

**BRITISH COLUMBIA
MINISTRY OF FORESTS AND RANGE**

Tree Farm Licence 45

held by

International Forest Products Ltd.

Rationale for Allowable Annual Cut (AAC) Determination

Effective July 15, 2009

**Melanie Boyce, R.P.F.
Deputy Chief Forester**

Table of Contents

Objective of this document..... 1

Statutory framework..... 1

Description of the TFL..... 1

History of the TFL and the AAC..... 2

New AAC determination..... 3

Information sources used in the AAC determination 3

Role and limitations of the technical information used 4

Guiding principles for AAC determinations 5

The role of the base case 8

Timber supply analysis..... 9

Consideration of factors as required by Section 8 of the *Forest Act*..... 11

 Land base contributing to timber harvesting 13

 - general comments..... 13

 - economic and physical operability 14

 - roads, trails and landings 15

 Existing forest inventory..... 16

 Expected rate of growth..... 17

 - site productivity 17

 - regeneration delay 17

 Silvicultural treatments to be applied 18

 - use of select seed 18

 - silvicultural systems 18

 Integrated resource management objectives 19

 - ecosystem-based management..... 19

 - the March 27, 2009 amendment to the SCCMO 20

 - First Nations traditional forest resources..... 20

 - First Nations traditional heritage resources 20

 - active fluvial units 24

 - biological diversity 24

 - wildlife habitat..... 26

 Land use planning..... 28

 Independent power projects 28

 First Nations considerations..... 28

 Harvest distribution by forest district 32

 Unsalvaged losses 32

Reasons for decision..... 33

Determination..... 35

Implementation..... 35

Appendix 1: Section 8 of the *Forest Act*..... 37

Appendix 2: Section 4 of the *Ministry of Forests Act*.....39
Appendix 3: Minister’s letter of July 4, 200639

List of Tables

Table 1. List of factors for which modelling assumptions applied in the base case have been accepted. 12

Objective of this document

This document provides an accounting of the factors I have considered and the rationale I have employed in making my determination, under Section 8 of the *Forest Act*, of the allowable annual cut (AAC) for Tree Farm Licence (TFL) 45. This document also identifies where new or better information is needed for incorporation in future determinations.

Statutory framework

Section 8 of the *Forest Act* requires the chief forester to consider particular factors in determining AACs for Timber Supply Areas and TFLs. Section 8 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*.

Description of the TFL

TFL 45, held by International Forest Products Limited (Interfor, the “licensee”), is located on the south-central coast of British Columbia. It consists of 7 separate areas located on the mainland coast north of the community of Campbell River, in the Knight Inlet and Phillips Arm areas and on West Thurlow Island. It is located within the Coast Forest Region of the Ministry of Forests and Range (MFR), and is administered from the North Island–Central Coast Forest District and Campbell River Forest District offices.

TFL 45 lies in terrain that varies from low-lying coastal islands to rugged mountains with glaciers and deep, narrow, forested valleys. It covers 230 997 hectares, of which 63 965 hectares (about 28 percent) are covered by productive forest. The other 167 032 hectares (72 percent) are composed largely of alpine tundra, ice fields, rock, and other non-productive areas. In the base case of the timber supply analysis, 22 470 hectares (35 percent) of the total productive land base were estimated to be available for timber harvesting in the long term. Overall, about 10 percent of the total TFL 45 area contributes to the long term timber harvesting land base assumed in the analysis.

The majority of the operable forest area lies within the Coastal Western Hemlock biogeoclimatic zone, with a smaller portion in the higher elevation Mountain Hemlock zone. The lower elevation forests are primarily composed of western hemlock, Douglas-fir, and western redcedar; whereas, higher elevation forests are predominantly amabilis fir, mountain hemlock, yellow-cedar, and subalpine fir. TFL 45 provides habitat for various wildlife species including small mammals, birds, amphibians, and fish; and large mammals such as grizzly and black bears, black-tailed deer, and mountain goats. Several of its rivers and creeks support important runs of salmon.

In the 1990s, growing public concerns regarding the sustainability of forest management in the central coast area, including the area of TFL 45, started to attract international attention. In 2006, following years of public participation and consultation regarding

land and resource use planning in the area, the provincial government announced its Coast Land Use Decision (CLUD). The CLUD is based on government-to-government agreements between the provincial government and First Nations. Key elements of the CLUD included identifying new protected areas and adopting ecosystem-based management (EBM) that encourages conservation and sustainable land use practices.

The TFL falls within the asserted traditional territories of the following First Nations: the Campbell River Indian Band (Wei Wai Kum Nation), the Cape Mudge Indian Band (We Wai Kai Nation), the Da'naxda'xw First Nation, the Xwemalhkwa (Homalco) Indian Band, the Kwiakah First Nations, the K'omoks First Nation, the Mamalilikulla-Qwe'Qwa'Sot'Em First Nation, and the Ulkatcho First Nations.

History of the TFL and the AAC

In 1982, TFLs 17 and 36 were amalgamated to form TFL 45. When TFL 45 was issued to British Columbia Forest Products Limited (BCFP) in 1983, the AAC was set at 305 000 cubic metres.

Between 1988 and 1989, 10 percent (28 776 cubic metres) of the Crown AAC available to the licensee was allocated to the Small Business Forest Enterprise Program (SBFEP) due to new provisions of the *Forest Act* and a share transfer. (The share transfer was from BCFP to Fletcher Challenge Canada Limited [FCC]).

In 1991, the chief forester reduced the AAC to 210 000 cubic metres. This volume was allocated entirely to the licensee because a portion of the TFL was deleted in order to move the SBFEP into the adjacent timber supply area.

As a result of the transfer of the TFL from FCC to Interfor in 1991, a further five percent (10 080 cubic metres) of the AAC was allocated to the SBFEP. The AAC was increased to 220 000 cubic metres in 1996; and in the 2001 determination the AAC was maintained at 220 000 cubic metres, including the SBFEP entitlement of 10 080 cubic metres. In 2004, the AAC was reduced by 5000 cubic metres under a *Forestry Revitalization Act* Order to provide BC Timber Sales (formerly the SBFEP) with additional volume. In 2007, a corresponding area of 839 hectares on West Thurlow Island was deleted from TFL 45.

In May 2004 the Central Coast Land and Resource Management Plan Completion Table recommended, among other things, an increase in protected areas and proposed that ecosystem-based management be implemented. In 2006, the provincial government's CLUD provided for land use zoning for protected areas, biodiversity areas and EBM operating areas. Between 2006 and 2008, three conservancies covering portions of TFL 45 were established under the CLUD. On September 26, 2006, the chief forester ordered under the *Forest Act* that the AAC for TFL 45 be temporarily reduced by 9000 cubic metres until the Hunwadi/Ahnuhati-Bald Conservancy, (Part 1 of the conservancy) established in 2006, ceases to be a designated area. All three conservancies have now been established and are now permanently accounted for (see *conservancies*) in the AAC determination.

New AAC determination

Effective July 15, 2009, the new AAC for TFL 45 will be 175 000 cubic metres. This AAC includes the volume that may be harvested from both Schedule A and B land, and by BC Timber Sales.

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

Information considered in determining the AAC for TFL 45 includes the following:

- *Landscape Unit Planning Guide*, March 1999, Province of BC;
- *Vegetation Resources Inventory, Phase I*, 2000, Interfor;
- *Forest Practices Code of British Columbia Act* consolidated to April 2009 and regulations, amendments, and guidebooks;
- *Natural and Managed Stand Yield Tables for Tree Farm Licence 45*, May 2001, J.S. Thrower and Associates Ltd. Natural stand yield tables accepted September 2008 by Forest Analysis and Inventory Branch (FAIB); managed Stand Yield Tables accepted June 2008 by MFR Research Branch;
- *Potential Site Index Estimates for the Main Commercial Species on TFL 45*, Interfor; accepted May 22, 2001 by MFR Research Branch;
- *Terrestrial Ecosystem Mapping (TEM) of International Forest Product's Tree Farm Licence 45*, accepted 2001 by MFR;
- *Vegetation Resources Inventory Phase II*, 2002, Interfor; accepted 2007 by MFR;
- *Forest and Range Practices Act, 2002* and amendments;
- *Order – Ungulate Winter Range #U1-008*, November 2003, MOE;
- *Identified Wildlife Management Strategy. Accounts and measures for managing identified wildlife: Coast Forest Region. Version 2004*. Province of BC;
- *Report of Consensus Recommendations to the Provincial Government and First Nations*, May 2004, Central Coast Land and Resource Management Plan (LRMP) Completion Table;
- *Establishment of Scenic Areas and Visual Quality Objectives for the Campbell River Forest District*, December 14, 2005, MFR;
- *Coast Land Use Decision*, February 7, 2006, Government of BC and First Nations;
- *Ministry of Forests and Range Act*, consolidated to March 30, 2006;
- *Analysis of the Impact on Timber Supply and Critical Habitat of the Central Coast LRMP Government-to-Government Draft Proposed Interim Legal Objectives*, May 2006, Cortex Consultants;
- Letter from the Minister of Forests to the Chief Forester, dated July 4, 2006, stating the economic and social objectives of the Crown (Appendix 3);

- Chief Forester Order reducing the AAC for TFL 45 by 9000 cubic metres, September 28, 2006;
- *Park (Conservancy Enabling) Amendment Act*, 2006;
- *Coast Forest Action Plan*, 2007, MFR;
- *Order # 3(4) 12-1 to delete 839 hectares from TFL 45*, July 26, 2007, Minister of Forests and Range;
- *Order Establishing Land Use Objectives for the South Central Coast Area*, July 27, 2007, Minister of Agriculture and Lands;
- *Parks and Protected Areas Statutes Amendment Act*, 2007;
- *Tree Farm Licence 45 Timber Supply Review Information Package and Timber Supply Analysis Report #5*, submitted by Interfor March 2008, accepted September 2008 by MFR Forest Analysis and Inventory Branch (FAIB);
- *Analysis and Enhancement of TFL 45 Inventories for Deriving Sensitive Soil and Hydrosiparian Themes*, submitted March 2008, B.A. Blackwell and Associates Ltd.;
- *Background and Intent Document for the South Central Coast and Central and North Coast Land Use Objectives Orders*, April 18, 2008, Ministry of Agriculture and Lands;
- *Information Package and Timber Supply Analysis Report # 5 Comment and Review Binder* documenting the public and First Nations input provided to Interfor in response to information sharing, Interfor; submitted September 2008;
- *TFL 45 Vegetation Resources Inventory Statistical Adjustment Version 3.0*, J.S. Thrower & Associates Ltd; accepted December 2008 by FAIB;
- *Protected Areas of British Columbia (Conservancies and Parks) Amendment Act*, 2008;
- *First Nations Consultation Summary*, Campbell River and North Island – Central Coast Forest Districts, received June 2009, and,
- *South Central Coast Amendment Order*, March 27, 2009, Minister of Agriculture and Lands; and
- Technical review and evaluation of information and current operating conditions through comprehensive discussions with MFR and MOE staff, including the AAC determination meeting held in Victoria on December 17, 2008 and subsequent dialogue with staff.

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 management

practices and biophysical factors, such as rate of timber growth and definition of the land base considered available for timber harvesting.

The analytical techniques used to assess timber supply are necessarily simplifications of the real world. Many of the factors used as inputs to timber supply analysis are uncertain, due in part to variations in physical, biological, and social conditions. Ongoing scientific studies 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. Technical information and analysis therefore do not necessarily provide the complete answers or solutions to forest management problems such as AAC determinations. Such information does provide valuable insight into potential impacts of different resource-use assumptions and actions, and thus forms an important component of the information I must consider in AAC determinations.

In determining the AAC for TFL 45, I have considered known limitations of the technical information provided. I am satisfied that the information provided forms a suitable basis for my determination.

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. I have observed the chief forester during a number of previous AAC determinations and am familiar with the guiding principles that the chief forester has employed in making AAC determinations. I find these principles to be reasonable and appropriate and I have employed them as described below in making my AAC determination for TFL 45.

Rapid changes in social values and in our understanding and management of complex forest ecosystems will affect interpretations 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 such changes and associated uncertainties. To make my approach in these matters explicit, I have set out the following body of guiding principles. In any specific circumstance where I may consider it necessary to deviate from these principles, I will explain my reasoning in detail.

Two important ways of dealing with uncertainty are:

- (i) minimizing risk; in respect of which, in making AAC determinations, I consider particular uncertainties associated with the information before me and attempt to assess the current and potential risks that could affect social, economic, and environmental values associated with a range of possible AACs; and
- (ii) redetermining AACs frequently, to ensure they incorporate current information and knowledge. This principle has been recognized in the legislated requirement

to review AACs every five years, and the adoption of this principle is central to many of the following guiding principles.

In considering the various factors of Section 8 of the *Forest Act*, I attempt 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 to factors either that could work to *increase* the timber supply, such as optimistic assumptions about harvesting in unconventional areas or using unconventional technology; 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 and Range Practices Act* (FRPA).

In many areas the timber supply implications of some legislative provisions 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. As deputy chief forester, in making my determination for TFL 45 I have followed the same approach.

As British Columbia progresses toward the completion of strategic land-use plans, in some cases the eventual timber supply impacts associated with the land-use decisions resulting from 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 may not always be possible to fully analyze and account for the consequent timber supply impact in a current AAC determination. Many government land-use decisions must be followed by detailed implementation decisions. For example, a land-use decision may require the establishment of resource management zones and resource management objectives and strategies for these zones. Until such implementation decisions are made it would be impossible to fully assess the overall impacts of the land-use decision. In such cases the legislated requirement for five-year AAC reviews will ensure that future determinations address ongoing decisions about plan implementation.

In the case of TFL 45 I must consider the CLUD and its implementation processes, which apply to and guide current management on the TFL. The February 7, 2006 announcement by the provincial government on CLUD committed the province to protecting large areas of temperate rain forest and to implementing EBM. In April 2006 the *Park Act* was changed to create a new designation of protected area called a 'conservancy'. Conservancies prohibit logging, mining, and hydro electric power generation, except for run-of-the-river projects, but differ from Class A Parks in allowing for social, ceremonial and cultural uses by First Nations and for low impact compatible economic opportunities.

On July 27, 2007, the provincial government released Ministerial Orders establishing EBM land use objectives covering the central and north coast and the south central coast, including TFL 45. The South Central Coast Ministerial Order (SCCMO) specifies the level of management that must be incorporated into forestry plans in TFL 45. The

SCCMO was amended effective March 27, 2009, resulting in increased constraints on the timber supply.

Government also issued the *Background and Intent Document for the South Central Coast and Central and North Coast Land Use Objectives Orders*; which provides supplemental information regarding the intent of the land use objectives, and context for understanding and implementing the objectives. For each legal objective found within the orders, the background and intent document provides a statement of intent, followed by key definitions and some implementation suggestions.

The Province, First Nations and stakeholders are engaged in implementing the CLUD through the establishment of implementation and monitoring committees, Land and Resource Forums, and an EBM working group.

Where specific protected areas have been designated by legislation or by order-in-council, these areas are deducted from the timber harvesting land base (THLB) and are not considered to contribute any harvestable volume to the timber supply in AAC determinations. They may, however, contribute indirectly by providing forest cover to help in meeting resource management objectives such as for biodiversity.

For the area of TFL 45, the CLUD and SCCMO and amendments have resulted in the designation of conservancy areas and the implementation of EBM. The impacts of these decisions are accounted for in this determination to the extent that they can be forecast with reasonable confidence. Where appropriate, I will consider information on the types and extent of planned and implemented intensive silviculture practices 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 an urgent need to redetermine many outdated AACs. In any case, the data and models available today are improved from those available in the past, and undoubtedly they will provide for more reliable determinations.

Others have suggested that, in view of data uncertainties, the chief forester or I should immediately reduce some AACs in the interest of caution. Any AAC determination made by the chief forester or me, however, 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 have made 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 recent court decisions including those in 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 by 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 45. It is also independent of any decision by the Minister of Forests and Range with respect to subsequent allocation of wood supply.

Overall, in making AAC determinations, I am mindful of the chief forester's 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 the chief forester's responsibilities under the *Forest and Range Practices Act* and the *Forest Act*.

The role of the base case

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

For each AAC determination a timber supply analysis is carried out using an information package that includes 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 other forecasts provided, depends on the reliability of the data and assumptions incorporated into the computer model used to generate it. Much of what follows in the considerations outlined below is an examination of the degree to which the assumptions made in generating the base case forecast are realistic and current, and the degree to which the resulting predictions of timber supply must be adjusted to more properly reflect the current and foreseeable situation. These adjustments are made on the basis of informed judgment using currently available information about forest management, and that information may well have changed since the information package was assembled. Forest management data are particularly subject to change during periods of legislative or regulatory change, such as the enactment of the *Forest and Range Practices Act*; or during the implementation of new policies, procedures, guidelines, or plans.

Thus, in reviewing the considerations that lead to the AAC determination, it is important to remember that the AAC determination itself is not simply a calculation. Even though the timber supply analysis I am provided is integral to those considerations, the AAC determination is 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. Judgements that in part may be based on uncertain information are essentially qualitative in nature and, as such, are subject to an element of risk. Consequently, once an AAC has been determined, no additional precision or validation would be gained by attempting a computer analysis of the combined considerations.

Timber supply analysis

The 2007 timber supply analysis for TFL 45 (referred to below as the “timber supply analysis” or just the “analysis”) was conducted by Timberline Forest Inventory Consultants Ltd. (Timberline) on behalf of the licensee. Timberline used its proprietary timber supply model Critical Analysis by Simulation of Harvesting Version 6 (CASH6) to conduct the analysis. CASH6 uses GIS overlays to create multiple resultant polygons, which are used as the basic modelling units to create a variety of potential harvest unit configurations. The model can be used to project spatially-implicit or spatially-explicit timber supply forecasts. For this analysis the licensee used CASH6 in a spatially-implicit mode, which means that the model did not track the spatial relationship between cutblocks. Rather, it approximated the impact on the timber supply that would occur if spatial restrictions were implemented using forest cover constraints and adjacency rules. Based on a review by MFR staff, as well as my previous experience reviewing the results of this model, I am satisfied that the spatially-implicit version of CASH6 is capable of providing a reasonable projection of timber supply.

The analysis process commonly used for TFLs elsewhere was adapted to suit the particular situation on TFL 45. When the TFL 45 analysis was initiated EBM objectives had not been legally established. Rather than waiting for conventions for modelling EBM objectives to be developed, MFR and the licensee decided that the analysis could be expedited by (i) using existing data from the 2001 timber supply analysis and (ii) adjusting the 2001 harvest flow using available information on the impacts of EBM. The timber supply review took much longer than planned; however, and the 2007 SCCMO establishing EBM objectives was issued before the analysis was completed.

For TFL 45, the licensee; therefore, made an assessment of the 2007 SCCMO objectives and applied its own assumptions to model the netdown and cover constraints required by EBM. For some objectives, it did not model full implementation of the EBM objectives. In other cases, the licensee assumed that the resource value will be protected through implementation of other objectives, such as stand-level retention and riparian reserves. Interfor has committed to monitoring the SCCMO objectives and, if necessary, adjusting management assumptions in the next timber supply review.

After the SCCMO was issued in 2007, the licensee decided to update some of the 2001 data and to do a new base case analysis. Interfor improved the data used for the 2007 analysis by incorporating the following changes into the 2001 data set:

- The TFL area on West Thurlow Island (839 hectares) that was deleted under the *Forestry Revitalization Act* was removed from the contributing land base;
- The 1995 operability mapping was augmented with economic and other operability mapping;
- Some visual landscape inventory polygons were updated so as to adhere to the Government Action Regulation and a related ministerial order titled *Establishment of Scenic Areas and Visual Quality Objectives for the Campbell River Forest District*, December 14, 2005;
- The 2001 Ungulate Winter Range (UWR) mapping was replaced with UWR areas established by Order #U1-008 under the FRPA;
- The natural and managed stand yield curves were modified to reflect the Vegetation Resources Inventory (VRI) Phase II, Net Volume Adjustment Factor (NVAF) destructive sampling, and the VRI statistical adjustment;
- The VRI was updated for depletion due to harvesting and for growth to the end of 2004; and
- The report *Analysis and Enhancement of TFL 45 Inventories for Deriving Sensitive Soil and Hydrospheric Themes* was used to delineate active fluvial fans.

The base case provided in the timber supply analysis was intended to reflect current management practices, including the EBM objectives established by the SCCMO. The licensee conducted only one sensitivity analysis, to assess the impacts of the conservancies established under the CLUD.

Given that many harvest scenarios are possible, the harvest flow objectives for the base case included: (i) maintaining an initial harvest level of 188 000 cubic metres per year; (ii) decreasing the periodic harvest rate in manageable steps of 10 percent or less per decade, when decreases are required to meet resource management objectives or reach the long-term harvest level; (iii) not allowing the mid-term harvest level to fall below a level reflecting the productive capacity of the TFL; and (iv) maintaining even-flow in the long term with a non-declining growing stock. The productive capacity of the TFL was estimated from the maximum mean annual increment based on Variable Density Yield Prediction (VDYP) estimates.

The base case harvest for the first 20-year period is 188 000 cubic metres per year. The harvest then declines 11 percent per decade for two decades, reaching a low of 150 600 cubic metres per year by 2045. That level is maintained for a further seven decades, after which the harvest rises to a sustainable long-term level of 182 700 cubic metres per year. This long-term harvest level is 7.4 percent below the theoretical long run sustained yield (LRSY) that could be achieved if the mean annual increment was maximized.

In the 2001 analysis, which supported Management Plan No. 4 and the last AAC determination effective 2001, the base case projected an initial harvest level of 220 000 cubic metres per year, which was maintained for 30 years. The harvest level then declined by eight percent per decade for two decades to 186 200 cubic metres per year; was maintained at that level for five decades; and then rose to a long-term harvest

level of 210 000 cubic metres per year. The main changes in the new base case relative to the previous one are: (i) the area of the current THLB is 13 percent smaller; (ii) the overall estimated timber volume on the TFL increased by 12 percent as a result of ground-based sampling of stands since 2001; and (iii) the new base case excludes the 839 hectares deleted from the TFL under the *Forestry Revitalization Act*.

From my review of the timber supply analysis, including discussions with MFR analysts about the differences between this analysis and the 2001 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 one sensitivity analysis carried out using the base case as a reference, and supplemental analysis work. This and other information noted below have been helpful in the considerations and reasoning leading to my determination.

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

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

As previously noted, in this document I will not discuss numerous factors for which I accept the modelling assumptions applied in the base case. Those factors are listed in Table 1, grouped according to the section of the *Forest Act* to which they apply. The licensee's information package and analysis report contains more information on each of these factors.

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

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

Forest Act section and description	Factors accepted as modelled
8(8)(a)(i) Land base contributing to timber harvesting	Non-forest areas Non-productive areas Non-commercial brush areas Deciduous stands Low productivity stands
8(8)(a)(i) Composition of the forest and expected rate of growth	Aggregation procedures Unmanaged stand yields Managed stand yields Operational adjustment factors (OAFs) Minimum harvestable age Harvest sequencing
8(8)(a)(ii) Expected time for the forest to be re-established following denudation	Not satisfactorily restocked (NSR) Impediments to prompt regeneration
8(8)(a)(iii) Silvicultural treatments to be applied	Regeneration Fertilization Juvenile spacing
8(8)(a)(iv) Standard of timber utilization and allowance for decay, waste, and breakage	Utilization standards Decay, waste, and breakage
8(8)(a)(v) Constraints on the amount of timber produced by use of the area for other purposes	Culturally modified trees (CMT) Important fisheries watersheds Aquatic habitat that is not high-value fish habitat Upland streams Riparian reserves and management zones Fisheries sensitive zone Red-listed and blue-listed plant communities Stand-level retention Sensitive grizzly bear habitat Adjacency considerations Ungulate winter range (UWR) Visual quality considerations Recreation Slope stability

	Watershed considerations
8(8)(a)(vi) Other information	Public review
8(8)(b) Short and long-term implications of alternative rates of timber harvesting from the area	Alternative rates of harvest
8(8)(d) Economic and social objectives of the government	Community dependence

Section 8 (8)

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

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

Land base contributing to timber harvesting

- general comments

The total area of TFL 45, as estimated from the licensee’s inventory file, is 230 997 hectares. About 167 032 hectares are considered non-forest or non-productive forest. In the analysis this area was deducted from the total area, leaving 63 965 hectares of productive forest land.

As part of the process used to define the timber harvesting land base (THLB) – the land base estimated to be biologically and economically available for harvesting – a series of area deductions was made from the productive forest land base. These deductions account for the factors that effectively reduce the suitability or availability of the productive forest area for harvest due to social, ecological, or economic reasons. For TFL 45 these reductions result in a current THLB of 22 470 hectares, which means that 41 495 hectares of productive forest (nearly 65 percent) are unavailable for timber harvesting for a variety of reasons.

The current THLB is 13.2 percent smaller than the land base assumed in the 2001 determination. Several factors contributed incrementally to cause this decrease.

- conservancies

Between 2006 and 2008, three conservancies covering portions of TFL 45 were established to implement key elements of the CLUD. Timber harvesting is prohibited in conservancies under the *Park Act*.

The Hunwadi/Ahnuhati-Bald Conservancy was established in 2006 and covers approximately 34 532 hectares. This has become known as Part 1 of the Hunwadi/Ahnuhati-Bald Conservancy. The Dzawadi/Klinaklini Estuary Conservancy was designated in the spring of 2007. It contains 189 hectares of land and 440 hectares of foreshore for a total of 629 hectares. The Phillips Estuary/¿NACINUXw Conservancy was designated in the spring of 2007. It contains 1382 hectares of land and 79 hectares

of foreshore for a total area of 1461 hectares. Finally, an area of 20 891 hectares was designated as Part 2 of the Hunwadi/Ahnuhati-Bald Conservancy in the spring of 2008, bringing the total area of the conservancy to 55 423 hectares. Part 2 of the Hunwadi/Ahnuhati-Bald Conservancy does not overlap with TFL 45.

As noted above in *History of the TFL and AAC*, in September 2006, the chief forester ordered that the AAC for TFL 45 be reduced by 9000 cubic metres until the area corresponding to Part 1 of the Hunwadi/Ahnuhati-Bald Conservancy ceases to be a designated area. The reduction of 9000 cubic metres is based on the proportion of the 2001 THLB covered by Part 1. Because the other conservancies were established about the same time or after the licensee started preparing its GIS database for the base case, the conservancies were left in the land base for the base case analysis.

The licensee conducted a sensitivity analysis with the three conservancies excluded from the land base to assess the effects on the timber supply. The sensitivity analysis showed a three percent decrease in the harvest across the forecast period.

Because the conservancies are not excluded from the base case THLB, I conclude that the base case overestimates the harvest level by approximately three percent throughout the forecast period. The overestimate in the short term amounts to 5600 cubic metres per year.

- economic and physical operability

Portions of the TFL are not physically accessible for harvesting or are not expected to be feasible to harvest economically. These areas are categorized as inoperable and are excluded when deriving the THLB.

To identify inoperable areas for the purposes of the analysis, the licensee used the operability assessment for TFL 45 that was completed in 1994 and approved by the MFR in 1995. In 2000, following map conversion from North American Datum (NAD) 27 to the Terrain Resource Inventory Mapping (TRIM) NAD 83 base, some minor adjustments were made to the operability maps to ensure operability classes were correctly identified. Additional projects were completed in 2001 and 2006 to assess economic operability on TFL 45, but the results of the 2006 project were not used in the analysis due to its limited scope. Instead, in 2005 and 2006, the licensee's staff used maps from the 2001 project and local knowledge to identify additional areas where the current economic value is limited. These areas were removed from the THLB, resulting in a 2219 hectare decrease in the THLB as compared to the operability deduction assumed in the 2001 analysis.

Four operability categories were included in the 1995 operability mapping: conventional, helicopter, marginal stands, and inoperable. Areas identified as being harvestable using conventional and helicopter harvesting systems were included in the THLB for the current base case, while marginal stands and inoperable areas were excluded. The excluded area amounted to 28 950 hectares after other previous reductions.

I accept that the operability mapping used in the analysis was the best available information and is suitable for use in this determination. I note; however, that information submitted by the licensee shows that 18 percent of harvesting in the TFL between 2001 and 2008 occurred in areas mapped as marginal or inoperable. This

suggests that some additional amount of area should likely be included in the THLB. On the other hand, the impact of EBM on forest operability and operating costs, which is as yet not known, is expected to reduce the economic timber supply to some degree. Nonetheless, I conclude the operability assessment may have underestimated the size of the THLB to a significant but uncertain amount, and I consider this in my *Reasons for Decision*.

- roads, trails and landings

During timber supply analysis, a percentage of the productive forest otherwise considered available for harvesting is excluded from the THLB to account for the loss of productive forest as a result of the construction of roads, trails, and landings. To reflect both current access and anticipated road requirements over time, separate estimates were made for: (1) roads that existed as of 2001; and (2) roads built since then plus expected future roads, trails and landings. These estimates reflect both potential changes in road building practices and road network requirements over time, and the access that the existing network of roads will provide for future harvesting operations. Estimates account for the area that is permanently removed from the THLB.

1) existing roads, trails and landings

Existing roads for the TFL as of 2001 are in the licensee's Geographic Information System (GIS) database as line features. They were classified by road type based on the licensee's familiarity with the TFL. The licensee assumed a non-productive road width of 12 metres for mainline roads. For branch roads, the non-productive road width was estimated based on measurements of built road on the TFL, as surveyed in 1996/97. Application of these width estimates to the road lengths identified in the GIS database resulted in 827 hectares of productive forest land being excluded from the timber harvesting land base.

Although trails are constructed on the TFL for harvesting some stands, the soil on these trails is not excavated. Therefore, the licensee assumed no degradation associated with their construction and use. Landings may be necessary on the TFL for landing helicopters and some conventional yarding situations. According to the licensee, legislation encourages operators to limit the size of newly developed helicopter and conventional landings and other disturbances such as rock quarries and spoil sites. Therefore, Interfor assumed that no additional reduction for these areas was necessary.

District staff have reviewed the reductions applied in the analysis to account for existing roads, trails, and landings; and indicate that they adequately represent current conditions on the TFL. I have reviewed the available information and am satisfied that the exclusions applied in the base case adequately account for timber harvest area lost due to existing roads, trails, and landings.

2) future roads, trails and landings

To account for future (post-2001) roads, trails, landings, quarries, and spoil sites, the licensee reduced the area of each harvested unit that was older than age 40 years by five percent the first time it was harvested in the model. This percentage was based on a

review of silviculture prescriptions and field verification of a sample of cutblocks logged from 1998 to 2000. That review indicated that the reduction percentage should be six percent, but the licensee reduced it to five percent to account for the results of watershed restoration projects conducted by the licensee in the 1990s using Forest Renewal BC funds. The licensee's assumption was that future watershed restoration projects will rehabilitate about one percent of the area of roads, trails, and landings identified in silvicultural prescriptions. Although there have been no recent restoration projects, the licensee expects them to restart due to growing risks from a backlog of non-rehabilitated roads.

The total deduction for future roads, trails, and landings was 595 hectares, which is 420 hectares less than the deduction made in 2001 for the same factor. According to the licensee, the reduction made in the 2001 analysis was incorrect and should have been smaller.

The licensee provided information that showed the area of productive forest lost due to roads, trails, and landings in conventionally harvested cutblocks on the TFL is 6.4 percent. Although this is slightly higher than the five percent factor assumed by the licensee for future roads, trails, and landings, it would be offset by the very low percentage of disturbance associated with cutblocks harvested using helicopters.

Having reviewed the methodology and deductions applied in the base case, I conclude that the reductions to account for future productivity losses are adequate for this determination. Because changes in the estimate for future roads, trails, and landings will affect projections of long-term timber supply, I repeat the previous deputy chief forester's 2001 request that the licensee review the data and methodology used to account for this factor and develop a more definitive approach for the next analysis for TFL 45. I am especially concerned that the information for trails and landings be improved, and that the effects of watershed restoration projects on the productive capacity of rehabilitated areas be better described and quantified.

Existing forest inventory

In 2000, Interfor completed Phase 1 of a VRI for TFL 45, consisting of mapped polygons and photo interpreted attributes. Phase 2 ground sampling was completed in 2002, fulfilling a request made by the former deputy chief forester in 2001, and was used to correct for bias in interpretation. Net volume adjustment factor (NVAF) sampling was completed and audited in 2004; and the final statistical adjustment was completed in 2005. The VRI and the attribute adjustment procedure was reviewed and approved by MFR staff.

For this analysis, the forest inventory was updated for harvesting disturbances and projected in age and height to the end of 2004.

Compared to the estimate from the VRI Phase 1, the Phase 2 and NVAF sampling resulted in volume increases of 52 percent for immature stands and four percent for mature stands on the TFL, leading to an overall increase of 12 percent in timber volume. MFR staff note that the impact of the volume adjustment in young stands is high, and will be maintained when these stands are projected into the future.

I have considered the information regarding the forest inventory and given that MFR Forest Analysis and Inventory Branch staff accepted it, I am satisfied that it is the best available information for this determination.

Expected rate of growth

- site productivity

Inventory data include estimates of site productivity for each 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.

For the purpose of this analysis, the licensee obtained site index values from the VRI inventory database and, for the Coastal Western Hemlock biogeoclimatic zone only, from a Site Index Adjustment (SIA) project conducted for the licensee in 2000. The assignment of site indices for all polygons in the base case has been accepted by Research Branch staff.

As the site indices used in the analysis for TFL 45 are based on the VRI plus local ground sampling to adjust the site index estimates, I conclude that this provides a solid basis for site index inputs to the modelling and that the data used by the licensee are the best available.

- (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. In timber supply analysis, regeneration delay is used to determine the starting point of tree growth for projecting stand volumes.

Interfor used an area-weighted regeneration delay for each silviculture management regime assumed in the timber supply analysis. The regeneration delay ranged from one to six years depending on the site series and whether the regeneration was planted or natural.

District staff have reviewed the regeneration delays and indicate that they appear to be consistent with, or even overestimate, the actual delays experienced in the field. In the absence of clear evidence on this matter, I accept that the regeneration delays as modelled are the best available information and reflect current practice.

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

Silvicultural treatments to be applied

- use of select seed

The licensee plans to plant select (Class A) Douglas-fir seed in 26 percent of future stands in which Douglas-fir is expected to be the leading species. The licensee estimates the volume gain from this seed to average one percent for Douglas-fir leading stands.

Based on information from MFR staff on the demonstrated genetic gain from select seed used in other areas, it appears that the one percent genetic gain modelled in the base case is too low. According to MFR's Tree Improvement Branch, the genetic gain for Class A Douglas-fir seed is at least six to ten percent. Furthermore, volume gains associated with the use of this seed are improving and it appears likely that select seed will be used more often in future. As a result, I conclude that the timber supply is underestimated in the mid-term and long-term by an unquantified amount, and I have considered this below in *Reasons for Decision*.

In the analysis for the 2001 AAC determination, the licensee also underestimated the genetic gain from use of select seed. For the next determination, I request that better information be provided on how genetic gain is estimated and accounted for in the analysis.

- silvicultural systems

Variable retention and even-aged management using clearcutting are the only silvicultural systems used on TFL 45 and were the only systems modelled in the base case. Variable retention is used to meet management objectives for biodiversity, visual quality, wildlife habitat, and terrain stability. It is also employed to allow some timber to be harvested in environmentally sensitive areas, riparian buffers, wildlife management zones, and visually sensitive areas where clearcutting—the other common silvicultural system used on TFL 45—would not be considered.

In the management plan associated with the 2001 AAC determination, the licensee estimated that variable retention (VR) silviculture would be applied to about 50 percent of the THLB. Experience since 2001 has shown, however, that much less than 50 percent of the harvesting has been VR. The licensee reports that over the past three years in only three of 62 different units more than 10 percent of the basal area of the original stand was retained after harvesting. Where VR has been used, usually single trees or patches of trees have been retained, with little impact on growth and yield.

In the base case, the licensee applied volume reductions of three percent for variable retention and five percent for Wildlife Tree Patches (WTPs), which are discussed further under *Stand-level biodiversity*. This resulted in an overall eight percent volume reduction to all yield curves to account for the combined effects of retaining trees under the variable retention silvicultural system and in WTPs.

In reviewing the variable-retention yield reductions, staff from MFR's Research Branch noted that no reductions were applied to the yield tables to account for the effect of shading of regeneration by retained overstory trees. They also noted; however, that such

shading significantly affects growth only when retention exceeds 15 percent, which is much higher than the usual retention level on TFL 45.

I have considered the information and assumptions regarding silvicultural systems and am satisfied that current practice was reasonably reflected in the base case.

- (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,**

As noted in Table 1, I accept as modelled the factors usually considered under this section, and I will not discuss them further.

- (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 realisation of fisheries, wildlife, water, outdoor recreation, and other natural resource values are co-ordinated 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.

- ecosystem-based management

The CLUD established EBM as the new management system for TFL 45. EBM legal objectives as established in the SCCMO and amendments cover many of the non-timber values referenced in the *Ministry of Forests and Range Act*, including traditional heritage resources, aquatic habitats, landscape and stand-level biodiversity, and sensitive grizzly bear habitat. At present; however, there are no inventories of some of the resources that must be maintained or protected to meet the EBM objectives.

The SCCMO provides the option for licensees to vary from certain objectives in the SCCMO under specific circumstances. For the TFL 45 analysis, Interfor chose to exercise that option for a number of the factors it modelled, which are discussed further in the following sections.

Because EBM is a relatively new concept that is in the early stages of implementation in TFL 45 and other coastal management units, there is considerable uncertainty about its implications for the future timber supply. MFR staff advise me, for example, that they expect EBM to reduce the economic timber supply to some degree, due to its impact on operating costs and; therefore, forest operability. One method that the licensee has committed to employing to reduce the uncertainty is to monitor and evaluate the implementation of EBM under adaptive co-management principles. It has stated that it will adjust management assumptions in the next timber supply review if results indicate that to be necessary.

Based on my review of the information available to the licensee at the time of the analysis, I accept the licensee's overall treatment of EBM in the base case, with certain exceptions that I have noted in the following sections. I conclude that significant uncertainty exists concerning the future impact on the timber supply of EBM when it is fully implemented, which I return to in my *Reasons for Decision*.

- *the March 27, 2009 amendment to the SCCMO*

The land use objectives for the South Central Coast were legally amended effective March 27, 2009. These amendments took into account input received during the public review and comment period from December 19, 2008 to February 16, 2009.

Of all the amendments, I expect only those pertaining to objectives for high-value fish habitat and for landscape-level biodiversity to significantly affect timber supply on TFL 45. I will discuss those amendments in the corresponding sections below.

- *First Nations traditional forest resources*

The intent of the SCCMO objective for First Nations traditional forest resources is to maintain those resources in a manner that allows continued use for food, social, and ceremonial purposes. In the analysis, the licensee assumed that implementation of other SCCMO objectives covering stand-level retention and high-value fish habitat will maintain First Nations traditional forest resources. No inventory of these traditional resources is available for the TFL, but a search of the Remote Access to Archaeological Data (RAAD) website by MFR staff revealed many archaeological features located in TFL 45 and within the asserted traditional territory of the First Nations. The majority of these features are bark-stripped culturally modified trees (CMT).

According to the licensee, if and when a First Nations traditional forest resource is known or found within a proposed operating area, consultation occurs and a buffer may or may not be required or established after the consultation.

I am satisfied that a process is in place to address First Nations traditional forest resources, and that this factor is adequately modelled in the base case.

- *First Nations traditional heritage resources*

The intent of the objective for First Nations traditional heritage resources is to protect traditional heritage features, other than culturally modified trees, within areas proposed for forest development activities; and include a management zone of sufficient size to protect the integrity of the feature.

An archaeological overview assessment and traditional use study has been conducted on the North Island – Central Coast Forest District portion of the TFL, but there has been no inventory of First Nations traditional heritage features on the Campbell River district portion of the TFL 45. According to the licensee, if and when a First Nations traditional heritage feature is known or found within a proposed operating area, consultation occurs and a buffer may or may not be required or established after the consultation.

In the base case, the licensee assumed that implementation and accounting of other SCCMO objectives will overlap with First Nations traditional heritage resources. I am

satisfied that a process is in place to address to First Nations traditional heritage resources, and that this factor is adequately modelled in the base case.

monumental cedar

The SCCMO specifies an objective for monumental cedar for First Nations use, the intent of which is to maintain a sufficient volume to support present and future cultural uses. The K'omoks First Nation has explicitly stated that they consider long-term access to monumental cedar of the utmost importance. They intend to work closely with the MFR and the licensee to identify sources of this material throughout their traditional territory. Other First Nations, including Campbell River, Cape Mudge and Kwiakah have expressed similar concerns.

I am aware that maps and summaries of red and yellow cedar by height and age class were compiled by the staff from the Campbell River Forest District in 2004. This data has been shared with the Campbell River, Cape Mudge and Kwiakah First Nations. It indicates generally where these species might be found but it is not specific to monumental cedar. Due to the lack of inventory data for monumental cedar, the THLB derived in the analysis did not include netdowns for this resource. District staff have offered to work with First Nations to develop a cedar strategy that could include refining the inventory.

According to the licensee, initial discussions with local First Nations and involvement with their detailed strategic planning process have produced some tentative cedar log specifications to define First Nations cultural cedar requirements. Based on these discussions, the licensee has committed in its forest stewardship plan to making 200 cubic metres of its AAC available for First Nation's use of monumental cedar.

I have considered the information provided on monumental cedar and conclude that this factor was not accounted for in the base case analysis. I understand that quantifying the objectives for monumental cedar for the purposes of timber supply is difficult at this time. For this determination, I have considered the impacts of accounting for monumental cedar in conjunction with the following factor on western redcedar and yellow-cedar as noted in the *Reasons for Decision*. I consider it extremely important that First Nations are provided with access to an agreed upon annual volume of monumental cedar. This commitment should continue to be recognized in the licensee's Forest Stewardship Plan for TFL 45 and its operational activities (see *Implementation*).

stand-level retention of western redcedar and yellow-cedar

The SCCMO sets an objective of maintaining a sufficient volume and quality of western redcedar and yellow-cedar to support First Nations cultural use of those species. The intent is to ensure sufficient western red and yellow-cedar to support the First Nations' present and future cultural and social uses.

In the analysis, the licensee did not explicitly model retention of cedar. Instead, it assumed that constraints for stand-level retention, including wildlife tree patches (WTPs) and variable retention will suffice to provide for these species. The licensee has stated that it will monitor implementation of this objective over the next five years, and will use

adaptive co-management (ACM) principles to adjust management assumptions in the next timber supply review if needed.

As with monumental cedar, the K'omoks First Nation considers long-term access to western redcedar and yellow-cedar to be of the utmost importance. They intend to work closely with the MFR and the licensee to identify the long-term source of this material throughout their traditional territory. Other First Nations have expressed similar concerns.

Both MFR and MOE staff noted that it is important to provide a long-term supply of these species for future generations, and that requires more than maintaining old trees in the short term through stand-level retention.

After considering the information provided on stand-level retention of western redcedar and yellow-cedar, I conclude that the base case overestimates the timber supply by a small but unquantified amount over the forecast period because the assumptions for stand-level retention and variable retention in the base case may not maintain a sufficient volume and quality of western redcedar and yellow-cedar to support First Nations cultural use of those species, and I have accounted for this in *Reasons for Decision*. For the next analysis, the licensee should provide improved information on the supply of these species to determine if its assumption is correct that a sufficient amount will come from current stand-level retention practices.

- high-value fish habitat

In the 2007, SCCMO, high-value fish habitat is defined as areas used by anadromous and non-anadromous fish as critical spawning and rearing habitat; including estuaries, wet flood plains, and marine interface areas. The SCCMO objective for high-value fish habitat is to maintain a reserve zone 1.5 times as wide as the height of the dominant trees, and to not alter or harvest the forest in the reserve zones unless there is no practicable alternative. The SCCMO specifies that the width of the reserve zone in any one location may be increased or decreased by up 0.5 tree-heights to address site-specific values, including reserving critical habitat for species at risk. The March 27, 2009 amendment to the objective for high-value fish habitat adds a requirement for a 100 metre wide reserve zone on each side of the lower portion of the Klinaklini River in TFL 45.

The intent of these objectives is to protect hydroriparian ecosystems which contain high-value fish habitat and maintain or accelerate the natural ecological progression towards late seral structural conditions in forests adjacent to high-value fish habitat. Riparian forests adjacent to high-value fish habitat are reserved sufficiently to protect functions and habitat values from agents such as wind throw. Where such forests were damaged or removed in the past, recruitment of functional riparian forest is to be a priority.

In the 2008 analysis, in anticipation of these requirements, the licensee modelled a 50-metre riparian reserve zone on each side of the Klinaklini River, and a buffer along high-value fish streams that was 1.35 times average tree-height rather than the 1.5 times specified in the SCCMO. It assumed that the flexibility provided in the SCCMO to reduce the buffer would always apply and; therefore, reduced the buffer along high-value

fish streams by 10 percent. For marine shorelines, the licensee also modelled a buffer 1.35 times the average height of dominant trees in stands bordering the ocean.

MOE staff advise that the intent of the flexibility provided in the SCCMO is to allow for special management in certain specific circumstances, not to reduce the buffer width everywhere. They state that where a buffer is narrowed in one area it should be widened elsewhere to compensate. They also are concerned that all fish streams have not been mapped on TFL 45 and; therefore, the impact of the reserves for high-value fish habitat may be underestimated.

The licensee states, however, that since the 2008 analysis a refined definition and a system for identifying high-value fish habitat have been developed, and that much of the uncertainty surrounding it has been resolved. Based on this information, Interfor believes that in the base case the area reserved as high-value fish habitat was significantly overestimated.

Another consideration that I deem it appropriate to account for is the additional impact of the 100 metre buffer along the lower Klinaklini River required under the March 27, 2009 amendment to the SCCMO objective. MFR staff advise that even though this buffer is expected to overlap to some extent with other reserves modelled in the base case, it is expected to exert a significant but unquantified downward pressure on the timber supply over the forecast period.

Having reviewed the information provided on high-value fish habitat, I conclude that on this account the timber supply has been overestimated by an unquantified but significant amount over the forecast period and I have considered this in my *Reasons for Decision*. For the next analysis the licensee should improve the information on the extent of high-value fish habitat and it should model the buffer widths in accordance with the SCCMO.

- forested swamps

The SCCMO objective for forested swamps is to retain 70 percent of the functional riparian forest in a management zone having a width, on average, equal to 1.5 times the height of the dominant trees adjacent to forested swamps greater than 0.25 hectares. The intent is to maintain the natural ecological function of forested swamps. Licensees are directed to manage riparian forest adjacent to those ecosystems in a manner that sustains hydrological processes and the ecological composition, structure, and function of those forests.

For the 2007 analysis Interfor buffered all polygons interpreted as forested swamp based on criteria from terrestrial ecosystem mapping of TFL 45. Within the buffers, the licensee modelled retention of 35 percent of the functioning forest. The remaining 35 percent was expected to be retained through the provisions for stand-level retention, plus other non-contributing forested areas. After accounting for other deductions from the THLB that overlapped with forested swamps, an additional 52 hectares were excluded from the THLB.

MOE staff expressed concern that the licensee modelled only 35 percent retention for forested swamps. They consider it to be unclear from its WTP strategy whether Interfor

has reserved enough forest overall to meet the objectives for both stand-level retention and forested swamps. I note that no analysis has been done by the licensee to support the assumption that the additional 35 percent retention of functional riparian forests required adjacent to forest swamps will be covered by stand-level retention or non-contributing forested areas.

Having reviewed this information with MFR and MOE staff, I conclude that on this account the THLB has been overestimated over the forecast period by 52 hectares, and I discuss this further under *Reasons for Decision*.

- *active fluvial units*

The SCCMO objective for active fluvial units is to retain 90 percent of the functional riparian forest on active fluvial units. An additional 10 percent of the forest on an active fluvial unit may be harvested, provided sufficient bank stability is retained, First Nations are consulted, and the impacts are monitored under an adaptive management plan. The intent of this objective is to maintain the integrity and natural ecological function of active fluvial units.

Active fluvial units were identified on TFL 45 using the TFL's terrestrial ecosystem mapping as an analysis base. Results are documented in the report *Analysis and Enhancement of TFL 45 Inventories for Deriving Sensitive Soil and Hydroriparian Themes*.

The licensee modelled only 81 percent retention of the functional riparian forest rather than the 90 percent retention specified in the SCCMO, as it assumed that it could always harvest the additional 10 percent that is allowed under the SCCMO if bank stability is maintained. After accounting for other deductions from the THLB that overlapped with forested swamps, an additional 382 hectares were excluded from the THLB on this account.

MOE staff and MFR district and branch staff expressed concern; however, that Interfor may have been too optimistic in expecting to maintain bank stability in all areas. They stressed that the flexibility in the SCCMO was designed to account for specific extenuating circumstances and should not be applied in all instances. MOE staff state that in some instances the buffer may need to be increased to protect especially sensitive sites.

I have reviewed the information provided on active fluvial areas, and I conclude that the reduction applied for active fluvial units is not consistent with the intent of the SCCMO objectives. The difference represents a small, about 42 hectares overestimation, in the size of the base case THLB over the forecast period and I have accounted for this in my *Reasons for Decision*.

- *biological diversity*

Biological diversity, or biodiversity, is defined as the full range of living organisms in all their forms and levels of organization; and includes the diversity of genes, species, ecosystems, and the evolutionary and functional processes that link them. Biodiversity in a given management unit is usually assessed and managed at the level of both the forest

stand and the landscape. Although some general forest management practices can broadly emulate the natural processes within most ecosystems, more often a variety of practices is needed to represent the different natural disturbance patterns under which ecosystems have evolved.

A major consideration in managing for biodiversity at the landscape level is leaving sufficient and appropriately located mature forests for species dependent on, or strongly associated with, old-growth forests. At the stand level, retention of WTPs and coarse woody debris are the major biodiversity concerns. Maintenance of certain rare or threatened ecosystems, as represented by plant communities on the red- and blue-lists of the MOE, is another issue needing attention.

As noted in Table 1, I accept the modelling assumptions applied in the base case for red-listed and blue-listed plant communities and for stand-level retention.

In the analysis the licensee assumed that landscape-level biodiversity would be protected through implementation of the pertinent 2007 SCCMO objectives, which require that:

- For each landscape unit, an amount of old forest be retained equal to or greater than specified for each site series surrogate listed in schedule 3 of the 2007 SCCMO. Where there is less old forest in a landscape unit than required, forest is to be recruited to meet the representation requirements within 180 years.
- In each landscape unit, less than 50 percent of each site series surrogate listed in schedule 3 of the SCCMO is to be maintained in mid-seral forest age classes. Where more than 50 percent of any site series surrogate is in mid-seral forest age classes in any landscape unit, the mid-seral forest age classes in that site series surrogate are to be reduced to less than 50 percent within 80 years.
- Within the old forest retention areas, habitat elements important for species at risk, ungulate winter range, and regionally important wildlife are to be included to the extent practicable.

The intent of the SCCMO is to maintain or recruit the amount of old forest in each ecosystem type that would normally exist under conditions of natural disturbance; to limit the amount of mid-seral forest that is present across the landscape unit at any one time; and to reduce the amount of mid-seral forest where it currently exceeds desired levels.

The March 27, 2009 amendments to the SCCMO objectives for landscape-level biodiversity changed the definition of old forest from “a stand of trees 180 years or older” to “a stand of trees 250 years or older”. This will decrease the amount of timber available for harvesting on TFL 45. Also, the targets for site series surrogates have been revised, further constraining the timber supply from the TFL. MFR staff advise that the combined effects of the amended objective for landscape-level biodiversity are expected to result in a significant downward pressure on the timber supply.

In the analysis, the licensee modelled the objectives for landscape-level biodiversity by retaining old forest using the targets by site series surrogate as defined in schedule 3 of the 2007 SCCMO. The licensee did not model the required cover constraints for

mid-seral stands because the timber supply model (CASH) used for the analysis is not capable of modelling this type of constraint.

I consider that the lack of modelling of mid-seral cover constraints resulted in an unquantified, but probably small, overestimate of timber supply in the short- and mid-term. Under *Implementation* I request for the next determination that the licensee report specifically on the distribution of seral stages over time, either by using a different model capable of directly modelling seral stages or by using CASH runs to report on seral stage distribution at various time intervals over the forecast period.

I consider that the March 27, 2009 amendments to the SCCMO objective for landscape-level biodiversity will exert a small, unquantified but further downward pressure on the timber supply in the short term and I have accounted for this in my *Reasons for Decision*.

- wildlife habitat

TFL 45 provides habitat for many wildlife species, including grizzly and black bears, black-tailed deer, mountain goat; and various small mammal, bird, amphibian, and fish species. The biodiversity and riparian provisions of the FRPA are intended to provide for the needs of most wildlife species, but some species require special management practices. In consideration of the habitat requirements of these species, areas may be set aside from harvesting or a suitable distribution of forest cover may be maintained over time.

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

i) identified wildlife

'Identified wildlife' refers to two categories of wildlife designated by the Minister of Environment under FRPA. These categories are: (1) species at risk (i.e., species that are endangered, threatened, or vulnerable); and (2) regionally important species that rely on habitat that may be adversely impacted by forest or range practices on Crown land and that may not be adequately protected by other management strategies, such as those for biodiversity or riparian management. The establishment of these categories of species enables a number of provisions under FRPA to be used to manage habitat for identified wildlife, including Wildlife Habitat Areas (WHAs) and objectives and General Wildlife Measures and objectives.

The provincial government announced its Identified Wildlife Management Strategy (IWMS) Volume I in February 1999. The IWMS Version 2004 contains an updated list of identified wildlife, updated species accounts, and updated procedures for implementing the IWMS. Government has limited the impact of management for identified wildlife to a maximum of one percent of the short-term harvest level for the province.

IWMS Version 2004 indicates that eleven species of identified wildlife occur or may occur in the Johnstone Strait and Central Pacific Ranges Ecosections where TFL 45 lies: bull trout, Cassin's auklet, coastal tailed frog, fisher, great blue heron, grizzly bear, Keen's long-eared myotis, northern goshawk (*laingi* ssp.), marbled murrelet, sandhill crane, and wolverine. In addition, IWMS Version 2004 indicates that three plant communities identified as at risk may also be found on the TFL: western redcedar – Douglas-fir/devil's-club, western redcedar – Douglas-fir/electrified cat's-tail moss, and western redcedar – Douglas-fir/vine maple.

Habitat for grizzly bear and plant communities are covered by certain provisions of the SCCMO. Also, two wildlife habitat areas covering five hectares of the THLB have been established on TFL 45 to conserve habitat for coastal tailed frogs. The licensee did not exclude these WHAs from the THLB in the analysis. Interfor has made additional commitments within its forest stewardship plan for the establishment of WHAs for the marbled murrelet, great blue heron, red-legged frog, coastal tailed frog, and Keen's long-eared myotis.

MOE staff advise that they plan to pursue additional WHAs within TFL 45, and several hectares of the maximum THLB impact of one percent that government has allotted for WHA establishment are still available for designation. MOE staff consider that for modelling purposes Interfor should have allotted some area of the THLB to new WHAs and the protection of focal species under the SCCMO.

Furthermore, the Minister of Environment has issued a legal notice for species at risk under FRPA that sets an amount of forest land to be protected equal to the total amount of currently suitable marbled murrelet nesting habitat in the non-contributing land base. As noted above under *economic and physical operability*, Interfor in recent years has harvested 18 percent of its volume from inoperable and marginally operable areas on the non-contributing land base. Protecting the total amount of marbled murrelet habitat required by the species at risk notice may restrict where and how much Interfor can harvest both in areas that are currently classified as inoperable and, to a small extent, on the THLB.

I have reviewed the information regarding the analysis assumptions for identified wildlife. I consider that the analysis has not adequately reflected the operational requirements for this value, as management for the coastal tailed frog, marbled murrelet, and other identified wildlife has not been modelled. I therefore conclude that on this account the timber supply has been overestimated by one percent over the forecast period and I have accounted for this in my *Reasons for Decision*.

For the next analysis, I request the licensee to better define marbled murrelet habitat on the TFL, using either the latest version of the BC Coastal Marbled Murrelet Habitat Suitability Model or low-level aerial surveys.

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

Land use planning

As discussed above under *Guiding Principles for AAC Determinations*, the CLUD and SCCMO apply to and guide current management on the TFL. Under FRPA, the licensee must now provide results or strategies in its Forest Stewardship Plans that are consistent with the SCCMO 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 *First Nations traditional forest resources, monumental cedar, important fisheries watersheds, and landscape-level biodiversity*. Having reviewed the legal objectives under FRPA stemming from the SCCMO with MFR and MOE staff, I am satisfied that the analysis has appropriately accounted for this important consideration except where specifically noted in my consideration of specific factors.

Independent power projects

MFR staff advise that several independent power projects are proposed for rivers within TFL 45. These projects could affect the THLB in future by removing corridors along the penstocks and transmission lines from forest production. The magnitude of the potential impact on the THLB is unknown at present.

I have considered the potential impact of independent power projects on the timber supply for TFL 45 and, because of the uncertainty about the magnitude and the approval of projects, I have made no adjustment for this factor.

First Nations considerations

The following First Nations have asserted traditional territories within the TFL: Campbell River Indian Band (Wei Wai Kum Nation), Cape Mudge Indian Band (We Wai Kai Nation), Da'naxda'xw First Nation, Xwemalhkwa (Homalco) Indian Band, Kwiakah First Nation, K'omoks First Nation, Mamalilikulla-Qwe'Qwa'Sot'Em First Nation, and the Ulkatcho First Nation. The Campbell River Indian Band, Cape Mudge Indian Band, and the Kwiakah First Nation are members of the Laich Kwil Tach Treaty Society. The Da'naxda'xw First Nation is part of the Winalagalis Treaty Group.

The Laich Kwil Tach Treaty Society, the Xwemalhkwa Indian Band, the K'omoks First Nation, and the Winalagalis Treaty Group are at stage four of the B.C. Treaty Commission process and are negotiating an agreement in principle. Consistent with my guiding principles, I will not anticipate the impact of decisions that have not yet been made, such as treaty settlements. When those decisions are made, they can be factored into subsequent timber supply reviews and accounted for in future AAC determinations.

The Campbell River Indian Band, Da'naxda'xw First Nation, Mamalilikulla-Qwe'Qwa'Sot'Em First Nation, and the Ulkatcho First Nation have agreements on forest and range opportunities; the K'omoks Cape Mudge and Xwemalhkwa First Nations have a forest and range agreement.

I am aware that the licensee conducted information sharing regarding the timber supply review process with the First Nations that have asserted traditional territory within

TFL 45, and with the Laich Kwil Tach Treaty Society. Interfor provided its *Timber Supply Review Information Package and Timber Supply Analysis Report #5* to these groups on April 23, 2008 and asked for comments by June 25, 2008.

The Laich Kwil Tach Treaty Society responded to the licensee in a letter dated June 24, 2008 stating their concerns with the *Timber Supply Review Information Package and Timber Supply Analysis Report #5*. Their concerns were:

- Government is obligated to make an initial assessment of First Nations rights and must not only engage in meaningful consultation, but must also seek an accommodation of First Nations interests (including cultural and economic ones).
- The traditional territories of the Campbell River Indian Band, Cape Mudge Indian Band, and the Kwiakah First Nation are the most important part of the culture and traditions of the people; and
- They are concerned that operations on the TFL will infringe upon their member nations' aboriginal rights and title.

The K'omoks First Nation responded with concerns that long-term access to monumental cedar and other cultural use cedar (western redcedar and yellow-cedar) is of utmost importance. In addition, they emphasized the importance of maintaining and ensuring sustainability of values such as fish, water quality, wildlife, riparian management, and sensitive soils; and stated its opposition to the use of herbicides on the TFL.

Furthermore, they stressed the importance of reducing the AAC so that it is closer to the long-term harvest level of 182 700 cubic metres per year, and to minimize the harvest reductions that are forecasted to occur in decades three and four.

In response to the comments from the Laich Kwil Tach Treaty Society and the K'omoks First Nation, the licensee emphasized that the analysis report is used to support the AAC determination, but it does not authorize operations on the ground. The licensee referred to the planning process for field operations and stated that discussions that are part of their Forest Stewardship Plan commitments will allow them to further identify and deal with a variety of important resource issues. The licensee also referred to the SCCMO objectives and advised that these objectives are addressed in its Forest Stewardship Plan, and will also be considered by the deputy chief forester in her AAC determination.

I concur with the licensee's response and I encourage the licensee to continue working with the Laich Kwil Tach Treaty Society's member nations as well as other First Nations as part of the planning process for their Forest Stewardship Plan. First Nations participation at the operational planning phase will assist in identifying their aboriginal interests. Their participation and the implementation of the SCCMO objectives and operational plans will help address potential infringement on their aboriginal rights and title.

MFR regional staff initiated the consultation process on December 8, 2008 in a letter to the First Nations with asserted territory within TFL 45, and to the Laich Kwil Tach Treaty Society. The First Nations groups were requested to provide information during the three-month period from December 8, 2008 to March 8, 2009 on how their aboriginal interests may be affected by an AAC determination for TFL 45.

The Laich Kwil Tach Treaty Society responded in a letter dated February 13, 2009 reiterating their concerns expressed in their June 24, 2008 letter to Interfor.

Staff from the North Island – Central Coast Forest District report that they undertook consultation on the proposed decision with the Da'naxda'xw, Mamalilikulla–Qwe'Qwa'Sot'Em and Ulkatcho First Nations. During the licensee-led information sharing process and the subsequent MFR-led consultation, these three First Nations did not express any concerns related to the timber supply review for TFL 45 nor the proposed AAC determination.

Staff from the Campbell River Forest District undertook consultation with the Xwemalhkwa, K'omoks, Kwiakah, Cape Mudge and Campbell River. In addition, district staff corresponded and met with representatives of the Laich Kwil Tach Treaty Society including chiefs of the Kwiakah, Cape Mudge and Campbell River First Nations.

Campbell River Forest District staff report that:

- At a meeting with MFR staff held on March 16, 2009, representatives of the Xwemalhkwa Indian Band indicated that they are currently updating their Traditional Use Study and Archaeological Overview Assessment. They asked that the resulting information be considered in current and future MFR decisions. Other issues unrelated to the AAC determination were also discussed at the meeting, including how they can increase their allocation of timber.
- In an email dated April 15, 2009 a representative of the K'omoks First Nation wrote that comments stated in their July 18, 2008 letter to Interfor expressed their concerns and that no further comments would be forthcoming.
- The Kwaikah First Nation referred district staff to the Laich Kwil Tach Treaty Society's letter to Interfor expressing concerns over possible infringement on First Nations rights and title.
- District staff met with the chiefs of the Kwiakah, Cape Mudge and Campbell River First Nations, along with a representative of the Laich Kwil Tach Treaty Society and their legal council on April 17, 2009 and May 19, 2009. The discussions were wide ranging and not entirely related to TFL 45. The issues discussed included inventories and availability of cedar, wildlife management, First Nations access to timber, availability of timber for housing, and how a statement of claim would be used by the MFR.
- In a letter dated May 22, 2009 to the MFR regarding the AAC determination, the Laich Kwil Tach Treaty Society asked district staff to advise the chief forester to: (1) to reduce the AAC for TFL 45 from 220 000 cubic metres to under 180 000 cubic metres and (2) to set aside areas and volumes of cedar to meet their interests, rights and title and to leave room for their treaty negotiations.

I have reviewed reports prepared by the licensee and district staff and I am satisfied that they have made reasonable efforts to share information and consult with First Nations on how their aboriginal interests could be affected by this AAC determination. Although a formal preliminary assessment was not conducted and shared with First Nations similar information was compiled near the end of the process. Based on that information I agree

with MFR staff that the level of consultation has been adequate. The scope of the consultation reflected and was commensurate with the assumption that many of the aboriginal interests asserted by the relevant First Nations likely would be strong over portions of their asserted traditional territories. Furthermore, opportunities were provided to all First Nations to share their concerns related to specific aboriginal interests that may be impacted by this decision.

Several First Nations have stressed the importance of cedar to their culture and expressed concern over the availability of cedar for their use. I note that the SCCMO requires that a sufficient volume and quality of western redcedar and yellow-cedar be retained at the stand level to support First Nations' cultural use. The SCCMO also requires that a sufficient volume and quality of monumental cedar be maintained. I do not have the legal authority to set aside specific areas and volumes of cedar as requested by the Laich Kwil Tach Treaty Society.

MFR staff have offered to work with First Nations to develop a cedar strategy that might include improving inventory information possibly through ground sampling. I encourage district staff to continue to work with First Nations and the licensee to develop such a strategy.

I am mindful that First Nation's traditional resources, traditional heritage features and culturally modified trees must be protected under the SCCMO. As I have discussed in this document I accept the licensee's overall treatment of the SCCMO objectives, including those for First Nations resources and features, with certain exceptions which I explain in my *Reasons for Decision*.

Some First Nations with asserted territory which overlap, at least in part, TFL 45 have expressed concern over the management and sustainability of fish, wildlife and other resources. I have considered these factors throughout this rationale and I am satisfied with the licensee's treatment of integrated resource management objectives in its analysis, with certain exceptions which I also explain in my *Reasons for Decision*.

The licensee has stated that the planning process for field operations will allow them to further identify and deal with a variety of important resource and forest management issues including the use of herbicides. I note that MFR district staff continue to be available to meet and consult with First Nations on specific issues that can be addressed at the operational planning level. I am satisfied that a process is in place to address concerns related to forestry operations that may affect aboriginal interests.

I am aware that discussions are in progress between the Laich Kwil Tach Treaty Society and staff from the Campbell River Forest District regarding the aboriginal interests of the Society's member nations. I also note that the Xwemalhkwa Indian Band is currently updating their Traditional Use Study and Archaeological Overview Assessment.

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

Harvest distribution by forest district

As noted in Table 1, I accept this factor as modelled. I repeat a concern that the previous deputy chief forester expressed in the 2001 determination; that is, I consider it feasible that disproportionately heavy harvesting in the Campbell River district in the short term might reduce the longer term timber supply if the North Island-Central Coast district's component of the TFL becomes significantly less economic. For the next timber supply review; therefore, I request the licensee to provide information on the forecast distribution of the harvest by forest district; including the profile of the harvest stratified by forest type, species, and productivity.

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

As noted in Table 1, I accept this factor as modelled in the analysis.

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

This provision of the *Forest Act* has been repealed, thus this factor is no longer a consideration in AAC determinations.

- (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,**

As noted in Table 1, I accept this factor as modelled in the analysis.

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

Unsalvaged losses

Numerous parasites, fungi and plants can kill trees or degrade the quality and value of logs. Unsalvaged losses are timber volumes destroyed or damaged by agents such as fire, wind, insects, and disease that are not recovered through salvage operations.

Estimates for unsalvaged losses account for epidemic infestations that are not incorporated into yield estimates used in the analysis. Timber volume losses due to 'normal' infestations (endemic losses) are accounted for in inventory sampling for existing timber yield estimation or through other methods. Similar losses associated with second-growth stands are addressed by application of operational adjustment factors accounted for in the analysis. Unsalvaged losses accounted for in the analysis for TFL 45 included fire, insects, and wind throw.

For the 2001 analysis Interfor and the MFR conducted a project to assess the unsalvaged volume lost to fire on the TFL. A ten-year fire history for the period 1988 to 1997 was obtained from the Fire Reporting System of the MFR Protection Branch. Over those ten years, a total of five fires burned on the TFL, covering 5.4 hectares. Of the burned area, 0.4 ha were due to lightning and constitute unsalvaged losses of 0.04 hectares per year on the productive land base. This number was prorated by 41 percent to reflect the losses relative to the net operable land base. Considering an average stand volume of 572 cubic metres per hectare in the stands where these non-recoverable losses occur, this translates to approximately 10 cubic metres per year over the THLB.

As the licensee has not found losses due to wind throw to be significant on the TFL, no allowance was made in the analysis for wind throw.

Quantifiable information regarding losses due to insects and disease is lacking for TFL 45. For the purposes of the analysis, an estimate of 10 cubic metres per year was applied to account for losses due to insects and disease.

In total, an allowance of 20 cubic metres per year was applied to account for unsalvaged losses. MFR staff advise that this is a lower level of such losses than has been observed in other coastal management units, but they are aware of no evidence of significant unsalvaged losses on TFL 45.

Having no better information available, I accept this factor as modelled. However, for the next determination I encourage the licensee to provide better information on this factor, particularly for insects and disease.

Reasons for decision

In reaching my AAC determination for TFL 45, I have considered all of the factors required under section 8 of the *Forest Act* and I have reasoned as follows.

Based on my review of the licensee's base case described above, I accept it as an adequate basis from which to assess timber supply for this AAC determination. Under the assumptions applied in the base case, as discussed throughout this document, it was possible to attain an initial harvest level of 188 000 cubic metres per year. This harvest level could be maintained for two decades before declining 11 percent per decade for two decades to 150 600 cubic metres per year. This level could be maintained for a further seven decades before increasing to the long-term harvest level of 182 700 cubic metres per year.

In determining an AAC for TFL 45, I have identified a number of factors which, considered separately, indicate that the timber supply may be either greater or less than that projected in the base case. Some of these factors can be readily quantified and their impact on the harvest level assessed with reliability. Others may influence timber supply by adding an element of risk or uncertainty to the decision, but cannot be reliably quantified at this time.

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

- *Conservancies* – The three conservancies established under the CLUD do not contribute to the timber harvesting land base. I concluded that this reduces the harvest level by approximately three percent over the forecast period, which equates to 5600 cubic metres per year in the short term;
- *Monumental cedar/ Stand-level retention of western redcedar and yellow-cedar* – I concluded that the base case overestimates the timber supply by a small but unquantified amount over the forecast period because the assumptions applied in the base case for stand-level retention and variable retention may well not provide for maintaining a sufficient volume and quality of western redcedar and yellow-cedar to support First Nations cultural use of those species;

- *High-value fish habitat* – I concluded that the timber supply has been overestimated by an unquantified but significant amount over the forecast period due to the additional buffer required along the lower Klinaklini River under terms of the March 27, 2009 amendments to the SCCMO objectives;
- *Forested swamps* – I concluded that accounting for retention of 70 percent of the functional riparian forest in a management zone adjacent to forested swamps, as required by the SCCMO, would reduce the THLB over the forecast period by approximately 52 hectares;
- *Active fluvial units* – I concluded that accounting for 90 percent of the functional riparian forest on active fluvial units, as required by the SCCMO, would reduce the THLB over the forecast period by 42 hectares;
- *Biological diversity* – I concluded that the lack of modelling of cover constraints for mid-seral stands resulted in a small but unquantified overestimate of the timber supply in the short-term and mid-term; and that the March 27, 2009 amendments to the SCCMO objective for landscape-level biodiversity will exert a further small but unquantified downward pressure on the timber supply in the short term; and
- *Identified wildlife* – I concluded that the lack of modelling of habitat management for identified wildlife resulted in an overestimate of the timber supply of one percent over the forecast period.

I have identified the following factor in my considerations that indicates that timber supply projected in the base case may have been underestimated:

- *Use of select seed* – I concluded that the timber supply has been underestimated by an unquantified amount in the mid- and long-term because the analysis did not account for the likelihood of increasing frequency of use of select seed on TFL 45 and for improving volume gains from the use of select seed.

I am also mindful of two factors that introduce further uncertainty to the decision:

- *Economic and physical operability* – I note that 18 percent of the licensee's harvesting since 2001 has occurred in areas mapped as marginal or inoperable, suggesting that some additional amount of area should be included in the THLB;
- *Ecosystem-based management* – I note that MFR staff expect that full implementation of EBM is expected to reduce the economic timber supply to some degree due to its impact on operating costs and therefore operability.

In consideration of the above-mentioned influences, I observe that several quantified and unquantified uncertainties affect the short-term timber supply. The quantified factors—conservancies, forested swamps, active fluvial units, and identified wildlife—have the effect of reducing the initial harvest level by approximately four percent compared to the base case level of 188 000 cubic metres per year. The unquantified factors—stand-level retention of western redcedar and yellow-cedar, high-value fish habitat, and biological diversity—introduce an additional downward pressure on the short-term timber supply of approximately three percent. Furthermore, the short-term timber supply may be reduced further as ecosystem-based management is implemented under terms of the SCCMO.

Due to the uncertainty associated with economic and physical operability, I consider that there may be a small upward pressure on the short-term timber supply if a substantial amount of the harvesting on TFL 45 continues to come from areas outside the THLB.

When I take into account the upward and downward pressures, sensitivity analysis, uncertainties, and risks, I conclude that it is appropriate to determine an AAC for TFL 45 of 175 000 cubic metres per year.

Determination

I have considered and reviewed all the factors documented above, including the risks and uncertainties of the information provided. It is my determination that a timber harvest level that accommodates objectives for all forest resources during the next five years, and that reflects current management practices as well as the socio-economic objectives of the Crown, can be best achieved on TFL 45 by establishing an AAC of 175 000 cubic metres. This AAC relates to the total land base, including Schedule A and B land, and will support harvesting by the licensee and by BC Timber Sales.

This determination is effective July 15, 2009, and will remain in effect until a new AAC is determined, which must take place within five years of this determination.

If significant new information is made available to me, or major changes occur in the land use objectives 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

As noted above in *Timber Supply Analysis*, the analysis conducted for this determination was based to a large extent on the 2001 information package and analysis. I find this acceptable given the transition to management under the CLUD and SCCMO that was underway when the analysis was initiated. For the next analysis; however, I consider it important that an updated information package be prepared and a comprehensive analysis be conducted, including sensitivity analyses to assess the impacts of the most uncertain factors.

In the period following this determination and leading to the subsequent determination, I encourage the licensee or MFR staff or both to undertake the tasks and studies noted below. I have described these tasks further in the appropriate sections of this rationale. These projects are important to help reduce the risk and uncertainty associated with key factors that affect the timber supply in TFL 45:

- *Future roads, trails, and landings*: I request the licensee to review the data and methodology used to account for this factor and develop a more definitive approach for TFL 45, especially for trails and landings;
- *Use of select seed*: I request the licensee to provide better information on how genetic gain is estimated;
- *Monumental cedar*: I request the licensee maintain its commitment to provide First Nations with access to an agreed upon volume of monumental cedar, and to

continue to recognize this commitment in its Forest Stewardship plans and operational activities;

- *Stand-level retention of western redcedar and yellow-cedar:* I request the licensee to provide improved information on the ongoing supply of redcedar and yellow-cedar;
- *High-value fish habitat:* I request the licensee to improve information on the extent of high-value fish habitat and to model the buffer widths in accordance with the SCCMO;
- *Landscape-level biodiversity:* I request the licensee to report on the distribution of seral stages over time;
- *Identified wildlife:* I request the licensee improve its definition of marbled murrelet habitat on the TFL;
- *Harvest distribution by forest district:* I request the licensee to provide information on the forecast distribution of the harvest by forest district; including the profile of the harvest stratified by forest type, species, and productivity; and
- *Unsalvaged losses:* I encourage the licensee to provide better information on unsalvaged losses, particularly for insects and disease.

For the next analysis, I also wish to stress the importance of better information on field practices being provided by the licensee, MFR, and MOE; especially for many of the EBM factors including red- and blue-listed plant communities, stand-level retention, and active fluvial units. I note that an adaptive management strategy is under development for the area covered by the SCCMO. I anticipate that monitoring and evaluation conducted as part of that strategy will generate valuable information on the effects of variable retention and other factors for the next analysis.



Melanie Boyce, R.P.F.
Deputy Chief Forester

July 15, 2009



Appendix 1: Section 8 of the *Forest Act*

Section 8 of the *Forest Act*, Revised Statutes of British Columbia 1996, c. 157
Consolidated to December 9, 2008, 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 agreement areas and woodlot licence areas, and
 - (b) each tree farm licence area.
 - (2) If the minister
 - (a) makes an order under section 7 (b) respecting a timber supply area, or
 - (b) amends or enters into a tree farm licence to accomplish a result set out under section 39 (2) or (3),the chief forester must make an allowable annual cut determination under subsection (1) for the timber supply area or tree farm licence area
 - (c) within 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 [2003-31-2]
 - (d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia, and
 - (e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

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

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

Purposes and functions of ministry

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

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