

**BRITISH COLUMBIA
MINISTRY OF FORESTS AND RANGE**

Tree Farm Licence 54

Ma-Mook Natural Resources Ltd.

Rationale for Allowable Annual Cut (AAC) Determination

Effective September 4, 2008

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Objective of this document

This document provides an accounting of the factors I have considered and the rationale I have employed in making an area-based allowable annual cut (AAC) determination for Tree Farm Licence (TFL) 54, under Section 8 of the *Forest Act* and Section 4 of the *Tree Farm Licence Area-based Allowable Annual Cut Trial Program Regulation*. This document also identifies where new or better information is needed for incorporation into future determinations.

Statutory framework

Section 8 of the *Forest Act* and Section 4 of the *Tree Farm Licence Area-Based Allowable Annual Cut Trial Program Regulation* require the chief forester to consider particular factors when determining area-based AACs for TFLs. These sections are reproduced in full as Appendix 1 and Appendix 2 respectively.

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* and Section 4 of the *Tree Farm Licence Area-Based Allowable Annual Cut Trial Program Regulation*.

Description of the TFL

TFL 54, held by Ma-Mook Natural Resources Limited (the ‘licensee’), is located on the west side of Vancouver Island in the Clayoquot Sound region. The landscape of Clayoquot Sound is a complex of mountains, valleys, ocean inlets, lakes, rivers, islands and forests.

In the 1980s and 1990s, growing public concern regarding the sustainability of forest management in the Clayoquot Sound area started to attract international attention. In 1993, following many years of public participation and consultation regarding land and resource use planning in the area, the provincial government announced its Clayoquot Sound Land Use Decision (CSLUD). The CSLUD designated portions of Clayoquot Sound as protected areas, special management areas (for recreation, wildlife, or scenic corridors), and general integrated resource management areas. Under the CSLUD, the general integrated management areas were intended to include timber harvesting as a major use. TFL 54 lies almost completely (93 percent) within the area covered by the CSLUD.

TFL 54 covers a gross area of 61 467 hectares, including 12 169 hectares of protected areas within the TFL established by the CSLUD. Excluding the protected areas, the total land base is 49 298 hectares, which is approximately 19 percent of the total area under the CSLUD. Almost eight percent (3813 hectares) of the TFL is on Meares Island, and approximately seven percent of the TFL lies outside the area covered by the CSLUD. The TFL previously included approximately 123 hectares of private land that was deleted from the TFL effective October 4, 2006.

The TFL landscape is dominated by old-growth forests comprised primarily of western redcedar, western hemlock, and amabilis fir. The TFL is located in the Windward Island

Mountains Ecosection and includes parts of the Coastal Western Hemlock and Mountain Hemlock biogeoclimatic zones.

On October 22, 1993, following the CSLUD, the provincial government announced the formation of the Scientific Panel for Sustainable Forest Practices in Clayoquot Sound (the Scientific Panel). The Scientific Panel's objective was to define world-class, sustainable forest practices for the area; including reviewing the forest practices standards in effect in Clayoquot Sound at that time and recommending changes to ensure that the practices would be sustainable. On May 30, 1995, the Scientific Panel submitted a three-volume report to government containing a total of 124 specific and 91 general recommendations on forest practices and First Nations issues in Clayoquot. On July 6, 1995, the provincial government issued a news release announcing acceptance of the Scientific Panel's report and government's intention to fully implement the report's recommendations.

Clayoquot Sound has an extensive First Nations cultural history, and the TFL includes the asserted traditional territories of several First Nations represented by the Nuu-chah-nulth Tribal Council. In March 1994, a two-year *Interim Measures Agreement* between the provincial government and hereditary chiefs of the Nuu-chah-nulth Central Region Tribes was signed. This led to the establishment of the Clayoquot Sound Central Region Board as part of a joint management process between First Nations and provincial government appointees, to oversee development in Clayoquot Sound, including implementation of the CSLUD and the recommendations of the Scientific Panel. In April 1996, the agreement was extended as the *Interim Measures Extension Agreement*. A new agreement, the *Interim Measures Extension Agreement: A Bridge to Treaty* was signed in March 2000. That agreement has since been extended several times, most recently in May 2008. As a result of the agreements, all planning for TFL 54, except for the small portion lying outside Clayoquot Sound, is reviewed by the Central Region Board.

Government also appointed a Clayoquot Sound Implementation Team to set in motion implementation of the Scientific Panel's recommendations. This implementation team included representation from the then Ministry of Forests; the Ministry of Environment, Lands and Parks; the Ministry of Small Business, Tourism and Culture; and the Ministry of Aboriginal Affairs. It collaborated with the Central Region Board to develop a planning framework with input from government officials, elected local governments, labour, forest licensees, and environmental groups. This process established the Clayoquot Sound Planning Committee—comprised of the Central Region Board plus one representative from each of the ministries mentioned above—to coordinate all planning activities in Clayoquot Sound in accordance with the recommendations of the Scientific Panel and provincial legislation.

The implementation team was eventually dismantled and replaced by the Clayoquot Sound Technical Planning Committee, which also consists of representatives from First Nations and government. The Technical Planning Committee's responsibilities are to carry out the technical duties associated with watershed management planning and prepare watershed-level plans for each of the fifteen watershed planning units delineated

in Clayoquot Sound. To date, the committee has completed eleven official watershed plans covering over 77 percent of Clayoquot Sound. Nine of the watershed plans address the area within TFL 54, of which, seven plans are completed. On June 26, 2008 land use objectives established for Clayoquot Sound by ministerial order became effective. These land use objectives recognize the importance of the watershed plans in guiding sustainable ecosystem management in the area covered by the CSLUD.

The Clayoquot Sound land use planning processes described above have resulted in a unique management regime for much of TFL 54. Areas of the TFL outside Clayoquot Sound are managed in accordance with the *Forest and Range Practices Act* (FRPA) and its associated regulations, as are Crown forest lands elsewhere in the province.

Clayoquot Sound supports industries which include forestry, tourism—particularly recreational activities associated with Pacific Rim National Park—fishing, fish processing, and mining. TFL 54 lies in close proximity to the communities of Tofino and Ucluelet; and the First Nations villages of Hot Springs Cove, Ahousaht, Opitsaht, Esowista, and Port Albion.

The licensee manages operations in the TFL from Port Alberni, using the services of Coulson Forest Products Ltd., which owns a 49 percent share of the TFL. The TFL is within the Coast Forest Region of the Ministry of Forests and Range (MFR) and is administered from the South Island Forest District office in Port Alberni.

Clayoquot Sound was designated a UNESCO Biosphere Reserve in 2000.

History of the TFL and the AAC

In May 1955 the Maquinna Forest Management Licence (FML) No. 22 was awarded to British Columbia Forest Products Limited. In July 1981, FML22 was replaced by TFL 22, which was amalgamated in July 1983 with TFL 27 to form TFL 46. TFL 46 was transferred to Fletcher Challenge Canada Limited in September 1988. In December 1991, TFL 46 was subdivided and blocks 4 and 5 (the west coast portion) of the TFL became TFL 54. TFL 54 was transferred to International Forest Products Limited on December 30, 1991. On March 28, 2007 TFL 54 was transferred to Ma-mook Natural Resources Limited (Ma-mook).

Ma-Mook is a holding company based in Ucluelet and owned by a group of five First Nations—Ahousat, Hesquiat, Tla-o-qui-aht, Toquaht, and Ucluelet—and by Coulson Forest Products Limited. On April 16, 2007, the general manager of Ma-Mook stated in a letter to the deputy chief forester that Ma-Mook accepts and will implement management as described in the TFL 54 Management Plan and timber supply analysis documents submitted by the previous licensee. Ma-Mook announced in March 2007 that it intends to harvest and mill timber from TFL 54 according to the standards of the Forest Stewardship Council with the goal of achieving certification by the Council.

The AAC determined in 1991 in conjunction with Management Plan No. 1 for TFL 54 was 180 000 cubic metres, of which 8991 cubic metres were allocated to the small business forest enterprise program (SBFEP). In May 1994, the chief forester determined temporary AAC reductions totalling 42 000 cubic metres for the TFL under Part 15 (now

Part 13) of the *Forest Act* as an interim measure to account for newly protected areas and anticipated changes to management resulting from the CSLUD. The resulting AAC of 138 000 cubic metres was allocated as 129 009 cubic metres to the licensee and 8991 cubic metres to the SBFEP, and remained in effect until 1996.

In 1996, there was still a large amount of uncertainty as to how the implementation of the Scientific Panel's recommendations would influence timber supply. The Clayoquot Sound Technical Planning Committee had not yet completed the watershed plans, which define the crucial network of reserve areas for ecosystem integrity. For the 1996 determination, a simplified version of an area-based analysis was used to account for Scientific Panel recommendations such as watershed rate-of-cut limits and old growth retention. Based on the results of this analysis the chief forester decided to apply the rate-of-cut limits to the timber harvesting land base instead of to the total watershed area as was intended by the Scientific Panel. This decision intentionally constrained the timber supply to a level below the former AAC, and possibly the rate intended by the Scientific Panel, to address the uncertainty around the implementation of the Panel's recommendations.

Based on the simplified analysis, a harvest rate of approximately 125 hectares per year could be maintained in the short term. Because the previous analyses pre-dated the area-based AAC trial program, the harvest rate was converted to a total annually harvestable volume using the average volume per hectare of old growth on the TFL. The resulting annual harvest volume of 75 750 cubic metres was determined as the new AAC by the chief forester for TFL 54 in 1996. That AAC, which included consideration of the CSLUD, was allocated as 66 759 cubic metres to the licensee and 8991 cubic metres to the SBFEP. This represented a decrease of 58 percent from the AAC in effect before the CSLUD, or a decrease of 45 percent from the AAC of 138 000 cubic metres resulting from the 1994 temporary AAC reduction.

In the most recent determination in January 2000, the deputy chief forester maintained the AAC at 75 750 cubic metres, due to continued uncertainty because the watershed plans were not yet completed.

All the watershed plans that are currently intended to be completed have now been released and are established as 'objectives set by government' under FRPA. Additionally, a detailed timber supply analysis has been completed in support of this determination that accounts for the new watershed plan reserve networks. The Scientific Panel intended the rate-of-cut limits to be applied to the entire watershed area. In the timber supply analysis, watershed rate-of-cut limits were applied to the productive forest area which resulted in a harvest rate only slightly below that which could have been attained had the entire watershed been used. I consider these sources of information to greatly reduce the uncertainty around the effect on timber supply of implementing the Scientific Panel's recommendations.

For this determination, the licensee applied to include TFL 54 in the area-based AAC trial program under the *Tree Farm Licence Area-based Allowable Annual Cut Trial Program Regulation*. TFL 54 is now included in that program, as recognized in Schedule A of the regulation.

New AAC determination

Effective September 4, 2008, the new AAC for TFL 54 will be 320 hectares. This AAC will remain in effect until a new AAC is determined, which may take place within five years of this determination unless that date is formally postponed according to the provisions of Section 8 of the *Act* or the trial program is terminated under Section 7 of the *Tree Farm Licence Area-based Allowable Annual Cut Trial Program Regulation*.

Information sources used in the AAC determination

Information considered in determining the AAC for TFL 54 includes the following:

- *Clayoquot Sound Land Use Decision—Key Elements*, Province of British Columbia, April 1993;
- *Sustainable Ecosystem Management in Clayoquot Sound, Planning and Practices*, Scientific Panel for Sustainable Forest Practices in Clayoquot Sound, Report 5, April 1995;
- *Forest Practices Code of British Columbia Act*, 1995; and regulations, amendments, and guidebooks;
- Letter from the Minister of Forests, September 17, 1996, to the chief forester, stating the Crown's economic and social objectives regarding Clayoquot Sound (Appendix 5);
- Vegetation Resources Inventory, Phase 1, 1996;
- *Forest and Range Practices Act*, 2002 and amendments;
- *Area-Based Allowable Annual Cut Determination: Recommended Information Requirements for Tree Farm Licences*, November 2002, Nemus Consulting;
- *Bedingfield Watershed Plan*, October 2003, Clayoquot Sound Technical Planning Committee.
- *Cypre Watershed Plan*, October 2003, Clayoquot Sound Technical Planning Committee;
- *Forest and Range Practices Regulations*, 2004 and amendments;
- *TFL 54 Site Index Adjustment*, submitted March 2004 and accepted by MFR Forest Analysis and Inventory Branch;
- Inventory Adjustment Procedure, submitted November 2004 and accepted by MFR Forest Analysis and Inventory Branch;
- Proposed Management Plan No. 4 for TFL 54, submitted January 2005;
- *Timber Supply Analysis Information Package (IP)*, submitted June 2005 and accepted September 29, 2005 by MFR Forest Analysis and Inventory Branch;
- Existing stand yield tables, submitted July 2005 and accepted by MFR Forest Analysis and Inventory Branch;

- Managed stand yield tables, submitted July 2005 and accepted by MFR Research Branch;
- *Ministry of Forests and Range Act*, consolidated to March 30, 2006;
- *Timber Supply Analysis Report*, submitted March 2006 and accepted May 9, 2006 by MFR Forest Analysis and Inventory Branch;
- Letter from the Minister of Forests to the chief forester stating the social and economic objectives of the Crown, July 4, 2006 (Appendix 3);
- *Sydney – Pretty Girl Watershed Plan*, July 2006, Volume 3 in *Watershed Planning in Clayoquot Sound*, Clayoquot Sound Technical Planning Committee;
- *Bedwell – Ursus – Bulson Watershed Plan*, July 2006, Volume 4 in *Watershed Planning in Clayoquot Sound*, Clayoquot Sound Technical Planning Committee;
- *Hesquiaht Watershed Plan*, July 2006, Volume 5 in *Watershed Planning in Clayoquot Sound*, Clayoquot Sound Technical Planning Committee;
- *Kennedy Lake Watershed Plan*, July 2006, Volume 6 in *Watershed Planning in Clayoquot Sound*, Clayoquot Sound Technical Planning Committee;
- *Fortune Channel Watershed Plan*, July 2006, Volume 9 in *Watershed Planning in Clayoquot Sound*, Clayoquot Sound Technical Planning Committee;
- Technical review and evaluation of information and current operating conditions through comprehensive discussions with MFR and Ministry of Environment staff, including the AAC determination meetings held in Victoria on December 5 and December 12, 2007 and May 7, 2008;
- *First Nations Consultation Summary*, South Island Forest District, April 3, 2008; and
- Tour of TFL 54 with the Deputy Chief Forester, Ma-Mook Natural Resources staff, and MFR staff from the South Island Forest District and Forest Analysis and Inventory Branch, April 22, 2008.
- Order Establishing Land Use Objectives for Clayoquot Sound, effective June 26, 2008.

Role and limitations of the technical information used

Section 8 of the *Forest Act* and Section 4 of the *Tree Farm Licence Area-Based Allowable Annual Cut Trial Program Regulation* require 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 necessarily are simplifications of the real world. Many of the factors used as inputs to timber supply analysis are

uncertain, due in part to variation in physical, biological, and social conditions. Ongoing scientific studies of ecological dynamics will help reduce some of this uncertainty.

Furthermore, 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 54, 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 in judgement in making AAC determinations. I also recognize the need for consistency of approach, and am familiar with the guiding principles that the chief forester has employed in making AAC determinations. I find these principles to be reasonable and appropriate and I have adopted them as described below in making my AAC determination for TFL 54.

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

Two important ways of dealing with uncertainty are:

- (i) minimizing risk, in respect of which, in making AAC determinations, I consider particular uncertainties associated with the information before me and attempt to assess and address the various potential current and future social, economic and environmental risks associated with a range of possible AACs; and
- (ii) redetermining AACs frequently, to ensure they incorporate current information and knowledge—a principle that has been recognized in the legislated requirement to redetermine AACs every five years. The adoption of this principle is central to many of the following guiding principles.

In considering the various factors that Section 8 of the *Forest Act* requires the chief forester to take into account in determining AACs, I intend to reflect as closely as possible those operability and forest management factors that are a reasonable extrapolation from current practices. It is not appropriate to base my decision on

unsupported speculation with respect either to factors that could work to *increase* the timber supply—such as optimistic assumptions about harvesting in unconventional areas or using unconventional technology, that are not substantiated by demonstrated performance—or to factors that could work to *reduce* the timber supply, such as integrated resource management objectives beyond those articulated in current planning guidelines or the FRPA.

In many areas the timber supply implications of some legislative provisions, such as those for landscape-level biodiversity, remain uncertain, particularly when considered in combination with other factors. In each AAC determination the chief forester takes this uncertainty into account to the extent possible in the context of the best available information. In making my determination for TFL 54, as deputy chief forester, I have followed the same approach.

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

In some cases, even where government has made a formal land-use decision, it is not necessarily possible to analyse and account for the full timber supply impact in a current AAC determination. Many government land-use decisions must be followed by detailed implementation decisions, as has been the case with the CSLUD. For example, the Clayoquot Sound Technical Planning Committee needed to prepare watershed-level plans incorporating the recommendations of the Scientific Panel, and those plans were recently formally established as objectives set by government. Until such implementation decisions are made it would be impossible to assess in full the overall impacts of land-use decisions. In such cases the legislated requirement for frequent AAC reviews will ensure that future determinations address ongoing plan implementation decisions. Whenever specific protected areas have been designated by legislation or order-in-council, these areas are deducted from the timber harvesting land base and are not considered to contribute any harvestable volume to the timber supply in AAC determinations, although they may contribute indirectly by providing forest cover to help in meeting resource management objectives such as biodiversity.

When 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 the urgency to redetermine many outdated AACs. In any case, the data and models available

today are improved from those available in the past, and will undoubtedly provide for more reliable determinations.

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

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

The AAC that I determine should not be construed as limiting the Crown's obligations under the Court's decisions in any way, and in this respect it should be noted that my determination does not prescribe a particular plan of harvesting activity within TFL 54. 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 my obligation as steward of the forest land of British Columbia, of the mandate of the Ministry of Forests and Range as set out in Section 4 of the *Ministry of Forests and Range Act*, and of my responsibilities under the *Forest and Range Practices Act*.

Specific to determining an area-based AAC under the tree farm licence area-based allowable annual cut trial program, I note that the main focus of the trial program is testing the efficacy of regulating harvest levels by area rather than volume. The timber supply analysis and my considerations in this AAC determination are consistent with the direction from the *Tree Farm Licence Area-Based Allowable Annual Cut Trial Program Regulation*. Depending on the results of the tests of area-based AACs in TFL 54 and elsewhere, determining AACs based on area may be included in legislation as an option for future AAC determinations.

The role of the base case

In considering the factors required under Section 8 of the *Forest Act* and Section 4 of the *Tree Farm Licence Area-Based Allowable Annual Cut Trial Program Regulation* to be

addressed in AAC determination for TFLs, I am assisted by timber supply forecasts provided to me by the licensee as part of the MFR Timber Supply Review program.

For an area-based AAC determination for a TFL, a timber supply analysis is carried out using an information package that includes data and information from three categories: land base inventory, minimum harvestable age criteria, and management practices. Using this set of data and a computer model, an even-flow annual harvest forecast is produced. This is known as the ‘base case’ forecast, and forms the basis for comparison when assessing the effects of uncertainty on timber supply. The model is also run using certain alternative assumptions to assess the timber supply effects of uncertainties or changes in the inputs to the model. These are called ‘sensitivity analyses’.

The base case forecast may incorporate information about which there is some uncertainty. The validity of the base case, 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. Judgments that may in part 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 54 (referred to below as the “timber supply analysis” or just the “analysis”) was prepared by Timberline Forest Inventory Consultants Ltd. (Timberline) on behalf of the licensee. Timberline used its model COMPLAN to conduct the analysis. COMPLAN—a spatially explicit model for simulating the forest estate over time—allows for area-based regulation of harvesting and is capable of simulating both even-aged and variable-retention silvicultural systems.

The area-based analysis was conducted following recommendations in the document *Area-Based Allowable Annual Cut Determination: Recommended Information*

Requirements for Tree Farm Licences, which had been prepared in support of the area-based AAC trial program. The anticipated benefit of this approach was that an area-based AAC would be easier to understand and relate to the land base than a volume-based approach. This approach also follows Recommendation R7.10 of the Scientific Panel: “Recognize that the rate (percent of area cut per unit time) and geographical distribution of timber harvesting are more important determinants than is the volume removed when wood harvest is planned” (*Sustainable Ecosystem Management in Clayoquot Sound, Planning and Practices*, Scientific Panel for Sustainable Forest Practices in Clayoquot Sound, Report 5, April 1995. Appendix I, p. 247).

Based on analysis staff experience examining results from the COMPLAN model, I am satisfied that it is capable of providing reasonable projections of timber supply for TFL 54. I am therefore satisfied that the base case prepared by the licensee is an acceptable starting point for this determination.

As directed by the *Tree Farm Licence Area-Based Allowable Annual Cut Trial Program Regulation*, the following timber-volume-related factors that are usually considered in volume-based analyses of timber supply were omitted or were only considered for their indirect influence in this analysis:

- Growth and yield estimates for clear-cut and partial harvesting systems;
- Estimates of decay, waste and breakage;
- Estimates of endemic losses (operational adjustment factors);
- Stand-level biodiversity volume reductions (e.g. wildlife tree retention);
- Timber volume adjustments;
- Utilization standards; and
- Volume of non-recoverable losses.

Given that many harvest scenarios are possible, the harvest flow objectives for the base case included: (i) maintaining an even-flow annual harvest area that would be sustainable over the entire 250-year planning horizon; (ii) attempting to balance the amount of area harvested using the different silviculture prescriptions so as to dampen volume fluctuations between periods; and (iii) harvesting oldest stands earlier in the planning horizon than younger stands. Cut-blocks shown in the existing forest development plan for the TFL were prioritized for harvesting first.

Six variable-retention silvicultural systems were modelled in the base case, representing various rates of tree retention and re-entry intervals as follows, on different portions of the land base depending on site conditions:

- Clear-cut with 15 percent permanent retention
- Uneven-aged, with varying levels of temporary and permanent retention and a 30-year re-entry interval
- Patch cut removing 30 percent of timber volume, 70 percent permanent retention, and a 100-year re-entry interval

The model attempted to harvest from each variable retention prescription in proportion to the area assigned to that prescription and available for harvest at each period. This rule

was used to limit fluctuations in harvest volume that might occur if primarily low-retention stands were harvested in one period and primarily high-retention stands were harvested in another period.

In the base case, the licensee identified the maximum sustainable even-flow harvest level to be 336 hectares per year. The maximum sustainable level was limited by a period of restricted growing stock that was projected by the model to occur between the years 2097 and 2103.

As discussed throughout this rationale, and in consideration of the items described above, I am satisfied that the information presented to me provides an adequate basis from which I can assess the timber supply for TFL 54 in this determination.

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

Consideration of factors as required by Section 8 of the *Forest Act*, as varied by Section 4 of the *Tree Farm Licence Area-Based Allowable Annual Cut Trial Program Regulation*

The *Regulation*, Section 4 (1) states:

When determining the allowable annual cut for a trial management unit, the chief forester, in addition to the matters set out in Section 8 (8) (b) to (e) of the Act, must consider the rate of harvesting, based on the amount of land from which timber is to be harvested annually, that may be sustained within the trial management unit, taking into account the following factors, which replace the factors set out in Section 8 (8) (a) (i) to (vi) of the Act

- (a) The composition of the forest within the trial management unit and its expected rate of growth**

Land base contributing to timber harvesting

- general comments

A new inventory for TFL 54 updated to Vegetation Resources Inventory (VRI) standards was used for the timber supply analysis. The new inventory was completed in 1996 but was not used in the previous timber supply analysis.

The total area of TFL 54, as estimated from the licensee's inventory file and excluding protected areas, is 49 298 hectares. This is about 263 hectares more than that assumed in the 2000 analysis, due to slight differences in the updated inventory mapping. About 1177 hectares are considered to be non productive or non-forest. In the analysis this area was deducted from the total area, leaving 48 121 hectares of productive forest land.

Private lands removed in 2006 decreased the total area of TFL 54 by 123 hectares. The timber supply analysis was completed prior to the removal date, so the base case did not reflect this change in the land base. I do not believe this small area of private land is likely to have contributed significantly to the base case timber supply forecast. I therefore will make no adjustments to account for the minor overestimation in TFL area.

As part of the process used to define the THLB, (i.e. the land base estimated to be economically and biologically available for harvesting), a series of area deductions was made from the productive forest. These deductions account for the factors that effectively reduce the suitability or availability of the productive forest area for harvest due to social, economic, or ecological reasons. For TFL 54 there are fewer of these area deductions than is typical of TFLs across the province. This is because the reserves identified in the watershed plans that extensively cover the TFL—as recommended by the Scientific Panel—were established to represent and protect many of the non-timber values that are typically deducted individually, including riparian, wildlife, and recreation areas. The watershed reserves provide for a greater degree of certainty than is usual in defining the THLB, as they are the result of a multi-stakeholder planning process that considered a wide range of values.

In total, the area deductions from the total productive land base of TFL 54 result in a current THLB of 24 086 hectares, which means that 25 212 hectares of productive forest (more than 51 percent) are unavailable for harvesting for a variety of reasons. In the analysis the long-term THLB is also 24 086 hectares, but future roads, trails, and landings in the TFL were not accounted for; a point that I return to later under *roads, trails, and landings*.

The current THLB is three percent larger than the land base assumed in the 2000 determination. Several factors contributed incrementally to cause this increase; key among them is an increase in the area considered to be productive and operable.

I have considered all of the deductions applied in the derivation of the THLB for TFL 54 assumed in the base case. I accept the deductions applied to account for areas that are non-productive, non-forest, or covered with non-commercial brush or deciduous species. These factors are described in the licensee's information package and I will not discuss them further in this document.

- Meares Island

In 1985 a court injunction was filed by the Tla-o-qui-aht First Nation preventing MacMillan Bloedel Ltd. from timber harvesting within the portion of TFL 57 located on Meares Island. In 1994, the court action was adjourned indefinitely with the injunction in force.

Previous interpretations of the court injunction concluded that the injunction applied to all harvesting on Meares Island. In the base case the licensee excluded Meares Island from contributing to the TFL 54 timber supply consistent with this interpretation. However, a recent legal opinion suggests that the injunction does not apply to all harvesting on Meares Island. In my guiding principles for AAC determinations, I indicate that in the absence of any formal designation of protection, such an area would

normally be considered to contribute to timber supply. Theoretically, therefore, the area of TFL 54 on Meares Island might be considered part of the THLB and might contribute to the timber supply considered in determining the AAC.

Nevertheless, I am mindful of the longevity of the Meares Island court injunction; and furthermore I consider that the reasons for the issuance of the injunction are likely to apply to the question of timber harvesting being allowed anywhere on Meares Island. For this AAC determination, I therefore concur with the licensee's exclusion of Meares Island from contributing to timber supply. This will ensure that the expected continued avoidance of harvesting on the island will not result in an unsustainable increased rate of harvesting elsewhere in the TFL. The exclusion of Meares Island results in a reduction of 3813 hectares to the land base of TFL 54.

Under the Clayoquot Sound planning framework, Meares Island is designated as one watershed planning unit. The watershed-level plan for this area has not yet been initiated and there are no plans and no change is expected for the status of this area in the short-term. Should the watershed-level plan be completed in the future, and should the injunction be removed, this area may once again contribute to timber supply and be factored into future analyses. Until that occurs, and therefore for this determination, I am satisfied that excluding Meares Island from contributing to the timber supply is appropriate.

- watershed reserves and generated reserves

Watershed plans are being developed according to the principles and recommendations of the Scientific Panel to guide operations in Clayoquot Sound. These plans include designation of specific areas as reserves to protect a wide range of values. TFL 54 lies within nine watershed planning units. Completed watershed plans are available for seven of the planning units. Of the two remaining watershed units, one is completely located within a park. The other also lies mostly within a park and there is currently no intention to create a watershed plan for this area. The watershed plans have recently been established as legal objectives under the Land Act.

The watershed plans delineate reserves that are set aside to preserve the long-term ecosystem integrity of each watershed planning unit, protect First Nations' culturally important areas, and maintain recreational and scenic values. In the analysis for TFL 54 it was assumed that these reserves replace the typical land base removals for wildlife habitat, environmentally sensitive areas, old growth management areas, and riparian buffers. The watershed-planning reserves totalled 13 345 hectares of productive forest.

I note that certain watersheds in the TFL are currently undeveloped or have had limited harvesting activity some time ago and were not designated as protected areas under the CSLUD and are not fully protected by watershed planning reserves. These watersheds are the focus of efforts by environmental groups and are referred to by them as "pristine watersheds." The environmental groups are advocating for protection of these watersheds from timber harvesting. According to the CSLUD, all areas outside the protected areas and formal watershed planning reserves contribute to timber harvesting. In the base case, unreserved portions of these currently undeveloped and partially

developed watersheds were assumed to contribute to the timber harvesting land base. District staff inform me that the central region Chiefs are working to find resolution with the environmental groups regarding this issue.

Watershed planning reserves are not mapped for the portions of TFL 54 that lie outside Clayoquot Sound or that did not have interim or completed watershed plans at the time of the analysis. For those areas, a Geographic Information System (GIS) mapping process was used to identify similar reserve areas under FRPA legislation based on inputs representing riparian buffers, terrain stability, environmentally sensitive areas, and operability. Reserves covering 1191 hectares of productive and operable forest were then generated following standard procedures for deductions during timber supply analyses.

District staff confirm that the Scientific Panel recommendations were followed by the Clayoquot Sound Technical Planning Committee in developing the watershed planning reserves, and that the approach for extrapolating ecosystem reserves to watersheds without planned reserves is reasonable.

I accept the way in which areas have been reserved in accordance with completed watershed plans, and the way in which that information was generated for areas where watershed plans have not yet been completed and to areas outside Clayoquot Sound. For the purposes of this determination, I am satisfied that the assumptions used in the base case were adequate, and have made no adjustments on this account.

- 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.

Operability mapping, including consideration of both economic and physical operability, was completed for the TFL in 1992 and was accepted by Port Alberni (now South Island) Forest District staff in 1993. The operability mapping was re-evaluated for the current analysis in light of changes to economic conditions, the new forest inventory (VRI), and an adjustment to the mature forest volumes (see *Existing forest inventory* below for details).

Using the new information, stands previously considered inoperable were reclassified as operable if they met the following criteria: a volume greater than 400 cubic metres per hectare, a slope of less than 60 percent, and not in Terrain Class V. In addition, any stand that had been recently harvested or that will be harvested in the near future according to the current forest development plan was classified as operable. Finally, any mature stands previously classified as operable that did not have a projected volume of at least 400 cubic metres per hectare at 120 years of age were reclassified as inoperable.

The total inoperable area in the analysis outside the watershed reserves and generated reserves was 5187 hectares. The revisions to the operability mapping were evaluated by licensee field staff familiar with the area and were found to be acceptable.

The revisions to the operable land base resulted in a gain in THLB area of 5124 hectares compared to the 2000 analysis. It was assumed that all reclassified stands near the threshold of the operability criteria were likely to be marginal stands and may represent sensitive sites. All of the area reclassified to operable status was therefore assigned in the analysis to a high-retention silvicultural system, which limits harvest to a maximum of 30 percent of the stand volume and a 100-year rotation age (see *Silvicultural systems* below).

The licensee conducted sensitivity analyses to assess the effect on timber supply of making changes to the operable land base. In these analyses, the operable volume limit was first reduced to 350 cubic metres per hectare and then increased to 450 cubic metres per hectare. Results indicated that reducing the operable volume limit to 350 cubic metres per hectare increased the THLB area by 12 percent. The additional area was then assigned to the high-retention silvicultural system described above, resulting in an increase in the sustainable harvest level of four hectares per year. Increasing the operable volume limit to 450 cubic metres per hectare reduced the THLB area by three percent, which resulted in a decrease in the sustainable harvest level of two hectares per year.

The revision of the operable land base did not consider the spatial location of the stands. The licensee was concerned that some stands that meet the revised operability criteria may be spatially remote or inaccessible. To address this, the licensee tested the effect on timber supply of excluding stands as inoperable if they were located further than 200 metres or 100 metres from stands that had previously been classified as operable. When the 200-metre limit was tested, the THLB decreased by five percent and the sustainable harvest level decreased by four hectares per year. When the 100-metre limit was tested, the THLB area decreased by 10 percent and the sustainable harvest level decreased by nine hectares per year.

The small effects on sustainable harvest seen in the sensitivity analyses—changes of plus four hectares to minus nine hectares—indicate that it is relatively insensitive to changes in the operability assumptions. This is probably due to the fact that marginally operable stands were assigned to a high retention silvicultural system on a long rotation, and thus would not have achieved minimum harvestable age criteria during the period in the forecast when timber supply is most constrained.

Based on my review of the assumptions incorporated in the analysis and my knowledge of the TFL area, combined with the fact that the South Island Forest District supports the approach and data used in the analysis, for this determination I accept the current estimates of economic and physical operability as a reasonable approximation of the total operable land base within TFL 54.

- roads, trails and landings

During timber supply analysis, 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.

For the analysis, the licensee used a GIS process to exclude from the THLB a five-metre corridor along each side of all existing roads, trails, and landings. A total of 516 hectares was excluded on this account.

No reductions were applied in the base case to account for future roads. I anticipate that the practices within the CSLUD area, which are generally more restrictive compared to other areas of the province, will continue to lead to lower net losses to roads over time. I am satisfied that there is minimal risk to the modelled short-term timber supply as a result of future construction of roads, trails, and landings. As the watershed-level plans covering the TFL are now complete, enough information about the area should be available to conduct an analysis of future roads, trails, and landings for the next determination. Under *Implementation*, I therefore request the licensee to include this information in the analysis for the next determination for TFL 54.

I consider the assumptions applied in the analysis for both existing and future roads, trails, and landings to be reasonable for use in this determination, and that they pose no undue risk to the timber supply for TFL 54.

- terrain stability

The most unstable terrain in the TFL (Terrain Class V and Environmentally Sensitive Areas for soils) was assumed to be accounted for in the watershed reserves and the generated reserves. Another 3472 hectares of Terrain Class IV in the Clayoquot Sound portion of the TFL was modelled in the silvicultural system with the highest tree retention and a 100-year rotation age.

District staff raised no concerns regarding the assumptions applied in the base case for terrain stability and I am satisfied that this factor is adequately addressed for this determination.

- sites with low timber growing potential

In the base case, sites with low productivity as a result of inherent site factors such as nutrient availability, exposure, or excessive moisture are excluded from contributing to the THLB.

The licensee considered areas with a site index of 15 metres or less could not support a commercial stand of timber. The analysis for TFL 54 indicated that most such sites fell inside reserve areas. Only 80 hectares of the THLB were found to have a site index of 15 metres or less. It was assumed that those areas would be managed operationally through retention prescriptions that would result in minimal harvesting.

I have discussed the information regarding low site productivity with district staff, and I accept that the assumptions applied in the base case are adequate for this determination.

- harvestable area versus timber harvesting land base

In the watershed plans, once all reserve areas are mapped, the remaining area outside reserves is designated by the Scientific Panel using the term “harvestable area”. The

THLB defined in the timber supply analysis for this determination is significantly smaller than the harvestable area due to additional areas outside of the reserves that do not contribute to timber supply such as inoperable areas, non-commercial species, and existing roads. Therefore, the harvest projections modelled for this analysis using the THLB are lower than the levels that would be attained using the harvestable area.

Existing forest inventory

- general comments

In 1996 a Vegetation Resources Inventory (VRI) was completed for Clayoquot Sound, including TFL 54. VRI is the current provincial standard for gathering new forest inventory information. The 1996 VRI was not used for the 2000 AAC determination, as no new timber supply modelling was done at that time. A simplified approach for approximating harvest levels was used as described above under *History of the TFL and AAC*.

The Clayoquot Sound VRI was completed to Phase 1, which consists of mapping polygons and attributes through aerial photo-interpretation. Phase 2 work that would establish ground sampling to adjust Phase 1 attributes to correct for bias in interpretation has not been initiated for this inventory.

The inventory was updated and projected to the end of 2003 to account for disturbances such as harvesting. Also, mature volumes were adjusted using historical inventory plots (see *volume estimates for existing mature and old-growth stands*). As volumes were not tracked in the area-based analysis, however, this adjustment only influenced the definition of the operable land base and minimum harvestable ages.

I accept the procedures used to aggregate stands for modeling, as described in the licensee's information package, and I will not discuss them further in this document.

I am satisfied that the inventory forms an acceptable basis for this determination.

- age class structure

The current age class structure of the forest on the THLB is dominated by stands that are older than 200 years of age. Recent logging has resulted in a relatively even distribution of stand ages up to 40 years, but there are very few stands between 60 and 200 years of age.

I have reviewed the age class distribution present on TFL 54 and I am not aware of any issues that would impact this determination.

- species profile

The predominant tree species within TFL 54 are western redcedar, western hemlock, mountain hemlock and amabilis (balsam) fir. Stands are typically composed of mixed species. A small portion of the land base is covered with managed and essentially even-aged Douglas-fir stands less than 60 years of age.

- *site productivity estimates*

Inventory data include estimates of site productivity for each forest stand, expressed in terms of a site index. Conventional timber supply analysis depends on values for site index to estimate years to green-up, reductions to the THLB for low-productivity sites, minimum harvestable ages, yields in regenerating stands, and growth in existing stands. In contrast, for this area-based analysis the site index values were used only for deriving the minimum harvestable age for stands in the THLB. Site productivity had no influence on estimating years to green-up as the watershed plans were used to regulate projected logging patterns through limits on the rate of logging in each watershed.

The site index for existing and future managed stands derived from VRI attributes were adjusted through a sampling project conducted by J.S. Thrower and Associates in 2004 and documented in the report *TFL 54 Site Index Adjustment*. The site index adjustment (SIA) results showed that the VRI underestimated the site index of managed stands by approximately 11 metres for western hemlock stands and eight metres for western redcedar stands. These results are comparable to those in other SIA projects completed by other forest licensees and by MFR throughout the coastal and interior regions of BC.

As noted in the summary of the J.S. Thrower report, however, variability in the SIA results for TFL 54 was higher than has been observed in other coastal SIA projects. MFR staff who reviewed the results were also concerned about the high level of variability. Nevertheless, the range of values appears to be reasonable and it is appropriate to correct the productivity assignments for the bias caused by estimating site index from old-growth stands in the VRI. I therefore conclude that the best available information was used in the analysis.

- *volume estimates for existing mature and old-growth stands*

Mature stand volumes from the 1996 VRI were adjusted using historical inventory plots, through analysis conducted by J.S. Thrower and Associates (see Appendix 1 of the *Timber Supply Analysis Report*). As a result, the average volume for the adjusted stands rose to 753 cubic metres per hectare from the VRI average of 482 cubic metres per hectare. Based on the large sample size used in the mature volume adjustment, MFR staff are confident that the adjustment was appropriate.

It is important to note that volumes were not tracked in the area-based analysis; this adjustment therefore influenced only the definition of the operable land base and minimum harvestable ages.

The licensee ran a sensitivity analysis to explore the effect on timber supply of using the unadjusted inventory volumes to define the THLB. Using the unadjusted mature volumes, the THLB decreased by 17 percent, which resulted in a 14 hectare per year (4.2 percent) decrease in the sustainable harvest level. The low sensitivity of the harvest level to this change was attributed to the fact that the area removed from the THLB held marginal stands that were assigned to a high-retention silvicultural system and managed on a long rotation. As noted previously, those stands were not available for harvesting at the most constrained point of the timber supply.

I accept that the estimates of mature and old-growth volume used in the analysis form a suitable basis for defining the operable land base and estimating minimum harvestable ages for this determination.

Expected rate of growth

- general comments

I have considered all of the factors applied in deriving the expected rate of growth of stands in TFL 54 in the base case. I accept that under area-based analysis, it is not necessary to project the growth of natural unmanaged stands, and I will not discuss them further in this document.

- volume estimates for existing and future managed stands

For this area-based analysis, growth estimates for regenerated stands were used to determine the minimum harvestable ages to be applied in the analysis and to guide development of the variable-retention silvicultural systems that were modelled. All existing natural stands in the THLB are currently considered by the licensee to be harvestable using one of six silvicultural systems, so growth estimates for these stands are not required.

For TFL 54, managed stand yields were generated using the most current version of the MFR's Table Interpolation Program for Stand Yields (TIPSY) model. The managed stand yield curves were reviewed and accepted by MFR staff for use in the analysis. I accept them as suitable for this determination.

- minimum harvestable ages

A minimum harvestable age (MHA) is an estimate of the earliest age at which a forest stand has grown to a harvestable condition and has met minimum merchantability criteria. MHA assumptions affect when young stands will be available for harvest in the timber supply model. In practice, many forest stands will be harvested at much older ages than the minimum, due to constraints on harvesting which arise from managing for other forest values such as visual quality, wildlife, and water quality.

In the analysis for TFL 54, MHAs were defined based on a combination of stand volume per hectare and profitability (estimated harvested timber value greater than the estimated cost of harvesting and reforestation). Additional criteria applied were that no stand would have a MHA greater than 100 years, and that stands assigned to the silvicultural system with the highest retention level would have a MHA of 100 years.

Results showed that, of the 5600 hectares of existing managed stands, most (about 80 percent) would have MHAs younger than 50 years, with more than 1700 hectares having MHAs of 35-39 years. These ages appear consistent with growth rates, as historic timber harvesting has taken place on highly productive sites with easy access and such sites could feasibly support the MHAs modelled. The economic data used in the analysis were from 2004, however, and may no longer be appropriate in today's market conditions. Also, MFR staff were concerned that there is little evidence that such young

stands on the west coast can be logged profitably. During the April 2008 field tour, licensee staff indicated to me that they too believe that some of the youngest MHAs are unrealistic. More importantly, the licensee emphasized that the MHA criteria were developed by the former licensee and do not necessarily match the current management objectives. The licensee was not able to provide new MHA criteria at the time of the meeting but did describe a management vision, including longer rotation ages to promote late-seral ecological values.

The licensee conducted a sensitivity analysis to test the effects on timber supply of increasing and decreasing MHAs for all existing and future managed stands. When the MHA was increased by 10, 20, and 30 percent the sustainable harvest level decreased by eight, 14, and 20 percent respectively. When the MHA was decreased by 10 percent the sustainable harvest level increased by six percent.

The results of the sensitivity analyses demonstrate that MHA is a key driving factor in this area-based analysis. I note, however, that in the sensitivity analyses the adjustments to MHA were applied to all stands, including those managed on long rotations. Therefore, from the sensitivity analyses it is not possible to infer the influence on timber supply of the small area assigned to very young MHAs. The period of most constrained timber supply occurs almost 100 years from now and is therefore strongly influenced by future managed stand MHAs. Under an even-flow timber supply analysis, this constrained point in the future also defines the sustainable harvest level in the short-term.

Considering the uncertainty in the MHAs modelled, and the general consensus among MFR staff and the licensee that the MHAs may be too young, I conclude that the base case sustainable harvest is overestimated by a small amount and I will discuss this further in *Reasons for decision*. For the next determination, under *Implementation* I request the licensee to formulate a clear definition of MHAs that reflects the new management objectives.

- (b) **the expected time that it will take the forest within the trial management unit, excluding areas that no longer contribute to the productive forest land base, such as areas on which permanent access structure have been constructed, to become re-established after timber is cut, damaged or destroyed;**

Expected time for re-establishment

I have reviewed the assumptions applied in the base case regarding regeneration delays, not-satisfactorily-restocked (NSR) areas, and impediments to regeneration; and I am satisfied that they appropriately represent current practice. I will therefore not discuss these factors further in this rationale.

- (c) **the silvicultural systems and silviculture treatments to be applied within the trial management unit;**

I have reviewed the assumptions applied in the base case regarding regeneration practices, genetic gains, and incremental silviculture. To the extent that they affect minimum harvestable age, I am satisfied that they appropriately represent current practices. I will therefore not discuss this factor further in this rationale.

Silvicultural systems

The Scientific Panel recommended that timber harvesting in Clayoquot Sound be conducted with variable-retention silvicultural systems. According to the recommendations, in cutting units with significant values for resources other than timber or with sensitive areas, at least 70 percent of the forest should be retained in a relatively uniform distribution. On cutting units without significant values for resources other than timber or without sensitive areas, at least 15 percent of the forest should be retained.

In the analysis the licensee modelled areas of the TFL in Clayoquot Sound as managed with a variable-retention silvicultural system, and areas of the TFL outside Clayoquot Sound as managed with a clear-cutting regime with standard retention of Wildlife Tree Patches under the FRPA. As noted above under *Timber Supply Analysis*, the variable-retention silvicultural systems modelled for the Clayoquot Sound portion of the TFL consisted of six prescriptions, ranging from 85 percent removal in the first pass with 15 percent permanent retention, to 30 percent removal in the first pass with 70 percent permanent retention. The highest levels of retention were assigned to sensitive sites, as recommended by the Scientific Panel.

I note that the licensee has mapped the projected distribution of the silvicultural prescriptions across the TFL, and has devised innovative silvicultural systems aimed at supporting the commitment made in the draft management plan to manage according to all 22 recommendations of the Scientific Panel regarding silviculture. I further note that, following one of the Scientific Panel's recommendations, the licensee has instituted a monitoring system to report on silviculture performance for future AAC determinations.

I have reviewed with MFR staff the Scientific Panel recommendations for variable retention and am satisfied that, in general, the modelling of silvicultural systems in the analysis is consistent with the Panel's recommendations. I am concerned, however, that certain nuances in the Panel's recommendations may not have been recognized in the base case, such as the Panel's categorization of dry floodplains outside of riparian areas as sensitive areas. I also recognize that the licensee has yet to implement the variable retention prescriptions widely, and may therefore find unexpected operational difficulties.

I note that the BC coastal industry is only now gaining significant experience in implementing systems for variable retention harvesting, and there is even less experience with implementing the Scientific Panel's recommendations. The variable retention system for TFL 54 is critical for achieving the Scientific Panel's recommendations. Under *Implementation* I therefore request the licensee to employ adaptive management principles when implementing the silvicultural systems. This includes monitoring the proportion of blocks logged with multiple-entry systems, monitoring the results of the silvicultural systems, and adapting the systems as needed to meet management goals and objectives. Findings from this adaptive management approach should be incorporated in the analysis for the next determination.

Considering that the silvicultural systems as designed by the licensee are the best available information at this time, I accept the approach as modelled for use in this

determination. Nevertheless, given the relative uncertainty in this factor, I will discuss it further under *Reasons for decision*.

- (d) **the constraints on the amount of land available for timber harvesting that reasonably can be expected from use of the trial management unit for purposes other than timber production;**

Integrated resource management objectives

The Ministry of Forests and Range is required by 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 to ensure production and harvesting of timber and the realization of fisheries, wildlife, water, outdoor recreation, and other natural resource values are coordinated and integrated. For that reason, the extent to which integrated resource management objectives affect the timber supply must be considered in AAC determinations.

For Clayoquot Sound, the Scientific Panel set forth comprehensive recommendations related to planning for sustainable ecosystem management including the preparation of watershed plans as described above under *watershed reserves and generated reserves*. In accordance with the Panel's recommendations, the watershed plans prescribe retention requirements for old seral forests and rate-of-cut limits that regulate the maximum area that can be disturbed annually within a Watershed Planning Unit. The watershed plans also define special management areas where forestry practices will be restricted so as to safeguard sensitive values, including areas that are culturally significant for First Nations. The Watershed Planning Units were the primary form of non-timber inventory used to achieve integrated resource management objectives in this analysis.

I have reviewed the assumptions applied in the base case regarding disturbances in the inoperable land base and the protection of recreation and cultural heritage values in the watershed plans, and am satisfied that these factors were adequately accounted for in the analysis. I will not discuss them further in this rationale.

- cutblock adjacency

In most areas outside Clayoquot Sound, harvesting practices are guided by objectives for forest cover and cutblock adjacency, to address resource values such as wildlife, water, and visual quality. For example, a stand must meet a minimum green-up height requirement before an adjacent area may be harvested. In timber supply analysis this requirement is typically represented through a constraint on the maximum area that can be covered with stands below a specified green-up height at any point in time.

For Clayoquot Sound, however, the Scientific Panel recommends in Report 5 that:

- R3.2 Once an annual rate-of-cut (in hectares per year) from the watershed is determined, no arbitrary limit on the size and adjacency of individual cutting units within a watershed is needed because the rate-of-cut limits proposed (R3.1) restrict the amount and rate of disturbance within a watershed.

The Scientific Panel does note that exceptions to this statement may occur where size and adjacency must be considered in relation to visual landscape management objectives. Visual quality objectives are discussed below.

Disturbance constraints for adjacency were not applied in the analysis to the portion of the TFL lying in Clayoquot Sound, as the licensee followed the Scientific Panel's recommendation on rate-of-cut limits instead. The licensee also assumed that the planned variable-retention silvicultural systems would maintain adequate forest cover to meet adjacency requirements at all times. For the small area of the TFL outside of Clayoquot Sound, a disturbance constraint was applied that limited the portion of the area covered with stands less than three metres tall to less than 25 percent at any time.

I conclude that adjacency requirements are adequately addressed in the base case and are suitable for the purposes of this determination.

- visually sensitive areas

No visual quality objectives have been established in Clayoquot Sound, as visual objectives are assumed to be met by the watershed planning objectives. Nevertheless, the licensee modelled constraints for visual management based on local visual inventories from the work of the Scientific Panel that approximate MFR scenic classes. Sensitivity analyses tested the effect on timber supply of varying both the maximum disturbance limits and the visually effective green-up height by plus and minus 10 percent. The sensitivity analyses showed no changes in the sustainable harvest level as compared to the base case.

I have considered the information regarding visual quality and conclude that no further adjustment to the timber supply as projected in the base case is needed to account for visual resources.

- wildlife

Wildlife management objectives, including those for species considered to be at risk, were also assumed in the base case to be met by the watershed reserves. This is consistent with government orders under the FRPA (Section 7(2) of the *Forest Planning and Practices Regulation*) that habitat must be provided for black-tailed deer, Roosevelt elk, and marbled murrelet consistent with direction in the watershed plans.

As the analysis was being conducted, however, additional habitat areas for the marbled murrelet were identified, and those areas have since been added to the watershed reserves. As these additional habitat areas were draft at the time of the analysis, the licensee conducted a sensitivity analysis to examine the effect of excluding them from the THLB. A total of 216 hectares of additional area was excluded from the THLB, which reduced the sustainable harvest level by four hectares, to 332 hectares per year.

I have reviewed the information presented to me regarding wildlife habitat management, and conclude in my *Reasons for decision* that on this account the timber supply has been overestimated by about four hectares per year.

- *watershed management*

Three community watersheds have been designated within the TFL. One is located outside the Clayoquot Sound area, in the Ucluelet District water supply area. Any development in this area will be consistent with requirements under the Forest and Range Practices Act. Of the other two designated watersheds, one is located on Meares Island which, as noted previously under *Meares Island*, is excluded from the THLB for this determination. The other community watershed is located above Hot Springs Cove, and no harvesting activities are currently proposed for this area.

Watershed integrity throughout Clayoquot Sound was a concern for the Scientific Panel. The Panel identified flow rates, water quality, and channel stability as values that should be maintained, and set detailed objectives for rate of cut to protect these values. The analysis implemented the Scientific Panel's rate-of-cut limits applied to the productive forest area, and further restricted the short-term harvest in the Kennedy Lake watershed to allow for recruitment of young forests in disturbed stands.

A sensitivity analysis applied the same disturbance constraint that was used for the area of the TFL outside Clayoquot Sound (i.e., a maximum of 25 percent of each watershed covered with stands below three metres in height at any time) in place of the watershed rate-of-cut limits. The sustainable harvest level increased by nine hectares (2.7 percent) compared to the base case. This increase indicates that the rate-of-cut limits applied in the base case are more restrictive than the conventional disturbance constraints.

I am satisfied that the recommendations of the Scientific Panel for watershed management were adequately modelled in the base case and have therefore made no adjustments to this determination on this account.

- *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 wildlife tree patches and coarse woody debris are the major biodiversity concerns.

The licensee assumed in the analysis for the Clayoquot Sound portion of TFL 54 that stand-level biodiversity would be protected through implementation of the Scientific Panel's recommendations for watershed reserves and variable retention harvesting. For the area outside of Clayoquot Sound, the analysis included typical retention of Wildlife Tree Patches under the FRPA.

Landscape-level biodiversity objectives were addressed by the Scientific Panel through the recommendation to maintain watershed reserves representing all ecosystems across the landscape and at least 40 percent of each watershed planning unit in late successional forest (older than 140 years) at all times. These objectives were modelled in the analysis, and it showed that the objective could be met in the short term in all except the Kennedy and Beach units. In those two units, recruitment areas were retained in the analysis to eventually bring the area of stands older than 140 years up to 40 percent.

I consider that the base case for the analysis has adequately accounted for biodiversity, and have therefore made no further adjustments.

- (e) **any other information that, in the chief forester's opinion, relates to**
 - (i) **the capability of the trial management unit to produce timber, or**
 - (ii) **the suitability of areas within the trial management unit for timber harvesting.**

First Nations considerations

The TFL is located within the asserted traditional territory of the Nuu-chah-nulth Central Region First Nations (Ahousaht, Hesquiaht First Nation, Tla-o-qui-aht First Nation, Toquaht Nation, and Ucluelet First Nation) and the Mowachaht/Muchalaht First Nation.

In 2006, proposed Management Plan Number 4 for TFL 54 was referred to the Central Region Board by the licensee who then held the TFL. The Central Region Board responded in May 2006, noting that the proposed Management Plan was consistent with the recommendations of the Scientific Panel.

In June 2007, the MFR wrote to the five Nuu-chah-nulth Central Region First Nations, the Mowachaht/Muchalaht First Nation and to the Central Region Board, requesting comments on their interests in Management Plan No. 4 and the determination of a new allowable annual cut. Only the Tla-o-qui-aht First Nation responded. In their August 2007 letter, the Tla-o-qui-aht expressed concern over the impacts of clear-cut logging on their aboriginal interests within the Tla-o-qui-aht asserted traditional territory. The Tla-o-qui-aht have expressed concerns that clear-cut logging negatively affects traditional medicines and plants, fish populations, and game; due to the impact on forest floor light regimes, soil erosion and sedimentation. Finally, in their letter the Tla-o-qui-aht requested a meeting with the MFR to find solutions to their concerns.

MFR staff met in October 2007 with representatives of the Tla-o-qui-aht First Nation. At the meeting, staff emphasized that the values of concern identified by the Tla-o-qui-aht would be discussed with me for consideration in the determination, but that the determination could not prescribe silvicultural systems. Staff further suggested that the Tla-o-qui-aht could achieve their goals better by working with the licensee and the Central Region Board.

The Tla-o-qui-aht sent a follow-up letter to me in November 2007, reiterating their concerns as expressed in the June 2007 letter and at the meeting in October 2007. I replied in March 2008, stating that the AAC determination reflects current management

practices and legislation, and it is not within my authority to prescribe management practices to the licensee. I reiterated that the Tla-o-qui-aht's concerns may be more productively addressed through continued discussions with the licensee. I committed to consider all comments that were provided by the Tla-o-qui-aht in my AAC determination.

Further, as discussed under *Silvicultural systems* and *Reasons for decision*, the Scientific Panel recommended that in cutting units with significant non-timber values or with sensitive areas at least 70 percent of the forest will be retained in a relatively uniform distribution and the licensee intends to manage in accordance with this recommendation. I am requesting monitoring and review of silvicultural systems in the TFL, and I encourage co-operation between the licensee and First Nations in this review.

In making this determination, I am aware that First Nations are significant participants at all levels of land use planning for Clayoquot Sound, mainly through the Central Region Board. In addition, TFL 54 itself is held and managed by a company owned in part by the five First Nations of the Nuu-chah-nulth, including the Tla-o-qui-aht First Nation.

As I noted under *Guiding Principles with respect to First Nations*, the AAC that I determine should not in any way be construed as limiting the Crown's obligations resulting from recent court decisions. As I make my AAC determination, I am mindful of the responsibility of other statutory decision-makers to administer the determined AAC consistently with other legislation, and with relevant court decisions respecting the First Nations' interests.

I have reviewed the above information and, in making this determination, I am mindful of the expressed First Nations' interests. While I acknowledge the concerns expressed about clear-cut harvesting, as discussed above, the management regime in TFL 54 incorporates substantial amounts of tree retention on sensitive sites. Furthermore, the management regime has been reviewed in detail and accepted as part of consultations with the Central Region Board. If at some point the management regime in the TFL is changed, I will reflect those changes in future determinations. At this time, the information available to me regarding aboriginal interests does not lead me to alter my view of the sustainable timber supply in relation to the base case.

Attribution of harvest levels

Guidance for implementing the area-based analysis was provided by the document *Area-Based Allowable Annual Cut Determination: Recommended Information Requirements for Tree Farm Licences*. That document specifies that every harvest entry in a stand should be recorded as a treatment of the entire stand area regardless of retention level. In the analysis for TFL 54, retention levels within Clayoquot Sound varied from 30 percent to 70 percent, with some stands receiving two partial-harvest entries over the course of one rotation. Following the guidance described above, the timber supply model accounted for the treatment of the entire stand area at each partial-harvest entry. This approach ensures that all harvest activity, regardless if it is a partial harvest re-entry or a clear-cut, is accounted for in the timber supply.

It is important to recognize that this method of accounting for partial harvest entries results in a cumulative total of recorded treatments that is larger than the area that would be recorded for an equivalent clear-cut area. For example, if a ten-hectare area is harvested once with a 30 percent harvest (and 70 percent retention), and harvested with a second entry three decades later to remove 30 percent more (leaving 40 percent permanent retention), the total recorded treatment would be 20 hectares while the volume harvested would be equivalent to that of a six hectare clear-cut. For the TFL, the recorded average annual harvest level and the AAC will, therefore, be higher than would be the case under a clear-cut harvesting regime. As a result, this method of accounting for harvest entries cannot be converted to a volume equivalent by assuming an average harvest volume per hectare. On the April 2008 tour of TFL 54, I was shown many examples of past and recent silvicultural regimes that were based on partial-retention. I was informed that retention levels on coastal portions of the TFL are often higher than 15 percent, as experience has shown that greater retention levels are required to ensure the residual stand would be windfirm.

For this determination I have considered whether or not to attribute a harvest level to each of the partial harvest regimes proposed by the licensee. The licensee has committed to me to monitor the operational application of these partial harvest regimes over the next five years. As mentioned above, during the tour I witnessed a range of retention levels being implemented by the licensee. For this determination, I accept that the licensee intends to harvest in accordance with the proposed partial harvest regimes and I will not attribute a harvest level to each regime. Consistent with my request of the licensee under *Silvicultural Systems* to employ adaptive management principles when implementing the silvicultural systems, any changes in management will be reflected in the results of the monitoring plan and can be used to refine these assumptions for the next determination.

Over the next five years, based on the proportion of the land base assigned to each silvicultural system in the base case, I expect to see in the monitoring results that harvesting prescriptions with the lowest partial retention levels (i.e., 15 percent retention) will be approximately one-third of the total area harvested.

Difference between AAC and actual harvest

Until the *Forest Act* was amended in 2003, each TFL holder was required to harvest no less than 50 percent and no more than 150 percent of its AAC in a given year. In addition, it was held to harvesting between 90 percent and 110 percent over a five-year period. Changes to the *Act* have now eliminated the annual cut control requirements, as well as the minimum five-year limitation. Licensees are now limited only to harvesting no more than 110 percent of their AAC over a five-year period.

The last five-year cut control period for TFL 54 began in 2005, and included an allowance for the slight overcut that occurred in the previous cut control period. Between 2005 and 2007 there was very little harvesting on the TFL, but the licensee reports that harvesting has resumed recently and it intends to harvest the full allowable cut in future.

Under an area-based AAC, the licensee will report to the MFR the total area harvested each year. District staff have informed me that they are concerned about the methodology that will be used to report the variable retention harvesting, and consider it essential that the boundaries of the total harvest area are mapped and clearly recorded after each harvest. Otherwise, it is possible that variations in the methodology over time could result in incorrect accounting of long-term harvest performance.

I therefore request the licensee and MFR staff to work together to determine an appropriate method of tracking area harvested.

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

Alternative rates of harvest

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

Based on the model output data, I am aware that in the base case, timber supply is most limited in years 2097 through 2103. This coincides with the transition from harvesting currently existing natural stands to harvesting managed stands. In the base case, old forest (older than age 200 years) forms a large component of the harvest until 70 years from now.

The licensee conducted sensitivity analyses for TFL 54 to evaluate the effect on timber supply of increasing the harvest level to 350, 375, 400, 450, and 500 hectares per year. All sensitivity analyses attempted to achieve a non-declining even flow harvest.

Results of the sensitivity analysis showed that a harvest rate of 350 hectares per year could be sustained for the first 80 years of the forecast period but a shortfall would occur in the ninth and tenth decades. After the tenth decade, the harvest of 350 hectares per year could be sustained until the end of the 250-year horizon. Increasing the harvest rate to 375 hectares per year resulted in shortfalls in decades 8 through 10 and again in decades 19 and 20. Each further increase, to a maximum 500 hectares per year, caused the shortfalls to start earlier and last longer. Somewhat surprisingly, however, even the highest rate of cut (500 hectares per year) could be maintained for 30 years. This is attributable to the areas that are designated for management under partial-harvest silvicultural systems, which allow for a second volume removal in each stand over the course of a rotation. These stands can provide flexibility for the model to find areas available for harvest in the short term to support a high initial

harvest rate but, as demonstrated by the sensitivity analysis, that rate could not be maintained for the long term.

Review of alternative harvest flows can provide information about the amount of timber supply flexibility available in the short, mid, or long term. These forecasts provide me with valuable insight into the timber supply dynamics and trade-offs resulting from various choices of initial harvest levels, given the base case assumptions for TFL 54. Based on the information provided, I am satisfied that, subject to the assumptions underlying the forecast and the considerations discussed in this document, the base case projection is robust.

In making my AAC determination I have considered the forecasts of alternative harvest rates, the base case forecast, the sensitivity analyses provided in the analysis report, and the recent and current actual harvest levels in the TFL.

Community implications

The TFL is in close proximity to the communities of Tofino and Ucluelet and the First Nation villages of Hot Springs Cove, Ahousaht, Opitsaht, Esowista, and Port Albion. The majority of workers dependent on operations in the TFL live in the community of Ucluelet. The TFL is held by First Nations and is therefore also an important source of employment for the First Nations communities.

The forest industry is a much less important factor in the local economy now than it was in the late 1980s, when 350 to 400 loggers were employed by the companies then holding TFLs 54 and 57. The latest available figures on employment related to forestry and logging date from 2001. BCStats estimated that these occupations contributed 70 jobs (7.3 percent) to Ucluelet's labour force at that time; whereas the licensee estimated that logging, forestry, and related manufacturing contributed 100 jobs (10 percent) in Ucluelet. For Tofino, BCStats estimated 20 forestry and logging jobs (two percent of the labour force) whereas the licensee estimated there to be 40 jobs (four percent) including those in manufacturing related to forestry.

I acknowledge the significance of the timber harvest from the TFL to local employment. In my determination I have given primary consideration to the particular social and economic objectives of the Crown for the Clayoquot Sound area as expressed by the Minister of Forests, with respect to government's intention to manage the Clayoquot area in accordance with the recommendations of the Scientific Panel. This was done in recognition of the complex and unique circumstances surrounding the history of development of forest management policy in Clayoquot Sound.

(c) Repealed**(d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia,**Economic and social objectives*- Minister's letters*

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

The letter stresses the importance of a stable timber supply while being mindful of other forest values. The letter also notes that the coast of BC is experiencing a period of significant change and transition. The Minister urges the chief forester 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. Finally, the Minister suggests that the chief forester should consider the local social and economic objectives expressed by the public and First Nations.

The Minister has also expressed the social and economic objectives of the Crown specifically for the Clayoquot Sound area in a letter to the chief forester, dated September 17, 1996 (attached as Appendix 5). In this letter the Minister confirms government's intention that timber harvesting should continue to be one of the forest management objectives for the Clayoquot Sound area. The Minister also establishes government's intention that management of the area should be carried out in accordance with both the Forest Practices Code (now FRPA) and the recommendations of the Scientific Panel.

In my considerations for this AAC determination for TFL 54, I have been mindful of the information in each of these documents. For this reason, the methodology for obtaining a base-case analysis of the timber supply in TFL 54 has explicitly incorporated considerations unique to Clayoquot Sound, including implementation of the major recommendations of the Scientific Panel.

- local objectives

The Minister's letter of July 4, 2006 encourages the chief forester to consider important local social and economic objectives that may be derived from the public input. In the case of TFL 54, I note the long history of public participation in local planning processes which preceded the government's 1993 CSLUD, and the ongoing public representation in planning through the Central Region Board.

During the preparation of Management Plan No. 4 and the timber supply analysis for TFL 54, the licensee solicited public input by requesting it to identify areas significant for recreation and other values. There was limited public response to the licensee's public review process. The areas that were identified by the public were considered by

the licensee when preparing the management plan and the information package for the analysis.

In early July, 2008, several Environmental Non-Governmental Organizations (ENGO) collaborated in writing a letter to the Minister of Forests and Range expressing their concern over the licensee's intent to harvest in areas the ENGOs refer to as "pristine areas of Clayoquot Sound." As I indicated under *watershed reserves and generated reserves*, in the CSLUD these areas were not protected. I note that at the time government accepted the Scientific Panel recommendations, the province committed to stay out of undeveloped watersheds until watershed plans were prepared in accordance with Scientific Panel recommendations.

Watershed plans covering these areas are now established as objectives set by government under the Land Act. The reserves identified in the Watershed Plans and the harvestable area outside of the reserves, with the various prescribed levels of variable retention, conform to the recommendations of the Scientific Panel. For this determination I must therefore consider these areas to contribute to the timber supply of TFL 54. If in future a different land use decision is made regarding these areas, this can be accounted for in a subsequent determination.

Although otherwise there was limited public response regarding this determination, I am reassured by the fact that the Clayoquot Sound land use planning process, to which the TFL 54 analysis adheres, involved a high level of public participation.

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

Unsalvaged losses

Unsalvaged losses are timber volumes destroyed or damaged by causes such as fire, wind, insects, and disease that are not recovered through salvage operations. Endemic losses due to insects, disease, and windthrow are typically accounted for in timber supply analysis through a volume reduction factor and this is not applicable for area-based AAC determinations. Epidemic, or catastrophic losses, are large-scale natural disturbances that could significantly alter the age-class distribution and potentially affect timber supply.

In Clayoquot Sound, endemic losses are considered to be a natural and desirable feature of the old-growth forests dominating the area. Silvicultural systems are to be implemented in a way that best mimics the natural disturbance patterns of the area. In coastal forests such as those on TFL 54, large-scale natural catastrophic disturbances occur rarely and therefore are not anticipated to have an effect on timber supply. In the base case, the licensee did not apply any area-based reductions for unsalvaged losses on TFL 54 and I am satisfied that this was appropriate for this determination.

Reasons for decision

This is the second AAC in the province to be denominated in hectares, rather than cubic metres to be harvested each year. A number of factors that are critical to a

volume-denominated AAC determination (e.g., inventory volume) are not germane in this case. My reasons therefore are limited to factors that have a bearing on the area available for harvest each year.

In reaching my decision on an AAC for TFL 54, I have considered the information discussed throughout this document, 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 maintain a sustainable harvest level of 336 hectares per year on TFL 54. This figure includes an allowance for second entries in stands harvested with variable retention.

In determining an AAC for TFL 54, I have identified two factors which, considered separately, indicate that the timber supply may be less than that projected in the base case:

- *minimum harvestable ages* – I concluded that the base case may be overestimated by an undetermined but probably small amount due to uncertain assumptions about the age at which young stands can be harvested economically; and
- *wildlife* – I considered that accounting for additional habitat areas for the marbled murrelet would decrease the sustainable harvest level by four hectares.

I note that the sustainable harvest level is sensitive to small changes in minimum harvestable ages. Harvesting in TFL 54 to date has been in mature natural stands and is projected to continue in these stands for the near future. Therefore, there is very little information about harvesting managed stands at minimum harvestable ages and this uncertainty will remain until more information is gathered in the future. Due to the influence on harvest levels, and the general consensus among MFR staff and the licensee that the minimum harvestable ages may be too young, I concluded that the base case sustainable harvest is overestimated by a small amount on this account.

A further factor that I have identified as a source of uncertainty is the implementation of the variable-retention silvicultural systems on TFL 54. I am aware that the licensee has devised innovative silvicultural systems to support the commitment made in the draft management plan to manage according to all 22 recommendations of the Scientific Panel regarding silviculture and has mapped the projected distribution of silvicultural systems across the TFL. I further note that, following one of the Scientific Panel recommendations, the licensee has instituted a monitoring system to report on silviculture performance for future AAC determinations. Results of the monitoring will be important for the next determination to confirm, among other matters, the proportion of stands that will be harvested with second entries.

When I take into account the issues, sensitivity analyses, uncertainties, and risks, I conclude that the harvest level of 336 hectares per year proposed in the base case is too high. I have accounted for the overestimate in the base case due to additional habitat areas for the marbled murrelet and considered the uncertainty around minimum

harvestable ages. It is my conclusion that it is appropriate to determine an AAC for TFL 54 of 320 hectares.

As I noted under *Attribution of harvest levels*, I did not attribute a harvest level to each silvicultural system. However, I expect to see in the monitoring results that harvesting prescriptions with the lowest partial retention levels (i.e., 15 percent retention) will be approximately one-third of the total area harvested.

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, that reflects current management practices as well as the socio-economic objectives of the Crown, and that reflects First Nations' issues, can best be achieved on TFL 54 by establishing an AAC of 320 hectares.

This determination is effective September 4, 2008, and will remain in effect until a subsequent AAC is determined, which must take place within five years of this determination. I note that the licensee and the Central Region Board only endorse the trial of the area-based AAC for a period of five years. The effectiveness of this system will be thoroughly evaluated as part of the process leading up to the next determination.

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

It is important to note that this AAC, or any other AAC past or present, should not be construed as an input to the local planning processes. AAC determinations are reflections of current practice and do not prescribe management practices.

In accordance with section 151.3(4) of the *Forest Act*, section 151.3 of the Act allowing for the *Tree Farm Licence Area-Based Allowable Annual Cut Trial Program Regulation* is repealed on February 1, 2010. My staff are working towards having this date extended, but if that proves to be impossible, when the regulation is repealed I will determine a volume-based AAC for TFL 54 in accordance with the procedures required of me in section 7(3) of the regulation.

Implementation

In the period following this decision and leading to the subsequent determination, I encourage the licensee or MFR staff or both to undertake the tasks 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 54. I therefore make the following requests, to be completed before the next determination:

- *Future roads, trails, and landings:* I request the licensee to account for land base lost to future roads, trails, and landings for the next analysis;
- *Minimum harvestable ages:* As the analysis showed that minimum harvestable age is a key driving factor in determining the sustainable harvest rate, I request the licensee to formulate a definition of minimum harvestable ages;
- *Silvicultural systems:* I request the licensee to monitor implementation of silvicultural systems to assess the proportion of blocks established under a silvicultural system with anticipated second entries, how well the actual levels of retention match those assumed in the modelled projections, and whether the prescriptions with the highest levels of retention are applied—as recommended by the Scientific Panel—to sensitive sites including Terrain Class IV and dry floodplains outside riparian areas;
- *Harvest area:* I request that the licensee and MFR staff work together to determine an appropriate method of tracking annual area harvested, ensuring that the boundaries of the entire harvest area are mapped and clearly recorded after each harvest.

In addition, the licensee should continue to work closely with South Island Forest District staff and with the Central Region Board to ensure that all timber harvesting in the Clayoquot Sound area is a result of, and conforms to, appropriate local planning and forest practices as recommended by the Scientific Panel.



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

August 25, 2008



Appendix 1: Section 8 of the Forest Act

Section 8 of the Forest Act, Revised Statutes of British Columbia 1996, reads as follows:

Allowable annual cut

- 8** (1) The chief forester must determine an allowable annual cut at least once every 5 years after the date of the last determination, for
- (a) the Crown land in each timber supply area, excluding tree farm licence areas, community forest areas and woodlot licence areas, and
 - (b) each tree farm licence area.
- (2) If the minister
- (a) makes an order under section 7 (b) respecting a timber supply area, or
 - (b) amends or enters into a tree farm licence to accomplish the result set out under section 39 (2) or (3),
- the chief forester must make an allowable annual cut determination under subsection (1) for the timber supply area or tree farm licence area
- (c) within 5 years after the order under paragraph (a) or the amendment or entering into under paragraph (b), and
 - (d) after the determination under paragraph (c), at least once every 5 years after the date of the last determination.
- (3) If
- (a) the allowable annual cut for the tree farm licence area is reduced under section 9 (3), and
 - (b) the chief forester subsequently determines, under subsection (1) of this section, the allowable annual cut for the tree farm licence area,
- the chief forester must determine an allowable annual cut at least once every 5 years from the date the allowable annual cut under subsection (1) of this section is effective under section 9 (6).
- (3.1) If, in respect of the allowable annual cut for a timber supply area or tree farm licence area, the chief forester considers that the allowable annual cut that was determined under subsection (1) is not likely to be changed significantly with a new determination, then, despite subsections (1) to (3), the chief forester
- (a) by written order may postpone the next determination under subsection (1) to a date that is up to 10 years after the date of the relevant last determination, and
 - (b) must give written reasons for the postponement.
- (3.2) If the chief forester, having made an order under subsection (3.1), considers that because of changed circumstances the allowable annual cut that was determined under subsection (1) for a timber supply area or tree farm licence area is likely to be changed significantly with a new determination, he or she
- (a) by written order may rescind the order made under subsection (3.1) and set an earlier date for the next determination under subsection (1), and
 - (b) must give written reasons for setting the earlier date.

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

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Appendix 2: Section 4 of the *Tree Farm Licence area-based Allowable Annual Cut Trial Program Regulation*

Section 4 of the *Tree Farm Licence area-based Allowable Annual Cut Trial Program Regulation* (deposited 2004) reads as follows:

Section 8 of the Act is varied

- 4** (1) When determining the allowable annual cut for a trial management unit, the chief forester, in addition to the matters set out in Section 8 (8) (b) to (e) of the Act, must consider the rate of harvesting, based on the amount of land from which timber is to be harvested annually, that may be sustained within the trial management unit, taking into account the following factors, which replace the factors set out in Section 8 (8) (a) (i) to (vi) of the Act:
- (a) the composition of the forest within the trial management unit and its expected rate of growth;
 - (b) the expected time that it will take the forest within the trial management unit, excluding areas that no longer contribute to the productive forest land base, such as areas on which permanent access structures have been constructed, to become re-established after timber is cut, damaged or destroyed;
 - (c) the silvicultural systems and silviculture treatments to be applied within the trial management unit;
 - (d) the constraints on the amount of land available for timber harvesting that reasonably can be expected from use of the trial management unit for purposes other than timber production;
 - (e) any other information that, in the chief forester's opinion, relates to
 - (i) the capability of the trial management unit to produce timber, or
 - (ii) the suitability of areas within the trial management unit for timber harvesting.
- (2) Despite subsection (1), if the rate of harvesting referred to in that subsection is based in part on the volume of timber that is to be harvested annually, the chief forester must take into account the factors set out in Section 8 (8) (a) (i) to (vi) of the Act, to the extent the chief forester determines they affect the volume of timber that may be harvested annually from the trial management unit.
- (3) In determining an allowable annual cut under subsection (1) the chief forester,
- (a) in the case of an allowable annual cut, or part of an allowable annual cut, that is based on the amount of land from which timber is to be harvested, may specify a different amount of land for different parts of the trial management unit, for different silvicultural systems, or for different types of timber or terrain, and
 - (b) in the case of an allowable annual cut, or part of an allowable annual cut, that is based on the volume of timber that is to be harvested, may specify a different volume for different parts of the trial management unit, or for different types of timber or terrain,
- and Section 8 (5) of the Act is varied accordingly.

Appendix 3: Section 4 of the Ministry of Forests and Range Act

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

Purposes and functions of ministry

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

Appendix 4: Minister of Forests and Range's letter of July 4, 2006



JUL 04 2006

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

Dear Jim:

Re: Economic and Social Objectives of the Crown

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

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

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

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Minister of
Forests and Range
and Minister Responsible
for Housing

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Minister

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Jim Snetsinger

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

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

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

Sincerely yours,

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

Rich Coleman
Minister



File: 10100-01

September 17, 1996

Larry Pedersen
Chief Forester
Ministry of Forests
595 Pandora Avenue
Victoria, British Columbia
V8W 3E7

Dear Larry Pedersen:

Re: Social and economic objectives of the Crown in the Clayoquot Sound area

The government of British Columbia recognizes that the circumstances and history surrounding the development of forest management policy for the Clayoquot Sound area are complex and unique in British Columbia. In particular, government has accepted the recommendations of the report of the Scientific Panel for Sustainable Forest Practices in Clayoquot Sound.

Since these circumstances are specific to the Clayoquot Sound area, it is appropriate to express social and economic objectives of the Crown for this area specifically, in addition to the more generally applicable objectives expressed in the letter dated July 28, 1994, and the memo dated February 26, 1996, from the Minister of Forests to the Chief Forester.

In that respect, first, I confirm that it is government's intention that timber harvesting continue to be one of the forest management objectives for the Clayoquot area. Second, it is government's intention that management of the area be carried out in accordance with both the Forest Practices Code and the recommendations of the Scientific Panel for Sustainable Forest Practices in Clayoquot Sound.

Larry Pedersen
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These intentions should be read as an expression of the socio-economic objectives of the Crown for the Clayoquot Sound area, for consideration in the determination of allowable annual cuts for those management units which include parts of Clayoquot Sound.

Yours truly,

A handwritten signature in cursive script that reads "David Zirnhelt". The signature is written in dark ink and is positioned above the printed name and title.

David Zirnhelt
Minister of Forests