. (Western). Western recently acquired the TFL from Canadian Forest Products Ltd. (Canfor). TFL 37, also known as the Nimpkish TFL, is located in the north central portion of Vancouver Island about 100 kilometres northwest of Campbell River, British Columbia (BC). Local communities near or within the TFL area are Port McNeill, Sayward and Woss. TFL 37 is administered by the BC Forest Service (BCFS) North Island – Central Coast Forest District, based in Port McNeill, within the Coast Forest Region.

The general area within the perimeter of the TFL (which includes parks) is 196 725 hectares. The productive forest area is 148 720 hectares of which 91 325 hectares (about 61 percent) are considered to be in the current timber harvesting land base. The timber harvesting land base is the area estimated to be available for harvesting by considering economic, ecological and other factors.

The forests of TFL 37 occur in two biogeoclimatic zones: the Coastal Western Hemlock (CWH) and the Mountain Hemlock (MH) zones. Three commercial tree species are grouped together as “HemBal”. The species within this group are western hemlock, mountain hemlock and pacific silver fir (also known as balsam). They occupy 53 percent of the area (and 66 percent of the volume) within the timber harvesting land base. Douglas-fir, western red cedar, and yellow cypress occupy 23, 8, and 7 percent of the land base, respectively. Minor components of the land base (about 3 percent) are also occupied by Sitka spruce, pine and deciduous species. The remaining 6 percent of the land base has no tree species cover at this time.

The total Schedule A holdings are 25 692 hectares of which 4725 hectares are private land and 20 967 hectares are in timber licences on Crown lands.

Five First Nations have asserted traditional territories within the TFL: the Namgis, Mowachat/Muchalaht, Tlowitsis and the Quatsino First Nations and the Cape Mudge Band. The Namgis First Nation’s asserted traditional territory has a considerable overlap with the TFL.

Forestry, tourism, mining and fishing are the principal economic activities in the region. Road access to the TFL is provided by provincial highway 19 between Port McNeill and Woss. Western also operates a railway system from Vernon Lake to its log sort at Beaver Cove.

History of the AAC

TFL 37 was originally issued to Canfor in 1960. Between 1961 and 1965, under Management Plan (MP) No. 1, the AAC was set at 577 667 cubic metres. From 1966 to 1969, three successive determinations resulted in the AAC increasing substantially to 1 144 007 cubic metres. The increase was due to major changes in utilization standards, harvesting technology, and timber values.

For the last 30 years since 1976, the AAC has not significantly changed, varying from a high of 1 107 000 to a low of 1 063 000 cubic metres. For the last 12 years since 1994, the AAC has been set at 1 068 000 cubic metres. The last AAC determination was made effective January 1, 1999. It included 43 184 cubic metres administered under the Small Business Forest Enterprise Program (now British Columbia Timber Sales (BCTS)). On January 15, 2003, the Deputy Chief Forester signed an order postponing the next AAC determination to January 1, 2006.

On December 21, 2005 the Minister of Forests and Range (the minister) signed two orders pursuant to the *Forestry Revitalization Act* reducing the AAC available to the licensee by a total of 82 053 cubic metres. On February 9, 2005 the minister signed a Forest and Range Agreement with the Namgis First Nation which, among other things, would allow the First Nation to apply for a non-replaceable forest licence for up to 45 600 cubic metres annually in TFL 37. This volume is part of the volume mentioned above made available through the *Forestry Revitalization Act*. The remainder of this volume, 36 453 cubic metres, has not been assigned to any specific operator at this time.

New AAC determination

Effective October 1, 2006, the new AAC for TFL 37 will be 969 000 cubic metres. The new AAC represents about a nine percent decrease from the current AAC. The new AAC includes 37 000 cubic metres attributed to helicopter logging of low economic hemlock and balsam stands. This AAC will remain in effect until a new AAC is determined, which must take place within five years of this determination.

Information sources used in the AAC determination

Several information sources were used in this determination many of which are referred in detail in the draft Management Plan, timber supply analysis report, and the information package. Key information sources used in this determination include:

- *Sustainable Forest Management Plan 9 for Nimpkish Defined Forest Areas and Tree Farm Licence 37*. 2005. Canfor. This plan is also being submitted as Management Plan (MP) No. 9 under the TFL agreement.
- *Tree Farm Licence # 37, Timber Supply Analysis Report for Sustainable Forest Management Plan 9*. April 20, 2005. Prepared for Canfor by Forest Ecosystems Solutions Ltd. Accepted by the BCFS on July 5, 2005. Supplemental analysis provided on October 21, 2005 (also referred to as the “analysis” in this rationale).
- *Tree Farm Licence #37, Information Package for Sustainable Forest Management Plan 9*. Revised December 19, 2004. Prepared for Canfor by Forest Ecosystems Solutions Ltd. Accepted by the BCFS on December 23, 2004.

- *TFL 37 Twenty-year Plan*. 2005. Canfor. Accepted by the BCFS on July 15, 2005.
- *Vancouver Island Land Use Plan*. 1994. Province of BC.
- *Vancouver Island Summary Land Use Plan*. 2000. Province of BC.
- *Vancouver Island Land Use Plan Higher Level Plan Order*. 2000. Province of BC.
- *Sustainable Resource Management Plan Biodiversity Chapter for the Lower Nimpkish Landscape Unit*. 2005. Prepared by Canfor, Tangent Forestry and Wildlife Solutions, and the Ministry of Agriculture and Lands.
- *Order to Establish a Landscape Unit and Objectives – Lower Nimpkish Landscape Unit*. 2005. Ministry of Agriculture and Lands.
- *Sustainable Resource Management Plan Biodiversity Chapter for the Upper Nimpkish Landscape Unit*. 2005. Prepared by Canfor, Tangent Forestry and Wildlife Solutions, and the Ministry of Agriculture and Lands.
- *Order to Establish a Landscape Unit and Objectives – Upper Nimpkish Landscape Unit*. 2005. Ministry of Agriculture and Lands.
- *Conservation of Biological Diversity: An Assessment of the Application of Criteria and Indicators*. April 2006. In cooperation with Canfor TFL 37. Forest Practices Board.
- *Audit of Visual Resource Management in Campbell River Forest District*. May 2005. Forest Practices Board.
- *Procedures for Identifying and Approving Existing Ungulate Winter Ranges*. August 6, 1998. Memo from Larry Pedersen, BCFS and Jon O’Riordan, Ministry of Environment.
- *Procedures for factoring visual resources in timber supply analysis*. 1998. BCFS.
- *Sustainable Forest Management Plan: Western Forest Products Inc. Coastal Operations – Nimpkish Defined Forest Area*. 2002 (revised). Western Forest Products.
- *Nimpkish Tree Farm Licence 37 Management Plan & Timber Supply Analysis Report*. 1998. Prepared by Timberline Forest Inventory Consultants Inc. for Canfor (also referred to as the “1998 analysis” in this rationale).
- *Forestry Principles Implementation Plan: Coastal Region*. 2002. Western Forest Products Inc.
- *Growth and Yield in MP No. 8 and SFMP No. 9 on TFL 37*. 2004. J. S. Thrower & Associates Ltd.
- *Yield Tables for Natural and Managed Stands: MP No. 9 on TFL 37*. 2003. J. S. Thrower & Associates Ltd.
- *Potential Site Index Estimates for the Major Commercial Tree Species on TFL 37*. 2000. J.S. Thrower & Associates Ltd.
- *TFL 37 Vegetation Resources Inventory Statistical Adjustment – Version 3.0*. 2004. J.S. Thrower & Associates Ltd.
- *TFL 37 Net Volume Adjustment Factor Analysis – Version 2.0*. 2004. J.S. Thrower & Associates Ltd.
- *Terrestrial Ecosystem Mapping of Canfor’s TFL 37*. 2000. R.N. Green.
- *Modelling stand level growth and yield in response to silvicultural treatments*. 1995. Pienaar, L.V. and J. W. Rheney. For. Sci. 41(3): 629-638.

- Existing stand yield tables for TFL 37. Accepted by the BCFS on November 17, 2004.
- Managed stand yield tables and site index for TFL 37. Accepted by the BCFS on February 2, 2005.
- *Summary of dead potential volume estimates for management units within the Coastal Forest Region*. March 2006. Ministry of Forests and Range.
- *Tree Farm Licence 37 Rationale for Allowable Annual Cut (AAC) Determination Effective January 1, 1999*. 1998. Larry Pedersen, Chief Forester.
- *Chief Forest Order Respecting an AAC determination for Tree Farm Licence No. 37* (postponement order). 2003. Ken Baker, Deputy Chief Forester.
- Letter from the Minister of Forests to the chief forester, dated July 4, 2006, stating the Crown's economic and social objectives for the province (see Appendix 3);
- *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.
- *Biodiversity Guidebook*. 1995. Forestry Practices Code. Province of BC.
- *Riparian Management Area Guidebook*. 1995. Forest Practices Code. Prov. of BC.
- Summary of public input solicited by the licensee regarding the contents of the proposed Management Plan No. 9.
- Input received from First Nations through the consultation process.
- Consideration of factors required by Section 8 of the *Forest Act* for TFL 37 by the deputy chief forester with BCFS district, regional and branch staff at the AAC determination meeting held May 17 and 18, 2006.

Role and limitations of the technical information used

Section 8 of the *Forest Act* requires the chief forester to consider biophysical as well as social and economic information in AAC determinations. A timber supply analysis, and the inventory and growth and yield data used as inputs to the analysis, typically form the major body of technical information used in AAC determinations. Timber supply analyses and associated inventory information are concerned primarily with biophysical factors—such as the rate of timber growth and definition of the land base considered available for timber harvesting—and with management practices.

However, the analytical techniques used to assess timber supply are necessarily simplifications of the real world. There is uncertainty about many of the factors used as inputs to timber supply analysis due in part to variations in physical, biological and social conditions, although ongoing science-based improvements in the understanding of ecological dynamics will help reduce some of this uncertainty.

Furthermore, technical analytical methods such as computer models cannot incorporate all of the social, cultural and economic factors that are relevant when making forest management decisions. Therefore, technical information and analysis do not necessarily provide complete answers or solutions to forest management problems such as AAC determinations. The information does, however, provide valuable insight into potential

impacts of different resource-use assumptions and actions, and thus forms an important component of the information required to be considered in AAC determinations.

In determining the AAC for TFL 37, I have considered known limitations of the technical information provided, and I am satisfied that the information provides a suitable basis for my determination.

Statutory framework

Section 8 of the *Forest Act* requires the chief forester to consider particular factors in determining AACs for timber supply areas (TSAs) and TFLs. Section 8 of the Act is reproduced in full as Appendix 1.

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*.

Guiding principles for AAC determinations

The chief forester has expressed the importance of consistency of judgement in making AAC determinations. I also recognize the need for consistency of approach, and I 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 I have adopted them as described below in making my AAC determination for TFL 37.

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

Two important ways of dealing with uncertainty are

- (i) minimizing risk, in respect of which in making AAC determinations, I consider particular uncertainties associated with the information before me, and attempt to assess and address the various potential current and future social, economic and environmental risks associated with a range of possible AACs; and
- (ii) redetermining AACs frequently, 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 guiding principles that follow.

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 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* (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, still 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 37, 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 1994, government approved the Vancouver Island Land Use Plan (VILUP) and this plan includes the area covered by TFL 37. VILUP Higher Level Plan objectives under the Code were legally established in 2000 and have been grandparented to apply under FRPA. In addition, the Ministry of Agriculture and Lands established legal objectives for the Lower and Upper Nimpkish Landscape Units in 2005 which also apply under FRPA. This has clarified many aspects of land and resource management and I refer to this where applicable in various components of this document.

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 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 judgement to the available information, taking any uncertainties into account. Given the large impacts that AAC determinations can have on communities, no responsible AAC determination can be made solely on the basis of a response to uncertainty. Nevertheless, in making my determination, I may need to make allowances for risks that arise because of uncertainty.

With respect to First Nations' issues, I am aware of the Crown's legal 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 address those interests. When aboriginal interests are raised that are outside of my jurisdiction, I will endeavour to forward these interests for consideration to other decision-makers.

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 37. 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 am assisted by timber supply forecasts provided to me by the licensee as part of the BCFS 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

The 2005 timber supply analysis for TFL 37 (referred to below as the “timber supply analysis” or just the “analysis”) was prepared by Forest Ecosystem Solutions Ltd (FESL) under the direction of licensee staff. FESL used its Forest Simulation and Optimization System (FSOS) model for the timber supply analysis. Based on my staff’s experience examining results from this model, I am satisfied that it is capable of providing reasonable projections of timber supply.

Given that many harvest scenarios are possible, the harvest flow objectives for the base case included: (i) maintaining the initial harvest level at approximately the current AAC

until reductions were necessary for long-term sustainability; (ii) limiting harvest volume decreases to no more than 10 percent per ten-year period beginning in year 2007; and (iii) maintaining even flow in the long-term with a non-declining growing stock.

The base case harvest for the first five-year period (2002 to 2006) is 1 074 000 cubic metres per year. The harvest level is the average of four years' billing records and one year of estimated harvested. The estimated harvest for 2006 is 970 000 cubic metres.

The harvest level then declines just under 10 percent to 970 000 cubic metres per year for the subsequent five-year period from 2007 to 2011. Further five-percent decreases continue for ensuing five-year periods until a long-term harvest level of 780 000 cubic metres per year is attained in year 2032.

In the base case, the species composition of harvested areas over the first 35 years reflects the older stand profile in the timber harvesting land base. Although minor, deciduous volumes contribute to the base case and are being utilized in the TFL. The long-term species profile is dominated by Douglas-fir and Hemlock-Balsam stands (37 percent each), western red cedar (19 percent) with minor components of yellow cypress, Sitka spruce and other species.

The long-term harvest level was established with a minimum resolution of 4000 cubic metres per year, i.e. the actual estimated harvest level could be between 776 000 and 784 000 cubic metres per year. To ensure sustainable even-flow in the long-term, the simulations were run for 500 years. After the original older forests are harvested, the harvest is dominated by stands between 61 and 80 years of age with stand volumes that almost always exceed 500 cubic metres per hectare.

The base case in the 1998 timber supply analysis which supported MP No. 8 and the last AAC determination effective 1999 declined by only about three percent to 1 034 000 cubic metres in 2006 and this level could be sustained in the mid-term until year 2102 before eventually increasing to a long-term harvest level of 1 172 000 cubic metres. Relative to the current base case, the previous base case was 25 percent higher in the mid-term and 33 percent higher in the long-term.

The main changes in the new base case relative to the previous one are: (i) the current and long-term timber harvesting land base is 11.5 percent and 10.7 percent smaller, respectively; and (ii) the productive forest (total) growing stock is 13.0 percent smaller while the current and long-term timber harvesting land base growing stocks are 21.0 percent and 37.5 percent smaller, respectively.

The licensee tried to assess the factors leading to the 33 percent decrease in the long-term harvest level in this analysis relative to the 1998 analysis. Some of the specific factors were changes to the timber harvesting land base and include additional reductions due to the management of old growth, species at risk, area reductions for partial harvesting to attain wildlife tree patch objectives, and riparian area management.

These additional area reductions are in relatively more productive forests therefore causing a disproportionately higher impact on current growing stocks. In addition to area reductions to account for wildlife tree patches which affected the timber harvesting land

base, yield reductions were applied to account for other kinds of wildlife tree retention such as single tree retention.

The single most important factor leading to a reduction in long-term harvest level relative to the previous analysis was the method used for assigning site index to each species in the managed stand yield tables. In the 1998 analysis, the site index assigned for leading species was also assigned for all other species in the yield table. In this analysis, each species in the yield table was assigned the site index that reflects its growing potential for the particular ecosystem to which the yield table applies.

The above-noted reductions to the timber harvesting land base and to the yield tables accounted for 27 percent of the 33 percent decrease in the long-term harvest level in this analysis relative to the 1998 base case, and left six percent that could not be quantitatively attributed to any one factor.

Another important difference between this analysis and the 1998 analysis is the use of a new inventory based on Vegetation Resource Inventory (VRI) standards including ground samples. The combined effects of using the new inventory, improved site productivity assignments in the managed stand yield tables, and a refined definition of the timber harvesting land base can cause synergies and inter-related dependencies that result in harvest projection changes that can not be attributed to any one factor in isolation. These considerations likely accounted for the remaining six percent of the impact in the long-term relative to the 1998 base case.

From my review of the timber supply analysis, including discussions with BCFS analysts about the differences between this analysis and the 1998 analysis, I am satisfied that the base case forecast provides a suitable basis of reference for use in my considerations in this determination. In addition to the base case forecast, I was provided with alternative harvest flows, a number of sensitivity analyses carried out using the base case as a reference, and supplemental analysis work. This and other information noted below have been helpful in the considerations and reasoning leading to my determination.

Where I have concluded that an assumption was appropriately modelled in the base case, I will not discuss my considerations of it in this document, other than to note my agreement with the approach that is already documented in the licensee's analysis. Conversely I will explain my consideration of any assumption that concerns me for any reason, such as lack of clarity in the analysis report, apparent divergence from current management practice, or a high level of public or First Nations input.

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

Section 8 (8)

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

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

Land base contributing to timber harvest

- general comments

The total area within the boundary of TFL 37 is estimated to be 196 725 hectares. About 44 837 hectares are considered non-forest or non-productive forest, about 2970 hectares are occupied by roads and railways, and 198 hectares are associated with Highway 19. In the analysis these areas were deducted from the total area leaving 148 720 hectares of productive forest land. The total area within the perimeter of the TFL is 7980 hectares (about four percent) larger than that assumed in the 1998 analysis. This is due to the use of legally established landscape unit boundaries (see *land use plan and landscape unit planning*) to help define the TFL perimeter for analysis purposes, and resulted primarily in the inclusion of additional park area within the perimeter.

The current timber harvesting land base is 91 325 hectares which means that 57 395 hectares of productive forest (nearly 40 percent) are unavailable for timber harvesting for a variety of reasons: protected areas, physical inoperability, avalanche tracks, riparian management areas, unstable terrain, karst landscapes, recreation areas, ungulate winter range, goshawk and marbled murrelet areas, retained old growth, uneconomic and low productivity forests, and wildlife tree retention. The long-term timber harvesting land base is 90 221 hectares accounting for proposed and future roads in the TFL.

The current and long-term timber harvesting land base is 11.5 percent and 10.7 percent smaller, respectively, than the land base assumed in the 1998 analysis associated with MP No. 8 and the AAC determination effective 1999. Several factors contributed incrementally to cause this decrease; the key factors are additional area reductions for non-timber values including wildlife, landscape-level biodiversity associated with old growth management, stand-level biodiversity associated with wildlife tree retention, and riparian area management.

In the analysis, productive forests that are excluded from the timber harvesting land base do not contribute to timber supply but do contribute to meeting a variety of non-timber resource objectives such as for wildlife, visual quality and biodiversity.

I have considered all of the deductions applied in the derivation of the timber harvesting land base for TFL 37 assumed in the base case. I accept the area deductions applied to account for Highway 19, existing and future roads and railways, protected areas, physically inoperable areas, avalanche tracks, unstable terrain, campsites and recreation areas, and areas with low timber growing capacity. All of these factors are described in the licensee's information package, and I will not discuss them further in this document.

In the analysis several factors concerning constraints on the amount of available timber resulting from management for non-timber resources (as per section 8(8)(a)(v) of the *Forest Act*) were accounted for by excluding area from the timber harvesting land base. I will discuss these below under “Integrated resource management objectives”.

The “total area” deducted in the discussions that follow refers to the entire area of the factor deducted from the timber harvesting land base without consideration to overlapping land base reductions. The “productive forest area” reported is in the context of the “total area”. The “net area” refers to deductions made after accounting for preceding overlapping area exclusions (therefore the order of the land base reductions affects the estimates of the “net area”).

- non-forest and non-productive forests

In addition to excluding 31 523 hectares of non-forest and non-productive areas from the timber harvesting land base based on vegetation resource inventory (VRI) attributes, which is standard practice in most management units, an additional 13 314 hectares were excluded based on areas with low timber growing potential identified in terrestrial ecosystem mapping (TEM). The use of relatively recent TEM contributed to a smaller timber harvesting land base relative to the 1998 analysis. However, as discussed under *volume estimates for regenerated stands*, operational adjustment factor 1 (OAF 1) used to adjust managed stand yield tables from potential yields experienced under ideal conditions to operational conditions was reduced to account for the improved identification in TEM of small unproductive patches (e.g. rock, swamp, brush) encountered in normal forests. The revised OAF 1 reduces the effect of the additional TEM-related land base reductions on timber supply in the mid-and long term. I accept these further exclusions from the timber harvesting land base assumed in the analysis as they are based on the best available information.

- uneconomic forests

The licensee prepared an economic operability classification of stands within the TFL based on current market conditions. This classification mapped stands assumed to be: (i) economic - available for harvest; (ii) marginally economic – available for harvest under favorable market conditions; and (iii) uneconomic – where the value of the stand is not expected to offset harvesting costs. This classification assessment was based on a number of criteria including site series, maximum mean annual increment, local knowledge, previous harvesting performance, stand volume, stand value, stand height, crown closure, leading species, accessibility, slope and terrain stability. For example, low productivity stands not projected to provide a minimum merchantable volume of 250 cubic metres per hectare within 350 years, and economically inoperable stands, were classified as uneconomic.

In the base case, 10 617 hectares of productive forest that are considered uneconomic were excluded from the timber harvesting land base.

About 2300 hectares (about 2.5 percent) that are included in the timber harvesting land base have been identified as sensitive to harvesting where particular care will be needed to minimize impacts on the land. The licensee has harvested similar sites carefully in the past and believes these areas can contribute to timber supply. Nevertheless, a sensitivity

analysis was performed in which these areas were excluded from the timber harvesting land base in order to assess the cost/benefit of these areas in regard to their contribution to timber supply in the TFL. Removing these sensitive areas from the land base had no impact on timber supply until year 300. A small 10 000 cubic meter per year (about one percent) reduction in mid- to long-term timber supply stabilizes timber supply throughout the planning horizon.

In the base case, marginally economic stands were not excluded from the timber harvesting land base. These stands include low economic hemlock- balsam stands where helicopter logging would likely be necessary and that are unlikely to be merchantable in the foreseeable future if current market conditions persist. These latter stands were also included in the timber harvesting land base of the 1998 timber supply analysis and performance in these areas at that time was similar to their profile in the timber harvesting land base. This suggests that if markets improve as they have in the past, harvesting should take place in these stands. The low economic helicopter stands include:

(i) 5689 hectares of hemlock-balsam stands with less than 30 percent Douglas-fir, cedar and cypress; and (ii) 786 hectares of stands that are over one kilometre from existing or proposed roads. The total area, 6475 hectares, represents about 60 percent of the 10 858 hectares area in the land base where helicopter logging is believed necessary. Sensitivity analysis showed that removal of these low economic stands from the timber harvesting land base impacts the short, mid-, and long-term timber supply. Although these stands represent about seven percent of the current timber harvesting land base, they represent about 13 percent of the current growing stock volume in the TFL.

After reviewing current performance in the low economic hemlock-balsam helicopter stands, the licensee submitted a supplemental analysis in October 2005 where the 6475 hectares of low economic stands were harvested evenly over the entire simulation period. The supplemental analysis showed the contribution of these stands was 37 000 cubic metres per year. Creating an even-flow for this component of the harvest forecast slightly constrains overall harvesting activities and results in decreasing the initial harvest level from 2007 to 2011 by 1000 cubic metres to 969 000 cubic metres per year. Based on this supplemental analysis and review, the licensee initially proposed two timber supply options for the next five years: (1) a harvest level of 969 000 cubic metres including 37 000 cubic metres attributed to these low economic stands; or (2) a harvest level of 932 000 cubic metres that excludes these low economic stands.

The licensee views the low economic hemlock-balsam helicopter stands as “opportunity wood” for harvesting when markets permit. They are concerned, however, that if the AAC is based on these areas contributing to timber supply, any under-cut of the AAC during poor markets could result in under-cut volumes being carried forward to the next cut control period and potentially allocated by the BCFS to another licensee who might use the allocated volumes in the conventional land base. If that scenario occurred, it would impact on the licensee’s conventional land base and could exacerbate timber supply conditions in the TFL as well as impact the licensee’s ability to meet its commitment to harvesting in a balanced way consistent with its sustainable forest management plan.

After reviewing the above considerations regarding uneconomic forests, the many sensitivity analyses performed to test uncertainty in this factor, and the subsequent supplemental analysis performed by the licensee, I conclude as follows. First, excluding the low economic hemlock-balsam helicopter stands impacts timber supply and therefore needs to be addressed. Second, the *Forest Act* enables me to attribute a portion of the AAC to different types of timber and terrain to influence, but not direct, the behavior of the licensee. The reason for this is that no separate cut control is specified under the act for the administration of the AAC that I determine for such an attribution (partition). Consequently, there is risk of over-harvesting the conventional land base even with a portion of the AAC attributed to a specific area. Third, if the licensee honours the partition and undercuts the AAC, the partitioned under-cut could be carried forward to allow an over-cut in the next cut control period. Having looked at these low economic stands in the TFL, the licensee's view that these areas represent "opportunity wood" when markets permit seems valid. This suggests a partition for these stands is appropriate recognizing their even-flow contribution of 37 000 cubic metres per year. However, I am also mindful of the concern that any under-cut of a partitioned AAC not result in an over-cut in the conventional land base since such action could exacerbate future timber supplies. Consequently, any partition needs to be accompanied by a recommendation that any undercut not be directed to other stand types in order to prevent unacceptable pressures on more operable areas within the land base. I reflect on these conclusions in my "Reasons for Decision."

Existing forest inventory

The licensee initiated a Vegetation Resource Inventory (VRI), the current provincial standard for gathering new forest inventory information, in 1996. Phase 1, which consists of mapping polygons and attributes using photo-interpretation, was completed in 1997 with 1995 aerial photography. Phase 2 ground sampling occurred during 2001 and 2002, and the results were used to adjust Phase 1 estimates. Finally, in 2004, the licensee's consultant completed the Net Volume Adjustment Factor (NVAF) analysis to complete the process of preparing the final adjusted VRI database. I discuss these adjustments further below under *volume estimates for existing unmanaged stands*. The VRI phase 1 and 2 and the NVAF work was used in the analysis. The average adjusted volume per hectare of stands older than age 41 on the vegetated treed economic and marginally economic land base was 717.2 cubic metres.

The VRI was updated and projected to December 31, 2001 to account for disturbances such as harvesting, and growth using projections for age and height. As noted earlier, the first year of the harvest forecasts provided in the analysis is 2002.

After completing the base case, licensee staff noted that the inventory had been updated for denudation to a date that was later than the beginning of the harvest forecasts provided in the analysis. As a result, some areas harvested on TFL 37 in 2002, the first year in the harvest forecasts, were inadvertently assumed to be denuded in the initial inventory used in the analysis. This amounted to an area of 197.5 hectares and a volume of 148 275 cubic metres. The licensee suggests the volume inadvertently excluded from the initial inventory constitutes a small underestimate in timber supply of 0.5 percent (about 5000 cubic metres) over 30 years. Since the areas have already been harvested,

some BCFS staff suggest that this underestimate could be accounted for over the first 10 years of the base case. If the impact is spread over the remaining 6 years (i.e. 2006 to 2011) of the first 10-year period in the base case (2002-2011), this would represent about a 24 713 cubic metre increase in timber supply in the short-term.

Terrestrial ecosystem mapping (TEM) was completed during MP No. 8 for the TFL and was used in the analysis as discussed below.

Stands in the inventory are aggregated into analysis units for the purposes of the timber supply analysis. BCFS staff have reviewed the basis for the aggregation for existing natural stands and regenerated managed stands and found the approach acceptable. A timber volume check was undertaken by comparing inventory volumes with volumes used at the start of the timber supply forecast to help ensure the aggregation process did not introduce bias or errors. The volumes were within two percent and no major errors were detected.

The VRI and TEM inventories in the TFL were accepted by appropriate agency staff for use in this timber supply analysis. I believe the small error in the inventory update noted above represents too small an increase in timber supply, assuming the 0.5 percent impact over 30 years approach taken by the licensee, to warrant adjusting the base case. I am satisfied that VRI and TEM inventories used in the analysis are suitable for use in support of this determination.

- 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 will be graded based on its size and quality at the time it is scaled or assessed, without regard to whether it was alive or dead at harvest. These 'dead potential' trees (i.e. dead trees that are potentially merchantable) will now also be accounted for in AAC determinations.

On the BC Coast, logs from dead trees have been harvested, scaled and charged to the AAC for some time now. Dead western red cedar and old growth Douglas-fir stems can 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 AAC determinations. With the change in the BC Interior it is now appropriate to account for this dead potential volume in AAC determinations for coastal units as well.

Possible sources of data for assessing the 'dead potential' volume in a TFL include inventory audit plots, VRI phase 2 ground samples, permanent sample plots, temporary sample plots, and cruise data. For TFL 37, BCFS staff used Phase 2 sample plots from the recently completed VRI to provide an estimate of dead potential volume. The estimates for TFL 37 and all coastal units is included in the report *Summary of dead potential volume estimates for management units within the Coastal Forest Region* (March 2006).

While these figures likely provide best estimates for the management units as a whole and for the operable land base, they are not necessarily the most representative of the 'dead potential' volumes specific to the timber harvesting land base itself, or to the locations of current and near-term operations on the timber harvesting land base. Several

considerations present difficulties when assessing the most appropriate figure to apply to these particular areas. ‘Dead potential’ volume extracted from forest stands can vary significantly over time, depending on markets and other factors. The accounting is also complicated by the relationship between ‘dead potential’ volumes and the requirement to leave coarse woody debris on the ground for biodiversity objectives.

In the 2006 study conducted by the BCFS, the “dead potential” volume estimated for TFL 37 was about 9.7 percent. This estimate, however, is subject to the uncertainties I described above in that it is for the entire TFL and not just the timber harvesting land base. Further, the correlation between dead potential using VRI phase 2 ground samples and actual utilization by the licensee is not currently known.

Having reviewed this information with BCFS staff, I conclude in my “Reasons for Decision” that on this account timber supply has been underestimated by an unquantified amount over the forecast period. I note that any dead potential volume taken by the licensee will serve to mitigate the projected decline in short-term timber supply.

I recommend under “Implementation” that licensee and BCFS staff 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.

Expected rate of growth

I have reviewed the aggregation procedures used when preparing the yield tables described below for the timber supply analysis and accept them as modelled for use in this determination. I will not discuss them further in this document.

- 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 the 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, site productivity realized is generally higher than what inventory-based site index estimates of older stands would predict.

In order to derive a better estimate of site productivity for existing natural stands, the licensee used the results from the VRI Phase 2 ground samples to adjust site index estimates based on Phase 1 estimates (see “Existing forest inventory”).

In MP No. 8, the licensee used TEM and field sampling to adjust site index estimates for regenerated managed stands. In his 1999 AAC rationale, the chief forester asked the licensee to refine its site index estimates for regenerating stands, particularly in high-elevation areas. In response to the chief forester's instructions, the licensee hired a consulting firm to update site index estimates for MP No. 9 and these findings were used in the analysis. Potential site index (PSI) estimates were developed for the main species in the TFL; these were derived from additional field sampling for Douglas-fir and western hemlock, whereas other approaches were used for balsam and western red cedar.

For the high elevation MHmm1 and CWHvm2 biogeoclimatic variants, site index was assigned using an elevation model. The method used was accepted by BCFS staff. According to licensee estimates, when compared to the 1999 analysis results, this updated method of estimating site index in high elevation stands accounts for six percent of the reduction in the long term harvest level in the 2005 analysis.

I have discussed the methods used by the licensee to assign site index to existing and regenerated stands in the analysis with BCFS staff and I find them acceptable for this determination. I further note that the licensee has satisfactorily met the request made by the chief forester in the 1999 determination. I request under "Implementation" that the licensee continue to monitor its site productivity estimates to ensure the yield projections used in future analyses appropriately reflect volumes per hectare realized in harvesting operations. I concur with the licensee's recommendation in its analysis report that improvements in site index estimates in high elevation variants should be considered. As harvesting activity progresses in these variants, I encourage the licensee to localize site index estimates for these areas.

- volume estimates for existing natural stands

In the timber supply analysis, estimates of timber volumes in existing natural (unmanaged) stands aged greater than 41 years and leading red alder stands were projected using the Variable Density Yield Prediction (VDYP) model version 6.6d. When developing these natural stand yield projections the licensee first generated yield tables based on the VRI phase 2 adjusted site indexes. These were then further adjusted to account for NVAF sampling.

Although no issues were raised regarding the Phase 2 adjustments, a sensitivity analysis was performed to test the impact of decreasing volumes by 10 percent. This assessment indicated that harvest levels in the base case could be maintained in the short term, but that there would then need to be a nine percent decrease in the mid term. Long-term harvest levels could be maintained relative to the base case for the most part, with some timber supply deficits occurring at various intervals in 150 to 200 years.

I note that the information available for this analysis to estimate volumes for existing stands has been improved given the completion of VRI Phase 2 and NVAF sampling. Unmanaged (natural) stand yields were modelled in the base case using standard procedures that were accepted by government. I therefore find their use appropriate in support of this determination.

- volume estimates for regenerated managed stands

In the analysis, the standard BCFS growth and yield model, Table Interpolation Program for Stand Yields or TIPSYS (version 3.0a), was used to estimate the timber volumes for regenerated managed stands. The model was applied to all future regenerated stands and to all existing coniferous-leading stands established since 1960. Major inputs to the TIPSYS model include species composition, regeneration delay, site index, operational adjustment factors and genetic worth of planting stock.

As I noted above under “Timber supply analysis”, the long term harvest level in the current base case is 33 percent lower than was projected in the 1998 analysis. I further noted that when developing managed stand yield tables for the 1998 analysis, the licensee assigned the site index of the leading species to all other species in the yield table while in the 2005 analysis the site index assigned for species other than the leading species reflected the growing potential of each species on the given ecosystem. According to the licensee, this is the most significant factor leading to the lower projected long-term level in the 2005 base case, accounting for 12 percent of the reduction. In this analysis, the site index of the other species was generally lower than for the leading species and this resulted in lower projected yields for managed stands. I further observe that this result is also contingent on the small differences in regeneration strategies that were modelled in the two analyses, particularly the assumed species composition of the regenerating stands.

In the analysis, for regenerated managed stands initiated between 1961 and 1995, stand yield curves were developed based on historical stand data. Analysis units were grouped on the basis of leading species, site productivity and relative similarity of volume curves. The licensee developed an ecosystem-based approach to estimating managed stand yield curves for regenerated managed stands established since 1996. This was based on a two-step aggregation process: first, average yield curves based on unique combinations of site series was undertaken to create several hundred eco-groups; and second, eco-groups were then clustered based on similarities in yields.

In the development of managed stand yield curves for the TFL, the licensee did attempt to account for natural regeneration ingress that follows reforestation using planting stock. BCFS staff believe, however, that the assumptions used in the analysis should be verified or refined based on actual data. For example, ingress is not always well distributed and can lead to clumping which can affect managed stand yields. Under “Implementation”, I request that the licensee verify or refine the estimates of managed stand yields to account for ingress.

I have discussed the assumptions used to generate managed stand yield estimates in the base case with BCFS staff and find them suitable for use in this determination.

- operational adjustment factors

The TIPSYS projections 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 TIPSYS, 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. Standard provincial reductions of 15 percent for OAF1 and five percent for OAF2 are often applied in timber supply analysis but these can be adjusted based on local conditions.

The provincial standard OAF1 adjustment of 15 percent is based on espacement (4 percent), non-productive areas (4 percent), random risk (3 percent) and endemic losses (4 percent). An analysis by the licensee of the TFL 37 TEM suggests that about 1.3 percent of the timber harvesting land base consists of non-productive areas that are too small to map—about 2.7 percent less than assumed in the provincial OAF standard.

The licensee also believes that random risk and endemic losses are less prevalent in the TFL and that an additional one percent each could be deducted from the provincial standard on this account. Therefore, the licensee concluded a 10 percent OAF1 adjustment is more appropriate based on local conditions in the TFL, and applied this factor in the analysis. This approach was accepted by BCFS staff provided that a sensitivity analysis be performed using the provincial standard OAF1 adjustment of 15 percent (i.e. five percent higher than assumed in the analysis). This assessment showed no impact on short-term harvest levels relative to the base case, but required a five percent reduction in the mid- to long-term levels in order to avert timber supply deficits beginning in year 100.

The provincial standard OAF2 adjustment of five percent was applied in the analysis. BCFS staff feel a higher adjustment, in the order of 7.5 percent, may be warranted to account for root rot conditions in the CWHxm portion of the TFL when compared to other coastal units and considering available research. They are concerned that root rot conditions could worsen and note that while the licensee has removed the stumps on some affected areas to contain root rot, this practice has been limited in scope.

The licensee provided a sensitivity analysis with the OAF2 increased by two percent and this change had no impact on short-term harvest levels compared to the base case, but decreased mid- to long-term timber supply by 1.3 percent.

The use of TIPSYS with adjusted OAF1 reductions in the analysis reflects the use of best available information. As such, I accept the volume estimates based on these procedures. I am concerned that use of the standard OAF2 adjustment under-estimates potential impacts to managed stands due to root rot. However, uncertainty in this factor poses no risk to short-term timber supply, and very small risk to timber supply in the mid-to long-term and therefore I do not believe there is a need to adjust the base case in my determination. That said, the timber supply analysis indicates that licensee reliance on managed stands between 61 and 80 years of age will be very significant in 40 years time with about 70 percent of the volume derived from these stands. I therefore request under “Implementation” that the licensee monitor performance in these stands relative to volume projections due to forest health impacts, especially root rot.

- gains from the use of select seed

Use of select seed with improved genetic traits can increase timber volumes of managed stands in the long term and quicken the time for a stand to reach a green-up height or reach minimum harvestable age. The quantity and quality of select seed available in the province has increased in the past decade, and is projected to increase further. Licensees are required to use select seed when available. The previous TFL holder, Canfor, owns a seed orchard in Sechelt and is under contract with Western to supply seed for TFL 37.

The genetic gains applied in the analysis are based on the expected future managed species distributions by elevation (> or < 700 metres), and the pro-rated projected use of select seed over the next 20 years. For example, a three percent volume gain was applied to Douglas-fir stands below 700 metres elevation to account for use of select seed for the first five years in the analysis, whereas eight percent gain is applied in the ensuing 15 years to account for use of improved seed.

Other gains that are harder to quantify at this time can also be expected with the use of select seed that is more resistant to pests. For example, the licensee selectively plants about 20 000 rust-resistant western white pine per year, especially on root rot areas.

Having reviewed this factor with BCFS staff, I am satisfied that the analysis has reasonably accounted for current and expected use of select seed.

- minimum harvestable ages

A minimum harvestable age is an estimate of the earliest age at which a forest stand has grown to a harvestable condition. The minimum harvestable age assumption mainly affects when second growth stands will be available for harvest within the timber supply 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 older ages than the minimum harvestable age, due to economic considerations or forest cover constraints on harvesting that arise from managing for values such as visual quality, wildlife and water quality.

Minimum harvestable ages assumed in the base case were the age at which stands suitable for ground-based harvesting systems attained a net volume of 250 cubic metres per hectare and 24 centimetre average stem diameter. For areas needing more expensive cable and helicopter harvesting systems, the age at which stand volume reaches 350 cubic metres per hectare and an average stem diameter of 30 centimetres was assumed to be a suitable minimum harvestable age in the analysis. On average, harvesting is comprised of 54 percent ground-based systems, 37 percent cable systems and nine percent helicopter logging.

As an example, in general, existing natural stands suitable for ground-based harvesting needed to be at least 40 years of age on higher productivity sites, and at least 125 years of age on poorer sites, to reach minimum harvestable age.

The base case illustrates that after the original older forests are harvested, the harvest is dominated by regenerated managed stands between 61 and 80 years of age with volumes that almost always exceed 500 cubic metres per hectare, well above the minimums

assumed in the analysis. On a field trip in the TFL, I saw an example of a 50 year old stand being harvested with about 700 cubic metres per hectare of volume.

A sensitivity analysis tested the impact of changing the minimum harvestable age criteria to be 90 percent of culmination age. Culmination age is the age at which a stand achieves its maximum average rate of volume production. This assessment indicated no impact on the base case harvest flow. A second sensitivity analysis tested removal of the diameter criteria but this did not change the base case harvest flow either.

The minimum harvestable ages assumed in the analysis are product based considering the operational costs of different harvesting systems. BCFS district staff confirm to me the criteria employed represent current performance in the TFL. I therefore accept the accounting for this factor for the purposes of this determination.

- (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. Harvested sites in the CWH are generally planted by the licensee within two years and in the MH zone within three years. One year old seedlings are generally planted thereby resulting in effective regeneration delays of one and two years for the CWH and MH, respectively, which were assumed in the analysis.

BCFS district staff reviewed regeneration performance in the TFL, including a recent assessment in May 2006, and concluded that the regeneration delays assumed in the analysis are appropriate. Their recent review found that the effective delay was on average 0.6 years, slightly less than assumed in the analysis for the CWH where most harvesting and regeneration efforts take place. This confirms what licensee foresters advised me during the May 17, 2006 field tour, regarding their very aggressive approach to reforestation in an effort to minimise regeneration delay.

A sensitivity analysis was nevertheless performed to assess the impact of increasing regeneration delay by one year. The assessment suggests no impact in the short-term, about a 1.3 percent reduction in the mid-term, and about a 2.3 percent reduction in long-term harvest levels relative to those indicated in the base case.

In conclusion, BCFS district staff consider the regeneration delays assumed in the base case are appropriate based on a recent performance review, and I therefore accept their use for this determination.

Not-satisfactorily-restocked areas

Not-satisfactorily-restocked (NSR) areas are those 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.

The completed VRI and TEM provided the licensee with an opportunity to assess all NSR areas in the TFL. The licensee found no backlog NSR and a current NSR of 294 hectares. The current NSR is consistent with assumed regeneration delays. BCFS district staff have reviewed and accepted the licensee's accounting of NSR. In reviewing this factor, I am satisfied that NSR areas were appropriately modelled in the base case.

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

I have reviewed the stand regeneration strategies and silvicultural harvest systems assumed in the base case and accept they reflect current and past performance. I will not discuss these factors further in this document.

Incremental silviculture

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

To date, about 11 000 hectares of managed stands have been fertilized on the TFL, not including the licensee's current practice of applying teabags of fertilizer to each seedling at the time of planting. Over the last five years, the licensee treated an average of 625 hectares per year with fertilizer aerially and expects to continue with this level of treatment in the future. Current practice is to treat second growth stands that are expected to be harvested in about 10 years in order to capture the near-term volume gain that fertilization can provide.

Juvenile spacing has also been extensively used in the past, but this practice has been discontinued based on current levels of funding. Pruning treatments have also been conducted in managed stands in past, however, the area covered is minor and this is not likely to change in the future. No site rehabilitation projects have occurred on the TFL in the last 15 years and none are expected in the future. The main reason is that the majority of deciduous stands, where rehabilitation to coniferous stands might be considered, are located near major streams and might compromise riparian area management. No commercial thinning projects have been carried out on the TFL since 1994 and none are expected over the next five years.

No accounting for incremental silvicultural treatments was made in the analysis. Some volume gains from fertilization practices in particular can be expected. However, the scale of the present program would only amount to a relatively small increase in timber supply in the longer term and I do not consider that a specific adjustment is warranted on this account at this time. I am therefore satisfied that this factor, in general, was appropriately addressed in the base case for the purposes of this determination.

(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:

I have reviewed the information regarding utilization standards and am satisfied that standards consistent with coastal practices were employed in the analysis.

I have reviewed the information regarding allowances for decay, waste and breakage used in the base case forecast for TFL 37, and I am satisfied that this was appropriately modeled in the base case.

- (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.

I have reviewed assumptions made regarding forest cover/green-up in general, and watershed considerations, and am satisfied that these factors were appropriately accounted for in the base case. I will not discuss these factors further in this document.

- riparian management areas

Riparian management areas (RMAs) 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 RMAs which include riparian reserve zones (RRZs) that exclude timber harvesting and riparian management zones (RMZs) where constraints are put on timber harvesting.

The licensee made major upgrades to its riparian inventory during MP No. 8. This inventory is continuously improved by field staff using techniques such as air-photo interpretation, ground sampling, and GIS modelling to develop elevation gradients.

In the analysis, the recommended widths in the *Forest Practices Code Riparian Management Area Guidebook* were applied to riparian reserve zones (RRZs) for streams, lakes and wetlands based on their estimated riparian class. This led to total reserve area of 3430 hectares (3321 hectares for streams, 67 hectares for lakes, and 42 hectares for wetlands) which was excluded from the timber harvesting land base.

To account for tree retention in riparian management zones (RMZ) in the base case, the licensee applied buffer widths and percent area retention that reflect current practice in the TFL. This led to an additional 6954 hectare total area deduction (3292 hectares for streams, 3509 hectares for lakes, and 153 hectares for wetlands).

Due to buffering overlaps, the total area excluded from the timber harvesting land base for riparian management in RRZs and RMZs is 9329 hectares. After accounting for previous reductions, the net area excluded for RRZs and RMZs amounted to 7091 hectares.

In general, BCFS staff concur that the RRZs and RMZs modelled in the analysis reflect current practice. Some staff are concerned that observed performance varies for some RMZs from what was modelled in the analysis. The licensee also notes that 'current

practices' modelled in the analysis are based on a 'snapshot' in time and may not reflect the overall average size of buffers.

I appreciate the major upgrade in the riparian inventory undertaken recently and the licensee's commitment to its continuous improvement. I accept the assumptions made in the base case as they adequately reflect current practice. I note under "Implementation" the need for the licensee to monitor field performance in riparian management areas relative to its inventory and the modelling assumptions applied in this analysis. This monitoring effort can help verify or adjust assumptions applied in support of the next determination.

- karst landscapes

Karst landscapes are sensitive to impacts due to forest harvesting because of safety concerns, the intrinsic value of cave systems, and the presence of karst-associated flora and fauna. In 2004, the licensee completed a planning-level karst inventory that included a karst vulnerability potential (KVP) rating of areas within the TFL. About 8618 hectares of the TFL were subject to KVP ratings of very high, high, medium, and low with percent area exclusions of 29, 23, 17 and 11 percent applied, respectively. The area exclusions were intended to reflect current practice on the TFL. This led to a total area of 1300 hectares and a net area of 1122 hectares being excluded from the timber harvesting land base.

I recognize the recent karst inventory work undertaken by the licensee and its application of this inventory to model current practices in the base case. I accept these deductions as appropriate for the purposes of this determination.

- ungulate winter ranges

An ungulate winter range (UWR) plan for the TFL was first prepared in 1983, and most recently revised in 2001. UWRs were established by government in 2001 under the Forest Practices Code and amended in 2004 and 2005. The amended UWRs have been grandparented under FRPA. In general, the UWRs are reserved from harvesting in order to provide cover attributes necessary for deer and elk survival in severe winters. The winter ranges cover a total area of 6195 hectares, a productive forest area of 5809 hectares, and a net area of 4885 hectares which was excluded from the timber harvesting land base.

The licensee has tried to optimize reserves while limiting the impact of various factors that affect the timber harvesting land base by applying joint constraints, such as overlapping UWRs and old growth management areas (OGMAs), where possible. A review of a map that shows these areas illustrates the considerable overlap between OGMAs and UWRs in an effort to minimize impacts on timber supply.

The UWR reserves in the TFL comply with legal provisions under FRPA and reflect current practice by the licensee. As well, efforts have been made to apply joint constraints where old growth forests in the UWRs contribute towards old forest retention objectives and have influenced the location of OGMAs. I therefore accept the exclusion of the UWRs from the timber harvesting land base as applied in the base case for the purposes of this determination.

- *species at risk*

TFL 37 provides habitat to species at risk established by the Ministry of Environment (MOE) under the authority of FRPA including the Queen Charlotte goshawk, marbled murrelet, and Keen's long-eared myotis which are discussed below. These species may be affected by forest management and are listed by the Committee on the Status of Endangered Wildlife in Canada.

- *Queen Charlotte goshawk*

The Queen Charlotte goshawk, the coastal subspecies of the northern goshawk, is an uncommon forest raptor. Inventories conducted in the TFL have located 45 nests. The licensee has developed a strategy for the Queen Charlotte goshawk which includes the establishment of eleven conservation areas ranging in size from 135 to 538 hectares which help protect nesting sites. The conservation areas are not just circular reserves around nesting sites, but are designed to be more biologically functional and effective in consideration of factors such as forest cover requirements. Although single-tree harvest is permitted in three areas, the current practice has been no harvesting.

In the base case, all of the conservation areas were excluded from the timber harvesting land base resulting in a total area reduction of 2778 hectares, including 2559 hectares of productive forest. Excluding overlapping deductions, a 1611 hectare net area was removed from the timber harvesting land base to account for this goshawk species.

MOE and BCFS staff support the licensee's strategy and its implementation performance of that strategy. During a field trip that I attended on the TFL, the licensee pointed out examples of areas retained to optimize reserve values for a variety of important features including nesting sites, karst, denning sites, wildlife tree patches, etc. Careful planning on the part of the licensee enables the deployment of reserves in a manner that optimizes non-timber values while minimizing impacts to timber supply.

In reviewing this factor, I am satisfied that the base case has appropriately accounted for the conservation of Queen Charlotte goshawks for the purposes of this determination.

- *marbled murrelet*

Marbled murrelets are found within the TFL and are also listed by MOE as a species at risk under FRPA. Marbled murrelets are small seabirds that are most likely found within 30 kilometres of the Pacific coast. Suitable nesting habitat, in general, is old seral stage coniferous forest.

Field verification of marbled murrelet nesting habitat in the TFL was completed between 2001 and 2004 using a combination of habitat modelling, air-photo interpretation, habitat plots and transects, audio-visual surveys, low-level aerial surveys, and terrestrial radar surveys. Using this information, the licensee has developed an adaptive management strategy to conserve suitable marbled murrelet nesting habitat. The strategy, which has been submitted to MOE, includes 9454 hectares of proposed wildlife habitat areas (WHAs) in addition to a 322-hectare existing WHA that has already been established by government. The proposed WHAs may be formally established by MOE under FRPA.

Existing and proposed WHAs were excluded from the timber harvesting land base in the base case. The total area is 9776 hectares of which 8056 hectares are productive forest. The net area excluded from the timber harvesting land base is 2444 hectares.

The licensee provided a sensitivity analysis to assess the impact of adding the proposed WHAs for marbled murrelet back in the timber harvesting land base. Since these areas overlap with other reductions to the land base, particularly OGMAs, only 1040 hectares are actually returned to timber harvesting land base. In the sensitivity analysis, initial harvest levels between 2006 and 2012 in the base case could be increased by 2.4 percent, while the remaining mid-term harvest level increased by 2.3 percent and the long-term harvest level increased by 0.9 percent relative to the base case. Given the overlap with areas excluded from the timber harvesting land base for other reasons, the added impact of removing proposed WHAs for marbled murrelet conservation appears relatively minor in the TFL based on this sensitivity analysis.

BCFS district staff confirm that the licensee's current practices are consistent with the strategy that they have developed that has been submitted to MOE. This strategy was assumed in the base case. I accept therefore that the base case has appropriately accounted for current practices in the management of marbled murrelet.

- Keen's long-eared myotis

Keen's long-eared myotis, a medium-sized, dark bat, is also listed by MOE as a species at risk under FRPA. The bat appears to be associated with cool coastal montane forests and karst features. Caves with stable temperatures and 100 percent relative humidity have been reported to be important to these bats on northern Vancouver Island.

The licensee has identified several caves in the TFL that may be used by the bats. In order to protect the entrances of two caves likely used by the bats, and reduce impacts on timber supply, the licensee identified these areas as proposed OGMAs (which were subsequently approved by government as discussed below). Consequently no specific additional reductions were made to account for this species in the analysis. This is another example, as mentioned earlier, of the licensee proactively seeking to overlap values within reserves. I commend the licensee for these efforts and accept the treatment of this factor in the analysis for this determination.

- old growth management areas

Old seral stage forest retention is an important aspect of management for landscape-level biodiversity. The establishment of OGMAs, generally through landscape unit planning, provides a means to spatially conserve old forests. The Vancouver Island Land Use Plan Higher Level Plan (HLP) Order, established under the Forest Practices Code, provided legal direction regarding the retention of old forests under FRPA. Consistent with the HLP, the licensee worked with the Ministry of Agriculture and Lands (MAL) to identify draft OGMAs through landscape unit planning. This effort ultimately supported the Sustainable Resource Management Plans (SRMPs) for the Lower and Upper Nimpkish Landscape Units. The Orders to establish the two landscape units and objectives, including the OGMAs, were approved in September 2005 by MAL and took legal effect in October 2005. Timber harvesting is not permitted in OGMAs except as noted in the landscape unit Orders.

Through the landscape unit planning process, as described in the *Landscape Unit Planning Guide*, OGMA's are identified, wherever possible, in forests that are already unavailable for timber harvesting for other environmental reasons (e.g. UWR) or for economic reasons (e.g. physical inoperability). Old forest retention requirements are only met by establishing new reserves in the timber harvesting land base where these requirements are not met in areas already excluded from the timber harvesting land base for other reasons. Where this is done, areas with high biological value should be identified. As discussed previously, the process whereby reserves are established for overlapping values, where possible, helps to optimize their value for the non-timber values they are designed to protect while reducing impacts on timber supply. One example of where the licensee identified areas with high biological value to protect overlapping values is the location of OGMA's over areas where cave entrances that likely support Keen's long-eared myotis exist.

When the timber supply analysis was undertaken, the draft OGMA's were not yet approved. The approved OGMA's, however, are the same as the draft ones assumed in the analysis. Harvesting is normally excluded in OGMA's; therefore the entire 16 435 hectare OGMA area was excluded from the timber harvesting land base. This includes 14 017 hectares of productive forest. However, after taking other land base deductions into account, a net area of 1590 hectares was actually excluded from the timber harvesting land based due to OGMA's.

The Lower Nimpkish landscape unit was established by government as having low biodiversity emphasis which allows the licensee to draw down up to one-third of the old forest retention target if there is an impact on the timber harvesting land base. The approved OGMA's, however, were located in areas that were excluded from the timber harvesting land base for other reasons, and therefore the full target can be achieved in this landscape unit without impacting further on the timber harvesting land base. The Upper Nimpkish landscape unit has intermediate biodiversity emphasis and therefore the full target is immediately in effect and this is reflected in the extent of the area established as OGMA.

A sensitivity analysis was provided by the licensee to test the effect on timber supply of returning OGMA's and proposed marbled murrelet WHAs to the timber harvesting land base. The sensitivity analysis indicates that 2.4 million cubic metres of merchantable volume would be available for harvesting, and could be dispersed by increasing, relative to the base case, the initial 2006 to 2012 harvest level by 7.8 percent, mid-term levels by 7.2 percent, and the long-term level by 2.7 percent.

Another sensitivity analysis was performed to assess the impact of returning OGMA's, proposed marbled murrelet WHAs, and conservation areas for goshawks to the timber harvesting land base. This assessment returned 3.4 million cubic metres of merchantable volume, and could be dispersed by increasing, relative to the base case, the initial harvest level by 10.1 percent, mid-term levels by 10.3 percent, and the long-term level by 4.1 percent. This suggests the incremental impact of goshawk conservation areas on timber supply is about 2.3 to 3.1 percent in the short- and mid-term.

The sensitivity analyses demonstrate that area exclusions from the timber harvesting land base for these three important non-timber values do result in significant impacts on

timber supply (e.g. about 10 percent in the short-term). They also underscore the importance of co-locating values when reductions are made to the timber harvesting land base, as the licensee has done, so that important non-timber values are appropriately conserved while minimizing impacts on timber supply.

In summary, OGMAs have been legally established in the TFL in a manner consistent with government guidelines, and the analysis has accounted for the OGMAs by excluding the areas from the timber harvesting land base. I note also that the licensee has made efforts to co-locate values along with OGMA placement so that key non-timber values, including species at risk, can be conserved, while attempting to reduce impacts on timber supply. I am therefore satisfied that this factor has been appropriately addressed in support of this determination.

- landscape-level biodiversity

Mature plus old seral cover requirements are provided in the HLP for special management zones (SMZs) that specify the minimum percent area of productive forest older than a specified age that need to be provided. This direction is in addition to the old forest retention requirements discussed above under *old growth management areas*. The HLP specifies that at least 25 percent of each SMZ should be mature plus old (i.e. >80 years old in the CWH, and >120 years old in the MH zone). Consistent with the HLP, the analysis included mature plus old targets for each biogeoclimatic zone variant by SMZ for each of the two landscape units in the TFL.

The licensee provided a sensitivity analysis to assess the impact of removing the mature plus old targets. The assessment indicated no impact on the base case. A detailed review of this assessment concluded that: (a) there is sufficient mature plus old forest in areas outside of the timber harvesting land base (like OGMAs) to satisfy the targets, and (b) some modification of harvest queue occurred but with the same harvest level as the base case.

In reviewing this factor, I conclude that the mature plus old requirements in the HLP were appropriately accounted for in the base case and in support of this determination.

- wildlife tree retention/ecosystem-based harvesting

Wildlife tree retention (WTR) is the primary tool used in the TFL for managing stand structure and its corresponding contribution to stand-level biodiversity. The licensee has been applying an ecosystem-based harvest strategy since 1991 (before the Forest Practices Code) that incorporates WTR targets. Since 1995, the Code has required WTR associated with all cutblocks. The licensee developed a WTR plan in 1998 that was approved by the BCFS, where variable retention targets (percentages) from Table 20(b) of the *Biodiversity Guidebook* were applied to all cutblocks. Currently, the licensee is using an ecosystem-based retention strategy that sets targets for single trees and internal (within-block) retention of patches of trees.

In 2005, the SRMPs for the Lower and Upper Nimpkish Landscape Units, and the Orders to establish the landscape units and objectives were approved. The Orders include objectives that establish WTR requirements which have legal effect under FRPA. The WTR requirements in the Lower Nimpkish landscape unit Order are 11, 9 and 1 percent retention in the CWHxm, CHWvm and MHmm, respectively. The WTR requirements in

the Upper Nimpkish landscape unit Order are 14, 13, 9 and 3 percent in the CWHmm, CWHxm, CWhvm and MHmm, respectively.

The licensee's current ecosystem-based retention strategy for wildlife trees is designed to be consistent with the legal Orders for WTR. This is a key aspect of its ecosystem-based management approaches using variable retention. To reflect current practice for the timber supply analysis, internal retention is divided into area and yield reductions applied to ecosystem management units as described more fully in the *TFL 37 SFM Plan 9 Information Package*. The area reductions to the land base account for land area occupied by reserved trees whereas the volume reductions account the effects of the reserved trees on regenerating trees.

The area reduction results in a reduction to the timber harvesting land base based on Variable Retention Adjustment Factors (area VRAF) applied to all polygons on the timber harvesting land base of areas managed with different partial retention regimes in the TFL. For example, in the area managed with one of the partial retention regimes (SMZ_fire), an equivalent area reduction of 17.5 percent was applied in the analysis, whereas for another regime (EFZ/GMZ_gap), a 9.0 percent reduction factor was applied. Given overlaps with other reductions to the land base (e.g. riparian management, unstable terrain, karst reserves, etc), this resulted in a net area exclusion of 5634 hectares from the timber harvesting land base to account for area reductions for WTR. Yield VRAFs were applied to all future managed stand yield tables based on the VRAF applicable for each partial retention regime.

The area and yield reductions applied in the analysis for internal retention of wildlife trees associated with ecosystem-based harvesting has been reviewed and accepted by BCFS as they reflect current practice in the TFL. In reviewing the reductions applied in the analysis for WTR, I am satisfied that this factor has been appropriately accounted for in support of this determination.

- visual resources

About 11 586 hectares (13 percent) of the timber harvesting land base are managed for visual resource values in scenic areas in the TFL. Visual resources are important in the TFL along highway corridors and lakes, especially the highway corridor through to Beaver Cove, which is a known scenic area. About 16 percent of the harvest over time comes from scenic areas, and they continue to contribute to timber supply throughout the planning horizon in the analysis.

Consistent with the Higher Level Plan (HLP), the licensee used the recommended visual quality classes (RVQC) from the visual landscape inventory for the timber supply analysis. In the HLP, RVQCs are defacto visual quality objectives (VQOs) until VQOs are formally established by the BCFS. RVQCs limit the amount of new area that can be harvested before previously disturbed areas reach a visually effective green-up (VEG) height.

VEG height was calculated using standard procedures for timber supply analysis. For example, for gentle (0 to 10 percent) slopes, a VEG height of 3 metres must be reached whereas for very steep (>60 percent) slopes, a VEG height of 8.5 metres must be attained.

Normally in timber supply analysis, the entire cutblock is considered disturbed before it reaches VEG height. The licensee asserts that stands progressively recover towards VEG condition after harvest and therefore applied a curve in the analysis to account for the percent contribution of stands with different heights to achieving VEG. For example, if a stand attained about 80 percent of the desired VEG height, then 50 percent of the stand was no longer considered disturbed in the analysis.

The licensee also believes that standard procedures for addressing percent disturbance by RVQC in timber supply analysis are not appropriate given the visual design and ecosystem-based harvesting practices in the TFL. Therefore the licensee developed localized maximum disturbance factors based on RVQC and slope for the analysis. For example, for partial retention RVQCs the licensee assumed a 33 percent maximum disturbance is allowable for slopes less than 30 percent, and a 15 percent maximum disturbance for slopes greater than 30 percent.

The licensee provided a sensitivity analysis to test the effect on timber supply of using the standard procedures for accounting for visual resources documented in the *Procedures for Factoring Visual Resources into Timber Supply Analyses*. This sensitivity analysis indicated no impact on short-term timber supply, but resulted in a 5.1 and 3.6 percent decrease in mid- and long-term timber supply, respectively.

Another sensitivity analysis was provided to test the removal of all the constraints applied for visual resources. This change in assumptions had no impact on short-term timber supply but increased mid- to long-term harvest levels very slightly by 0.4 percent relative to the base case.

BCFS staff reviewed and accepted the methods used in the analysis to account for visual resources. They note, however, that the existing visual landscape inventory has not been completed to current standards, and that management of visual resources based on an inventory completed to current standards may reduce timber supply on TFL 37.

The Forest Practices Board released an audit report of visual resource management practices in the Campbell River Forest District in 2005. This district is south of the TFL but includes similar forest types, terrain and public sensitivities, and Western holds a major licence in that district. The audit found good performance by forest companies in limiting the visual impact of logging activities. One aspect of visual resource management that was somewhat weak was managing impacts of roadside and foreground harvesting where few guidelines are in place.

I have reviewed this factor with BCFS staff and accept that the approach taken in the analysis is based on the best available information and current practice, as well as general consistency with the HLP. That said, under "Implementation", I support the licensee's intent to update the visual landscape inventory for the TFL for the scenic corridor along the highway during the next management plan period so that this update can be factored into the next analysis.

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

Other information

- harvest sequencing

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. Any difference between the modelling assumptions made and the order in which stands are actually harvested in operational practice must be examined and accounted for.

In the base case for TFL 37, cutblocks in the forest development plan were harvested for the first five years. After that, consistent with the harvest flow objectives (see “Timber supply analysis”), a ‘relative productivity’ harvest rule was used in the analysis to queue stands for harvest. This rule gives harvest priority to stands that are growing the slowest relative to their potential as a regenerated managed stand. The harvest rule was accepted by BCFS staff for use in the analysis.

A sensitivity analysis tested use of the “relative oldest first” harvest rule which gives harvest priority to stands that are oldest relative to their minimum harvest ages. The minimum harvestable ages used in this assessment were 90 percent of culmination age. This sensitivity analysis suggests no impact in the short-term. The mid-term harvest level attained in the base case, however, would need to be reduced by about 3.8 percent in order to avoid a timber supply deficit in 90 years.

Another sensitivity analysis was provided to test the use of a ‘random harvest’ rule. The purpose of this assessment was to examine further the degree to which harvest scheduling can affect timber supply in the short- and mid-term. This rule resulted in the need to decrease mid-term harvest levels by 1.9 percent relative to the base case, but it had no effect in the short-term.

While no rule completely emulates actual harvest performance, the sensitivity analyses suggest uncertainty in this factor likely has no impact on short-term timber supply and relatively minor impacts in the mid-term. I find the rule used in the base case reasonable, and I accept its use in support of this determination.

- twenty-year plan

The licensee prepared a twenty-year plan in support of draft MP No. 9 for TFL 37. The plan was accepted by the North Island / Central Coast district manager in July 2005. The plan is a spatial analysis to assess if the short-term harvests level attained in the base case appears feasible. The twenty-year plan is not intended to be an operational plan but does demonstrate that harvest blocks can be identified in the TFL that achieve base case harvest levels for the first 20 years. I have considered the findings of this plan in my determination.

- land use plan and landscape unit planning

The Vancouver Island Land Use Plan (VILUP) was approved by government in 1994. In 2000, government approved the Vancouver Island Summary Land Use Plan which included more detailed information to support the implementation of the 1994 land use decision. The VILUP Higher Level Plan (HLP) Order was promulgated in 2000 under the Forest Practices Code. The order provides legal objectives that have been carried forward under FRPA.

In 2005, the Ministry of Agriculture and Lands (MAL) approved Sustainable Resource Management Plans (SRMPs) - Biodiversity Chapters - for both the Lower and Upper Nimpkish Landscape Units. Later that year, MAL legally established the landscape units and objectives for biodiversity; these legal objectives were approved under the Code and have also been grandparented under FRPA.

Under FRPA, the licensee must now provide results or strategies in their Forest Stewardship Plans that are consistent with these HLP and landscape unit objectives. The timber supply analysis was designed to be consistent with these legal objectives, and I have addressed this in previously discussed factors such as *old growth management areas, landscape-level biodiversity, wildlife tree retention/ecosystem-based harvesting, and visual resources*. Having reviewed the legal objectives under FRPA stemming from the VILUP and the SRMPs with BCFS staff, I am satisfied that the analysis has appropriately accounted for this important consideration.

- sustainable forest management plan

The licensee has developed a Sustainable Forest Management Plan (SFMP), which also serves as the draft Management Plan for the TFL, and has obtained certification under the Canadian Standards Association (CSA) for the Nimpkish defined forest area which encompasses the TFL. The SFMP uses a criteria and indicator (C&I) framework to measure management effectiveness. The criterion related to biodiversity was reviewed by the Forest Practices Board in a report released April 2006. The Board found the C&I framework used by the licensee for biodiversity to be sound.

I have reviewed the licensee's SFMP, and am impressed with the work that went into indicator identification and explanation, and the public advisory processes that included First Nations participation. I note that the plan was prepared consistent with VILUP and the SRMPs, and provides the management assumptions used in the timber supply analysis. The licensee also intends to prepare a Conservation Plan that includes monitoring performance. I also note that the draft MP No. 9 for TFL 37, which is based on the SFMP, is under review by BCFS staff. I expect to receive it for my review and approval soon. Having discussed the SFMP (and draft MP) with BCFS staff, I am satisfied the key factors that have a bearing on timber supply on TFL 37 have been accounted for in this rationale in support of this determination.

- First Nations considerations and cultural heritage resources

Five First Nations have asserted traditional territories within the TFL: the Namgis, Mowachat/Muchalaht, Tlowitsis and the Quatsino First Nations and the Cape Mudge Band. Initially in the consultation process the Namgis, Mowachaht/Muchalaht and the Tlowitsis First Nations were considered to have asserted traditional territory covering

areas on the TFL. However, as time elapsed during the process, more up-to-date information became available indicating that the Quatsino First Nation and the Cape Mudge Band also have asserted traditional territory covering parts of TFL 37. Therefore, as described in more detail below, these First Nations were also consulted concerning the pending AAC determination.

An archaeological overview assessment (AOA) was completed in 1995 which included the TFL. The AOA includes a map which shows the relative potential of different areas for finding archaeological features. The AOA is used by First Nations and the licensee to determine the need for more detailed archaeological surveys. If more detailed work is required, Namgis First Nations survey crews are contracted to do it in their asserted territory. If there is local knowledge that an area may contain sensitive archaeological values, an archaeologist is brought in to assist the Namgis survey crew. For example, if licensee engineers identify an area that potentially has culturally modified trees, they will contact the government staff responsible for the *Heritage Conservation Act* (now with the Ministry of Tourism, Sport and the Arts), and an archaeological impact assessment (AIA) will normally be conducted.

Traditional use studies (TUS) have been conducted for the asserted traditional territories of the Mowachaht/Muchalaht First Nation, which overlaps somewhat with the TFL and the Quatsino First Nation, which has a small overlap in the northwest corner of the TFL. A mapped polygon identified in the Mowachaht/Muchalaht First Nation's TUS along the headwaters of the Nimpkish River within the TFL is identified as being important for deer and elk hunting as well as berry picking. This area is protected by a riparian reserve and OGMA which helps conserve those values and uses. No polygons have been identified within the TFL based on the Quatsino TUS.

As a general practice, the licensee contacts First Nations at the beginning of each operational planning process for input on the management of cultural heritage resources. To date, modifications to harvesting plans for the protection of cultural heritage resources are typically undertaken through the careful placement of overlapping reserves. For example, culturally modified trees are used as "anchor points" for building reserves such as wildlife tree patches. Consequently, no additional reductions were made in the analysis to address cultural heritage resources. Given that the use of overlapping reserves to protect cultural heritage resources reflects current practices, I accept how this factor was addressed in the analysis for the purposes of this determination.

The Namgis First Nation is in Stage 4 of the treaty process, whereas the Quatsino First Nation has completed Stage 3 and the Tlowitsis First Nation Stage 2. Consistent with my guiding principles, I will not attempt to pre-judge decisions that have not been made such as treaty settlements. However, when those decisions are made, they can be factored into subsequent timber supply reviews and accounted for in future AAC determinations.

The Namgis First Nation is developing a land use plan which is confidential at this time. In the Namgis planning process, Elders are interviewed to ascertain the location of many of their traditional use sites and activities. The Namgis locate and record culturally modified trees (CMTs), important salmon rivers, and old grease trails and then record them on their land use plan maps. According to the Namgis, more work needs to be done to locate all the sensitive and traditional use sites. For example, numerous village sites

may have existed in the Nimpkish valley based on stories, but have yet to be identified. The land use plan may be completed within a year.

Through the treaty negotiation process, considerable information and mapping has been assembled regarding the Namgis First Nation, including information being addressed in their land use plan. Information and mapping include their asserted territory; historic village sites; known traditional use sites; grease trails; hunting, trapping and fishing access interests; potential land selection composites; and other themes.

Forest and range agreements (FRAs) and forest and range opportunities (FROs) are interim agreements between MOF and eligible First Nations designed to provide for workable accommodation of aboriginal interests that may be impacted by forestry decisions during the term of the agreement until such time as those interests are resolved through treaty. FRAs and FROs provide First Nations with opportunities for direct award forest tenure and a share of forestry revenues. The Quatsino First Nation has a FRA, while the Namgis First Nation and Cape Mudge Band have Interim Forest Agreements.

There is also a Tlowitsis Tribe Forest Agreement and a direct award interim measure agreement. No FRA or FRO has been signed with the Mowachaht/Muchalaht.

The licensee formed the Nimpkish Woodlands Advisory Committee (NWAC) as part of its forest certification process and to support development of its Sustainable Forest Management Plan (SFMP) which also serves as the draft MP No. 9. In 2003 and 2004, the TFL holder through NWAC meetings made efforts to share information about the timber supply review with First Nations. Eight meetings were held where the SFMP and various timber supply review topics were discussed. The licensee indicates that the Namgis First Nation participated in the NWAC but that the Mowachaht/Muchalaht and Tlowitsis First Nations decided not to participate.

The Namgis First Nation and the licensee are involved in other forums such as the Nimpkish Resource Management Board where resource management information is exchanged; the Namgis are a member of the Board. For example, the licensee is doing fish enhancement work with the Namgis, the federal Department of Fisheries and Oceans and the provincial Ministry of Environment through the Board. Accomplishments include establishment of around 700 structures including a fertilization station for river enrichment. The licensee has also provided large trees that the Namgis use for canoes or totem poles, and have provided sites for bark stripping. The Namgis have a timber volume assigned to them through their Interim Forestry Agreement.

In May 2005, the licensee provided the Namgis, Mowachaht/Muchalaht and Tlowitsis First Nations with a hard copy of the timber supply analysis, and invited them to an information sharing session. The licensee also responded to each of the comments and questions raised by the Namgis First Nation in March 2005 regarding its draft SFMP.

The consultation process initiated by the BCFS in support of the timber supply review included:

- A letter in August 2005 (a) advising the Namgis, Mowachaht/Muchalaht and Tlowitsis First Nations that the timber supply review process was underway and that it would culminate in an AAC determination; (b) asking the First Nations to provide information about their aboriginal interests and how these might be

affected by the AAC determination; and (c) offering to meet with First Nations to discuss how their aboriginal interests could be affected by the AAC determination.

- A follow-up letter in September 2005 reminded each First Nation about the timber supply review process and the invitation to meet.
- In October, the Tlowitsis First Nation responded to the invitations and asked to meet with BCFS staff. A Tlowitsis First Nation contact met with BCFS district and licensee staff in December 17, 2005 about the timber supply review process.
- In January 2006, BCFS branch staff contacted the Tlowitsis First Nation by telephone; the First Nation contact expressed satisfaction that he understood the timber supply review process and felt that no further meetings were necessary.
- A letter was sent in January 2006 to the Cape Mudge Band and the Quatsino First Nation indicating that the timber supply review process was underway and that an AAC determination was expected in the spring of 2006. As noted above, these First Nations had been missed in the earlier consultation efforts.
- In March 2006, a follow-up letter was sent to the Cape Mudge Band and the Quatsino First Nation re-iterating that the ACC determination process was underway and that an AAC determination was now expected by mid-2006.

No communication, other than those with the Tlowitsis First Nations as described above, were received by the BCFS based on this consultation process.

Based on information compiled within the treaty process and as part of consultation processes for other decisions, First Nations have interests in fish, wildlife, other biological values and historic village sites, known traditional use sites and grease trails in the TFL. Management of wildlife and fish habitat is accounted for in the base case through reductions for riparian buffers, ungulate winter range and other reserves, and application of forest cover requirements. In the absence of more specific information on aboriginal interests, I believe it is reasonable to conclude that the accounting in the base case for management of wildlife and fish habitat could provide for related aboriginal interests.

In summary, I am satisfied that the licensee and BCFS staff have made reasonable efforts to share information and consult with First Nations who have aboriginal interests in the TFL. I am also satisfied that the analysis has appropriately accounted for the management of known archaeological and cultural heritage resources, and other known forest values that may support aboriginal interests. Given the significant overlap between the TFL and the Namgis asserted traditional territory and aboriginal interests, I encourage the continued information sharing and cooperative efforts between the licensee and the Namgis within the Nimpkish Woodlands Advisory Committee and other appropriate forums such as the Nimpkish Resource Management Board. I am aware of the treaty process underway and of the land use plan being developed by the Namgis.

If new information that significantly vary from the assumptions made in this determination becomes available through these or other processes for any of the First Nations with asserted traditional territory covering portions of TFL 37, I am prepared to revisit this determination sooner than the five years required by legislation.

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

Alternative harvest flows

The nature of the transition from harvesting old growth to harvesting second growth is a major consideration in determining AACs in many parts of the province. In keeping with the objectives of good forest stewardship, AACs in British Columbia have been and continue to be regularly determined to ensure that short-term harvest levels are compatible with a smooth transition to medium and long-term levels. Timber supplies need to remain sufficiently stable so that there are no inordinately adverse impacts on current or future generations. To achieve this, the AAC determined must not be so high as to cause later disruptive shortfalls in supply nor so low as to cause immediate social and economic impacts that are not required to maintain forest productivity and future harvest stability.

In the base case, the harvest flow objectives included: (i) maintaining the initial harvest level at approximately the current AAC until reductions are necessary for long-term sustainability; (ii) limiting harvest volume decreases to no more than 10 percent per ten-year period; and (iii) maintaining even flow in the long-term with a non-declining growing stock.

Two alternative harvest flows were provided. For one alternative flow, the second five-year period (i.e. beginning in 2006) was reduced to 946 000 cubic metres per year, a level that is 12 percent lower than the initial harvest level of 1 074 000 cubic metres per year. This harvest level could be maintained for 15 years before declining by more than 10 percent to a long term harvest similar to the base case. In the second alternative flow the harvest level for the second five-year period was reduced by over 20 percent to 840 000 cubic metres per year. This level could be maintained for 30 years before declining to a long-term harvest level similar to the base case.

In reviewing these two alternative harvest flows, I am satisfied the harvest flow objectives in the base case are more consistent with socio-economic objectives of government as expressed by the minister in his letter (see below) regarding AAC determinations in that I have considered “the importance of a stable timber supply in maintaining a competitive and sustainable forest industry, while being mindful of other forest values.”

(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 and memorandum

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

The 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 that regard, I believe the harvest flow objectives assumed in the base case help provide a relatively stable transition from short-term harvest levels to lower even-flow long-term harvest levels. From 2006 until the long-term harvest level is reached in 2032, the base case decreases are maintained at five percent per five-year period in order to allow for a gradual decrease that minimizes disruptions to timber supply. The base case shows that the nature of timber supply will shift from primarily hemlock and balsam stands that are greater than 250 years of age in the short-term to primarily second-growth Douglas-fir stands that are 60 to 80 years of age by 2042. This transition is therefore predicated on continued markets for hemlock and balsam in the short-term.

The base case has also accounted for the Vancouver Island Land Use Plan, and the SRMPs for the Lower and Upper Nimpkish Landscape Units—the key government approved land and resource plans that are applicable to the TFL. Because the land base assumptions in the analysis accounted for these land use decisions, as well as other non-timber values, this has significantly reduced uncertainty in timber supply associated with these factors.

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.

The licensee provided opportunities for public review in the development of its Sustainable Forest Management Plan (SFMP) and associated documents which supported the timber supply analysis. These comments were considered by the licensee and helped shape or confirm the assumptions made in the analysis.

The licensee advised me that employment in the Nimpkish Valley is one of the most contentious issues identified by the NWAC, and that this can be affected by market conditions, timber reallocation and AAC reductions. As noted above, the moderated base case harvest level decline is designed to minimize disruption to timber supply and associated employment. Other NWAC issues besides jobs include: opportunities for non-timber forest products, recreation and tourism, visual resources and First Nation traditional uses.

Local objectives for land and resource use in TFL 37 are largely captured in the Cabinet approved Vancouver Island Land Use Plan (VILUP), and the HLP Order which provides land use objectives under FRPA. I have accounted for the HLP objectives as they relate to various factors that I have considered in my determination.

District staff briefed me on the information sharing and consultation process with First Nations associated with this timber supply review which I discussed earlier under *First*

Nations considerations and cultural heritage resources. I have taken this information into account in my determination.

The licensee uses the NWAC, which includes representation from stakeholders and First Nations, to provide feedback on its draft SFMP (i.e. MP No. 9) and various documents that supported the timber supply analysis. This provides opportunities for public input in the timber supply review process.

Based on this, I believe my accounting for objectives provided in the VILUP HLP, my consideration of concerns identified by the NWAC and the First Nations considerations I detailed above, have appropriately address the Minister's request that I consider local objectives.

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

I reviewed the information regarding unsalvaged losses and am satisfied that the assumption made in the analysis to account for this factor are appropriate for use in support of this determination.

Reasons for Decision

I have considered the information discussed throughout this document, and I have reasoned as follows.

I consider the 2007 to 2011 base case harvest level of 970 000 cubic metres per year as being most relevant to this determination as it represents the level in the forecast that is applicable for the timeframe of this determination and it allows for an orderly decline to the long term harvest level.

In determining AACs, my considerations typically identify factors which, 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 my considerations, I identified no significant factors that led me to believe the base case represents either an over- or underestimation of timber supply during any given period. For some factors I have discussed and considered above, I indicated the assumptions used in the base case for that factor may have led to a relatively minor over- or underestimate of timber supply (e.g. see *existing forest inventory* and *volume estimates for regenerated managed stands*), but I believe they are too small to have a consequential impact on my determination. I noted under *coastal log grades* that the base case is underestimated over the forecast period by an unquantified amount due to the utilization of dead trees that are charged to the AAC but which were not accounted for in the analysis. I further noted that this unquantified volume of dead potential timber could be used to mitigate the projected decline in short-term timber supply. I recommend under "Implementation" that better information be obtained on this factor in support of the next determination.

The risks and uncertainties normally associated with the management of non-timber values has been significantly reduced in TFL 37 with the approval of the Vancouver Island Land Use Plan (VILUP) and the VILUP Higher Level Plan (HLP) Order. The approval of the two Sustainable Resource Management Plans (SRMPs) for the Lower and Upper Nimpkish Landscape Units and the ensuing legal Orders that establish the landscape units and objectives has also helped in reducing uncertainty. Both the VILUP HLP Order and the Orders for the landscape units have legal effect under the *Forest and Range Practices Act* (FRPA). The HLP addresses issues such as green-up, visual resources, old forest retention, and old plus mature targets. The landscape unit Orders establish old growth management areas (OGMAs) and wildlife tree retention (WTR) targets. In addition, ungulate winter ranges (UWRs) have been established under the Forest Practices Code and these have been carried forward under FRPA, and a wildlife habitat area (WHA) for marbled murrelet has been legally established and many more WHAs are proposed. There is also active management by the licensee for other species at risk, such as the Queen Charlotte goshawk. The licensee has also introduced ecosystem management based on silviculture practices which assist with attaining WTP targets, patch retention targets, single-tree per hectare retention targets and forest influence targets. All of the above were accounted for in the base case which greatly reduces the risk and uncertainty regarding the timber supply impacts associated with the management of these important non-timber values.

One area of risk and uncertainty in the future that I have noted under “Implementation” is the forest health risk on TFL 37, especially root rot, to regenerated managed stands. The TFL will be transitioning to increased reliance on second-growth stands within 35 to 50 years, and it will be important to monitor the performance of these stands relative to yield projections due to forest health agents such as root rot.

Relative to this determination, the main area of risk and uncertainty lies in the marginally economic hemlock and balsam stands where helicopter logging is required. I discuss this factor in detail under *uneconomic forests*. These marginally economic stands were included in the base case, as harvesting has occurred in them in the past when market conditions were more favourable. However, the stands have been recently avoided due to poor markets, and this is unlikely to change in the foreseeable future. These stands represent about seven percent (6475 hectares) of the timber harvesting land base and about 13 percent of the growing stock volumes in the TFL. They are dominated by hemlock and balsam and either: (i) have less than 30 percent Douglas-fir, cedar or cypress, or (ii) are located greater than a kilometre from an existing or proposed road.

A sensitivity analysis that tested the impact of excluding the marginally economic stands from the timber harvesting land base indicated the need to reduce harvest levels in the short-term to avert significant disruptions to mid- to long-term timber supply. I am therefore concerned that if my AAC determination includes these stands, and they in fact are avoided, that portions of the land base that are more economic for harvesting may be over-harvested thereby potentially leading to greater impacts on timber supply than projected in the base case. One tool that I have in making AAC determinations, as provided under section 8 (5) of the *Forest Act*, is to attribute portions of the AAC to particular types of timber and terrain.

In determining what the AAC should be for the TFL, including the level attributed to the marginally economic hemlock-balsam stands, I am guided by a supplemental analysis provided by the licensee where these stands were harvested evenly over the entire simulation period. The supplemental analysis showed the contribution of these stands to be 37 000 cubic metres per year, with a corresponding overall harvest level starting in 2006 of 969 000 cubic metres per year (slightly lower than the 970 000 cubic metres per year indicated in the base case).

As I noted above, the base case harvest forecast prepared for the 2005 timber supply analysis associated with draft Management Plan (MP) No. 9 projects a significantly lower timber supply for TFL 37 than the base case in the 1998 analysis which supported MP No. 8 and the most recent AAC decision made in 1999. The differences in these forecasts are mainly attributable to land base reductions and changes in the method used for applying site productivity estimates when generating managed stand yield tables. While the 1998 base case indicated a relatively stable short term, and over the long term, an increasing timber supply, the base case in the 2005 analysis suggests the need for an immediate reduction of about ten percent and further step-wise reductions to a much lower long-term harvest level. Licensee and BCFS timber supply analysts have carefully examined the long-term harvest level projected in the 2005 base cases, as well as several sensitivity analyses, and based on their review and comments, I am satisfied that the 780 000 cubic metre per year level identified in the base case in the long term is appropriate and stable. I believe the harvest flow objectives in the base case that enable a progressive transition from initial harvest level to the long-term are appropriate and consistent with the Minister's letter.

The supplemental analysis that examined attributing a portion of the harvest to the marginally economic hemlock balsam stands, and which is consistent with the harvest flow objectives in the base case, best reflects my view of an appropriate level of harvest for the TFL. My decision therefore is that the new AAC for TFL 37 should be 969 000 cubic metres with 37 000 cubic metres attributed to the low economic hemlock-balsam helicopter stands as defined in the supplemental analysis.

Licensee and BCFS staff raised the concern that the licensee may not be able to harvest the marginally economic areas subject to the attribution if poor market conditions persist. Therefore the licensee would harvest less than its cumulative AAC for the cut control period and (as per cut-control provisions of the *Forest Act*) this unharvested volume may be disposed of to a person other than the tree farm licence holder. I am concerned that in order to dispose of this volume the BCFS could sell licences on more economically operable areas not covered by the attribution. This would defeat the whole purpose of the attribution—to protect the timber supply stability of more economic stands. Therefore, for this determination, I strongly recommend to BCFS staff involved in the administration of the AAC that the stated rationale and intent of the attribution be respected in the event of disposition of unharvested volume. Licences should only be issued in the low economic hemlock-balsam helicopter stands subject to the attribution. Under “Implementation” I speak to the need to monitor harvest performance in the stands subject to the attribution and compliance with cut control provisions.

I have reviewed the licensee's Sustainable Forest Management Plan, which also serves as its draft MP No. 9 and am impressed with the work that went into indicator identification and explanation, the public advisory processes and opportunities for First Nations participation. The licensee's intention to prepare a Conservation Plan that includes monitoring performance is also appropriate.

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 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 37 by establishing an AAC of 969 000 cubic metres. This includes an attribution partition of 37 000 cubic metres to the low economic hemlock and balsam helicopter stands. I provide the definition of these stands in my "Reasons for Decision".

This determination is effective October 1, 2006, and will remain in effect until a new AAC is determined, which must take place within five years of the effective date of this determination.

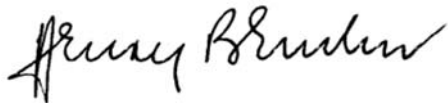
If significant new information is made available to me, or major changes occur in the land base or management assumptions upon which I have predicated this decision, then I am prepared to revisit this determination sooner than the five years required by legislation.

Implementation

In the period following this decision and leading to the subsequent determination, I encourage the licensee and/or BCFS staff to undertake the tasks noted below that I have also described further in the appropriate sections of this rationale document. These projects are important to help reduce the risk and uncertainty associated with key factors that affect the future timber supply in TFL 37, particularly in the mid-term. I therefore make the following requests to be completed before the next determination.

- *Attribution of AAC and cut control:* My determination is predicated on directing 37 000 cubic metres of the AAC towards low economic hemlock-balsam helicopter stands, as defined in the supplemental analysis (see "Reasons for Decision"). I need the assurance that in fact that portion of the AAC is being directed at these stands. I urge BCFS staff to work with the licensee to report on harvesting performance consistent with this attribution.
- *Cut control:* In the event volume becomes available for disposition because market conditions did not permit economic harvesting of the areas subject to the attribution, I strongly recommend to BCFS staff involved in the administration of the AAC that any new licenses are issued in the areas subject to the attribution. I request adherence to this recommendation be monitored and reported by BCFS staff prior to the next determination.

- *Coastal log grades:* I urge that the licensee and BCFS staff 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.
- *Regenerated managed stands:* I request that the licensee verify or refine the estimates of managed stand yields to account for ingress.
- *Site productivity estimates:* I request that the licensee continue to monitor its site productivity estimates to ensure the yield projections used in future analyses appropriately reflect volumes per hectare realized in harvesting operations. I encourage the licensee to improve site index estimates in high elevation variants.
- *Regenerated managed stands and forest health:* The operational adjustment factor applied to account for forest health impacts, especially root rot, on regenerated managed stands may have underestimated impacts on timber supply in the mid- to long-term. As the TFL transitions to second-growth forests, this concern becomes more pronounced. I therefore request that the licensee monitor performance in these stands relative to volume projections due to forest health impacts, especially root rot.
- *Riparian management areas:* I request that the licensee monitor its performance in riparian management areas relative to the riparian inventory and the modelling assumptions applied in the analysis in order to verify or adjust the assumptions applied for this factor for the next determination.
- *Visual resources:* I encourage the licensee to update its visual landscape inventory for the scenic corridor along the highway so that this can be factored into the next determination.



Henry Benskin
Deputy Chief Forester

September 8, 2006

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 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**