

**BRITISH COLUMBIA
MINISTRY OF FORESTS**

Tree Farm Licence 15

Issued to Weyerhaeuser Canada Ltd.

Rationale for Allowable Annual Cut (AAC) Determination

Effective July 29, 1999

**Bronwen Beedle
Deputy Chief Forester**

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Objective of this Document

This document is intended to provide an accounting of the factors I have considered and the rationale I have employed in making my determination, consistent with Section 8 of the *Forest Act*, of the allowable annual cut (AAC) for Tree Farm Licence (TFL) 15. This document also identifies where new or better information is required for incorporation into future determinations.

Description of the TFL

TFL 15 is located near the communities of Osoyoos, Oliver and Okanagan Falls in the south central region of the province. The TFL is held by Weyerhaeuser Canada Ltd. (Weyerhaeuser) and is administered by the Penticton Forest District which is part of the Kamloops Forest Region.

The TFL area is situated within the Southern Interior ecoprovince and is characterized by a mixed topography of rolling hills and mountainous terrain ranging in elevation from 500 metres to 2200 metres. The productive forest lies within the Montane Spruce (MS), Engelmann Spruce Subalpine Fir (ESSF), Interior Douglas-fir (IDF), and Ponderosa Pine (PP) biogeoclimatic zones. The licence area supports a variety of commercial tree species including lodgepole pine, western larch, Douglas-fir, Ponderosa pine, Engelmann spruce, and subalpine fir (balsam).

The total land base used in the analysis for TFL 15 is 48 449 hectares of which 45 375 hectares (93 percent) are considered productive forest. The remaining 3 074 hectares (seven percent) are composed largely of swamp, lakes, open range, non-productive brush and other areas which do not support commercial forest.

Forestry, agriculture, and tourism are the principle forms of economic activity in the region.

History of the AAC

TFL 15 was first issued to Oliver Sawmills Ltd. in 1954 as Forest Management Licence No. 1. During the term of Management Plan (MP) No. 1, the company was authorized to harvest 15 234 cubic metres per year from a total licence area of 55 210 hectares. The AAC increased significantly during subsequent MP periods largely as a result of the introduction of new provincial utilization standards. In 1971 an AAC of 82 827 cubic metres was determined for a five year period during which time a revised inventory of the TFL was initiated. Improved information from the new inventory lead to a 9770 cubic metre reduction in the AAC in 1977. In 1978 the TFL was assigned to Weyerhaeuser Canada Ltd. following the amalgamation of several companies including Northwood Properties Ltd., a successor to Oliver Sawmills.

During the 1980s the AAC remained relatively constant at approximately 72 000 cubic metres from a total TFL area of 48 195 hectares. Because of a severe mountain pine beetle epidemic, the AAC was temporarily increased during the 1990s to accommodate salvage harvesting of affected stands; the AAC in 1992 and 1993 was 172 000 cubic metres and in 1994 was 137 000 cubic metres. Effective January 1, 1995 the current level of 78 000 cubic metres per year was determined.

New AAC determination

Effective July 29, 1999, the new AAC for TFL 15 will be 70 000 cubic metres, a reduction of 8000 cubic metres from the current AAC. The new AAC includes 3594 cubic metres administered under the Small Business Forest Enterprise Program.

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

Information sources used in the AAC determination

Information considered in determining the AAC for TFL 15 includes the following:

- Statement of Management Objectives, Options and Procedures (SMOOP) for Draft Management Plan No. 8, TFL No. 15, accepted May 26, 1997;
- Existing stand yield tables for TFL 15, approved by BCFS Resources Inventory Branch, September 23, 1998;
- Managed stand yield tables and site index curves, approved by BCFS Research Branch, August 17, 1998;
- Timber Supply Analysis Information Package: TFL 15, Management Plan No. 8, , Weyerhaeuser Canada Ltd., accepted November 10, 1998;
- Timber Supply Analysis Report: TFL 15, Management Plan No. 8, Weyerhaeuser Canada Ltd., accepted July 22, 1999;
- TFL 15, proposed Management Plan No. 8, Weyerhaeuser Canada Ltd., submitted May 1, 1999; revised June 7 and 14, 1999;
- TFL 15, Twenty-Year Plan, Weyerhaeuser Canada Ltd., accepted May 6, 1999;
- Summary of public input solicited by the licensee regarding the contents of Management Plan No. 8;
- Letter from the Minister of Forests to the Chief Forester, dated July 28, 1994, stating the Crown's economic and social objectives;

- Memorandum from the Minister of Forests to the Chief Forester, dated February 26, 1996, stating the Crown's economic and social objectives regarding visual resources;
- Memorandum from the Deputy Ministers of Forests, and Environment, Lands and Parks, dated August 25, 1997, conveying government's objectives regarding the achievement of acceptable impacts of biodiversity management on timber supply;
- Technical information provided through correspondence and communication among staff from the British Columbia Forest Service (BCFS) and the Ministry of Environment, Lands and Parks (MELP);
- Technical review and evaluation of current operating conditions through comprehensive discussions with BCFS staff, including the AAC determination meeting held in Victoria on May 18, 1999;
- Review of TFL timber supply analysis and operating conditions through discussions between Weyerhaeuser Canada Ltd. staff and the Deputy Chief Forester on May 13, 1999;
- Correspondence from Weyerhaeuser Canada staff to the Deputy Chief Forester dated May 17, 1999 and June 23, 1999 regarding the AAC determination for TFL 15;
- *Forest Practices Code of British Columbia Act*, (as amended);
- *Forest Practices Code of British Columbia Act Regulations*, (as amended);
- *Forest Practices Code of British Columbia* Guidebooks, BCFS and MELP;
- *Forest Practices Code, Timber Supply Analysis*, BCFS and MELP;

Role and limitations of the technical information used

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

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

Furthermore, technical analytical methods such as computer models cannot incorporate all of the social, cultural and economic factors that are relevant when making forest management decisions. Therefore, technical information and analysis do not necessarily provide the complete answer or solution to forest management problems such as AAC determination. The information does, however, provide valuable insight into potential impacts of different resource-use assumptions and actions, and thus forms an important component of the information I must consider in AAC determinations.

In making the AAC determination for TFL 15, I have considered known limitations of the technical information provided, and I am satisfied that the information provides a suitable basis for my determination.

Statutory framework

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

In accordance with Section 23(3) of the *BC Interpretation Act*, the deputy chief forester is expressly authorized to carry out the functions of the chief forester including those required under Section 8 of the *Forest Act*. Consistent with this provision, the chief forester formally authorized me to make AAC determinations for a number of TFLs in a memo dated November 24, 1998.

In this memo the chief forester also expressed the importance of consistency of judgement in making AAC determinations. As a result, I have been involved with the Chief Forester on a number of previous AAC determinations and am familiar with the guiding principles he has employed in making AAC determinations. I find these principles to be reasonable and appropriate and I have employed them as described below in making my AAC determination for TFL 15.

Guiding principles for AAC determinations

Rapid changes in social values and in our understanding and management of complex forest ecosystems mean that there is always some uncertainty in the information used in AAC determinations. Two important ways of dealing with uncertainty are:

- (i) minimizing risk, in respect of which in making AAC determinations, I consider the uncertainty associated with the information before me, and attempt to assess the various potential current and future social, economic and environmental risks associated with a range of possible AACs; and

- (ii) redetermining AACs frequently, to ensure they incorporate current information and knowledge, a principle that has been recognized in the legislated requirement to redetermine AACs every five years. The adoption of this principle is central to many of the guiding principles that follow.

In considering the various factors that Section 8 of the *Forest Act* requires the chief forester to take into account in determining AACs, I intend to reflect as closely as possible operability and forest management factors that are a reasonable extrapolation from current practices. It is not appropriate to base my decision on unsupported speculation with respect either to factors that could work to increase the timber supply—such as optimistic assumptions about harvesting in unconventional areas, or using unconventional technology, that are not substantiated by demonstrated performance—or to factors that could work to reduce the timber supply, such as integrated resource management objectives beyond those articulated in current planning guidelines or the *Forest Practices Code* (the Code).

The *Forest Practices Code of British Columbia Regulations* were approved by the Lieutenant Governor in Council on April 12, 1995, and released to the public at that time. The *Forest Practices Code of British Columbia Act* was brought into force on June 15, 1995.

Although the Code is now fully implemented following the end of the transition period on June 15, 1997, the timber supply implications of some of its provisions, such as those for landscape-level biodiversity, still remain uncertain, particularly when considered in combination with other factors. In each AAC determination the chief forester takes this uncertainty into account to the extent possible in the context of the best available information. In making my determination for TFL 15, as deputy chief forester, I intend to follow the same approach.

As B.C. progresses toward completion of strategic land use plans, the eventual timber supply impacts associated with the land-use decisions resulting from the various planning processes—including the Commission on Resources and Environment (CORE) process for sub-regional plans or the Land and Resource Management Planning (LRMP) process—are often discussed in relation to current AAC determinations. Since the outcomes of these planning processes are subject to significant uncertainty before formal approval by government, it has been and continues to be the position of the chief forester that in determining AACs it would be inappropriate to attempt to speculate on the impacts on timber supply that will eventually result from land-use decisions that have not yet been taken by government. Like the chief forester, I will therefore not consider the possible impacts of existing or anticipated recommendations made by such planning processes, nor attempt to anticipate any action the government could take in response to such recommendations.

Moreover, even where government has made land-use decisions, including Land and Resource Management Plans (LRMPs), it may not always be possible to analyze the full timber supply impact in an AAC determination. In most cases, government's land-use decision must be followed by detailed implementation decisions. For example, a land-use decision may require the establishment of resource management zones and resource management objectives and strategies for these zones. The legislated requirement for five-year AAC reviews will ensure that future determinations address ongoing plan implementation decisions.

Forest Renewal BC is funding a number of intensive silviculture activities that have the potential to affect timber supply, particularly in the long term. As with all components of an AAC determination, like the chief forester, I require sound evidence before accounting for the effects of intensive silviculture on possible harvest levels. Nonetheless, I will consider information on the types and extent of planned and implemented practices as well as relevant scientific, empirical and analytical evidence on the likely magnitude and timing of any timber supply effects of intensive silviculture.

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 all the AACs in the province between 1992 and 1996, many of which were outdated. In any case, the data and models available today are superior to those available in the past, and will undoubtedly provide for more reliable determinations.

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

With respect to First Nations' issues, I am aware of the Crown's legal obligations resulting from recent court decisions including those in the Supreme Court of Canada. The AAC that I determine should not in any way be construed as limiting those obligations under these decisions, and in this respect it should be noted that my determination does not prescribe a particular plan of harvesting activity within TFL 15.

Overall, in making this AAC determination, as the deputy chief forester, I am mindful of the chief forester's obligation as steward of the forest land of British Columbia, of the mandate of the Ministry of Forests (MOF) as set out in Section 4 of the *Ministry of Forests Act*, and of his responsibilities under the *Forest Practices Code of British Columbia Act*.

The role of the base case

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

For each AAC determination a timber supply analysis is carried out using an information package including data and information from three categories: land base inventory, timber growth and yield, and management practices. Using this set of data, and a computer model, a series of timber supply forecasts is produced. These include sensitivity analyses to assess the timber supply effects of uncertainties or changes in various assumptions around a baseline option, normally referred to as the "base case" forecast.

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

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

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

Timber Supply Analysis

The timber supply analysis for TFL 15 was prepared by JCM Soulmates in conjunction with Weyerhaeuser staff. Weyerhaeuser used its proprietary computer simulation model entitled Total Property Simulation (TPS) to conduct the analysis. Based on my staff's experience examining results from this model, I am satisfied that it is capable of providing a reasonable projection of timber supply.

The timber supply analysis examined harvest forecast options using two different management scenarios. Weyerhaeuser's "Base Case A" applied management assumptions in accordance with the Okanagan Timber Supply Area Integrated Resource Management Timber Harvesting Guidelines. The licensee's "Base Case B" reflects the application of biodiversity management guidelines outlined in the Biodiversity Guidebook and more closely models current management practices on TFL 15. I therefore consider "Base Case B" to represent the base case as discussed above under "The role of the base case".

For TFL 15 the base case projects a short-term harvest level which varies from 51 000 to 62 000 cubic metres per year between 1998 and 2025. In 2026, the harvest level increases to 96 000 cubic metres per year followed by a further gradual increase to a long term harvest level of approximately 115 000 cubic metres per year.

Key factors affecting the base case harvest projection include the current age class structure of stands on the TFL, the productivity of land base and the amount of harvestable volume currently available on the TFL 15.

In the timber supply analysis, sensitivity analyses were provided to assess the risk to timber supply resulting from uncertainty in data assumptions and estimates, and these have assisted me in considering the factors leading to my determination.

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

Section 8 (7)

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

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

Land base contributing to timber harvest

- general comments

The total area of TFL 15 as reported in the timber supply analysis is 48 449 hectares. Productive forested areas, excluding non-forest and non-productive areas account for 45 375 hectares or approximately 93 percent of the total TFL area.

As part of the process used to derive the timber harvesting land base—i.e., the land base estimated to be economically and biologically available for harvesting—a series of deductions was made from the productive forest land base. These deductions account for factors which operate to reduce the forest area available for harvesting for economic or ecological reasons. In timber supply analysis, assumptions, and if necessary, projections, must be made about these factors prior to quantifying appropriate areas to be deducted from the productive forest area in order to derive the timber harvesting land base. These factors are described in detail below.

In reviewing these deductions I am also aware that some areas may have more than one classification—e.g. environmentally sensitive areas (ESAs) may also lie within riparian areas. To ensure the accuracy of the timber harvesting land base calculation, it is imperative that no deduction be made more than once in respect of the same area of land, by virtue of it or of some part of it coming under more than one classification. Hence, a specific deduction for a given factor reported in the analysis or the AAC rationale does not necessarily reflect the total area with that classification; some portion of it may have been deducted earlier under another classification. For TFL 15, I acknowledge that the licensee used the above approach to appropriately derive the timber harvesting land base and I find the results to be reasonable for use in this determination.

- non-forest and non-productive areas

Non-forested areas on TFL 15 include non-productive brush, rock, swamp, lakes, open range and urban areas. Based on the TFL inventory, the licensee deducted 782 hectares of non-forested areas and 2291 hectares of non-productive forest from contributing to the TFL 15 timber harvesting land base. Standard procedures were followed in the analysis to exclude these areas.

- physical operability

Terrain characteristics and access typically affect the areas on which the licensee may potentially conduct harvesting operations. On TFL 15, Weyerhaeuser considers the entire productive forest to be economically accessible; BCFS District staff agree with this assessment. The licensee appropriately did not deduct any productive forest areas to account for potentially inaccessible areas.

Having reviewed the criteria and approach used in the analysis, I accept the licensee's assumption and find it appropriate for this determination.

- non-commercial cover

In the analysis the licensee excluded 59 hectares of area occupied by non-commercial brush species. The licensee considers that timber production is unlikely on these areas and therefore appropriately excluded them from the timber harvesting land base.

- low productivity areas

TFL 15 includes areas of low productivity which are not expected to contribute to timber harvesting. To account for these areas the licensee applied site index limits by leading species to the productive forest land base. Using this approach the licensee excluded 32 hectares of low productivity areas from the timber harvesting land base. BCFS Penticton District staff accept the licensee's approach and the reductions applied in the analysis. Having examined the methodology and assumptions used, I accept the deductions made in the base case for low productivity areas for the purposes of this determination.

- deciduous forest types

The licensee's inventory identifies approximately 309 hectares of deciduous-leading stands. Since Weyerhaeuser considers only coniferous species to be merchantable on TFL 15, all stands which are predominantly deciduous were excluded from the timber harvesting land base. Deciduous trees also occur as a minor component in stands which are predominantly coniferous. In the analysis, the licensee excluded approximately 6756 cubic metres of deciduous volume to account for deciduous trees occurring in predominately coniferous stands. BCFS Penticton District staff confirm that Weyerhaeuser does not currently utilize deciduous species. I have reviewed the procedures used to account for deciduous species in the base case and consider them appropriate for this determination.

- *environmentally sensitive areas (ESAs)*

Based on the licensee's resource inventories, 2260 hectares of ESAs were deducted from contributing to timber harvesting in the base case. These deductions were made to account for the protection of sensitive or unstable soils, recreation areas, wildlife habitat and also to account for difficult-to-regenerate areas.

BCFS District staff concur with the location and extent of the deductions for ESAs. Specific details of each ESA category are considered later in the section entitled, Integrated Resource Management Objectives.

- *non-merchantable stands*

In the timber supply analysis, Weyerhaeuser excluded 4648 hectares from the timber harvesting land base to account for low volume and low productivity stands which are currently uneconomical to harvest. The licensee used a combination of leading species, stocking, age and height criteria to assess merchantability. BCFS District staff agree with the assumptions used to assess these areas. Having reviewed the criteria and approach used by the licensee, I accept the deductions for non-merchantable stands for use in this determination.

- *estimates for roads, trails and landings*

To account for *existing* roads, trails and landings, the licensee conducted a study to determine the average road width of three road classifications (main, operational, trail) currently in use on the TFL. Using computer mapping (GIS) techniques, the licensee multiplied these average road widths by the corresponding road lengths to derive an estimate of 738 hectares of existing roads and trails on the TFL. Using assumptions for average landing size the licensee estimated a combined total of 1099 hectares for existing roads, trails and landings. Accounting for previous reductions, Weyerhaeuser excluded 857 hectares from the TFL 15 timber harvesting land base.

To account for *future* roads, trails and landings the licensee assumed that an appropriate percent deduction would vary by management zone. For the 'Stocking Class 4 Zone' and the 'General Management Zone' the licensee assumed that eight percent of stands older than age 40 would be converted to roads, trails and landings upon harvesting, except for stands 41-60 years old where 6.5 percent was assumed. For the 'Landscape Management Zone' and the 'Wildlife Management Zone', Weyerhaeuser assumed that 50 percent of the roads, trails and landings required to access future harvest areas are already in place. As a result, in these two zones the licensee applied a four percent reduction to stands older than age 40 upon harvest to simulate future road, trail and landing requirements. Using the above methodology Weyerhaeuser estimated that 1792 hectares of TFL 15 would be developed in future roads, trails and landings. To account for previous overlapping deductions the licensee applied a ten percent reduction to this estimate and, after each area covered with stands older than age 40 was harvested, excluded a total of 1612 hectares from further contributing to the timber harvesting land base.

BCFS District staff concur with the magnitude of the reductions made for both existing and future roads, trails and landings. Having reviewed the licensee's methodology and estimates, I am also satisfied that the reductions used in the analysis are adequate, and in the absence of better information, I find them suitable for this determination.

Existing forest cover inventory

- inventory audit

The TFL 15 forest cover inventory was revised and updated in 1997 to Vegetation Resources Inventory (VRI) Phase I standards. The effective date for the purposes of projecting timber supply was January 1, 1997.

In 1996, BCFS Resources Inventory Branch staff conducted an inventory audit of TFL 15. The objective of this audit was to determine the overall accuracy of the volume projection estimates for the TFL. The original audit sampled the previous inventory and was therefore not directly applicable to the revised (VRI) inventory. As a result, BCFS Resources Inventory Branch staff restratified and recompiled the original sample plots to correspond with the configuration of the new inventory. Analysis of the restratified audit results suggests that coniferous volumes projected from the inventory file are overestimated by an average of 18 percent for stands older than 60 years.

Weyerhaeuser contends that the audit volume should not be applied to TFL 15 because of technical issues associated with the compilation of audit volumes and the variable distribution of sample plots.

I acknowledge that application of the restratified sampling methodology works to increase the uncertainty of the audit estimate. However, I view the information as an indication that the prevailing trend in timber supply is likely less than that projected in the base case and I have included in my determination a consideration of the potential implications of such a trend.

In the timber supply analysis, the licensee performed a sensitivity analysis by increasing and decreasing existing stand volumes by 10 percent. The analysis showed that medium-term timber supply is highly sensitive to decreases in existing stand volumes when compared to the base case harvest forecast.

I also requested that Weyerhaeuser provide an additional sensitivity analysis to assess the impact on timber supply of reducing existing stand volumes used in the base case by 18 percent in combination with lower biodiversity emphasis. I have discussed this further below under *landscape-level biodiversity*.

For the present determination I have considered the uncertainty in existing volume estimates as an indication of a strong potential for, rather than conclusive existence of, a substantial but currently unquantifiable decrease in the projected timber supply when compared to the base case harvest forecast and have discussed this below in my Reasons for decision. In view of the considerable uncertainty in the volume estimates for existing mature stands, as shown by the inventory audit, and of the demonstrated high sensitivity in the timber supply to variations in these estimates, before the next determination, I strongly encourage the licensee to refine the forest cover inventory using a VRI Phase II sampling plan.

- age-class distribution

Approximately two percent of the timber harvesting land base is covered by stands more than 250 years old, 19 percent by stands between 140 and 250 years old, 41 percent by stands between 60 and 140 years old and 38 percent by stands less than 60 years old.

- species profile

The TFL 15 timber harvesting land base consists of a variety of commercial tree species. Approximately 60 percent of the timber harvesting land base is covered by lodgepole pine-leading stands. Larch, ponderosa pine, Douglas-fir-, balsam- and spruce-leading stands comprise a further twenty, seven, five, two and six percent respectively.

- volume estimates for existing stands

Weyerhaeuser used the Variable Density Yield Projection (VDYP) model to generate volume estimates for existing stands 40 years and older as well as for naturally established stands less than 40 years old with no history of silviculture treatment. VDYP is based on information gathered from a large number of sample plots throughout the province and is generally accepted in B.C. as an adequate model for projecting volumes in existing natural stands. For the purposes of AAC determinations, I accept VDYP as an appropriate model for projecting the volume of existing stands.

Notwithstanding the results of the inventory audit (discussed above under *inventory audit*), the licensee followed recognized procedures in the timber supply analysis for TFL 15, and I therefore accept the estimates used for this determination.

Expected rate of growth

- site productivity estimates

Inventory data includes estimates of site productivity for each forest stand, expressed in terms of a site index. For a given forest stand the site index is calculated using height, age and species specific site index curves. The productivity of a site largely determines how quickly the trees on it will grow, and therefore affects the time seedlings will take to reach green-up conditions, as well as the volumes of timber that will grow, and the age at

which a stand will satisfy mature forest cover requirements and reach a merchantable size or a minimum harvestable age.

Generally, forest stands between 30 and 140 years of age provide the most accurate measurement of site productivity. Site indexes determined from younger stands and older stands may not accurately reflect potential site productivity. In young stands, growth often depends as much on recent weather, stocking density and competition from other vegetation as it does on site quality. In old stands, which have not been subject to management of stocking density, the trees used to measure site productivity may have grown under intense competition or may have been damaged and therefore may not reflect the true growing potential of the site. This has been verified in studies such as the old-growth site index (OGSI) project where actual site indexes are higher than those indicated by existing data from mature forests.

For the TFL 15 timber supply analysis the approach used by the licensee to assign site index values varied depending on stand age and leading species. Except for lodgepole pine-leading stands, Weyerhaeuser assigned available site index values from the licensee's silviculture records to all existing stands younger than age 30. For existing stands older than 30 years (except lodgepole pine), standard BCFS site indexes were used.

For lodgepole pine-leading stands the licensee adjusted site index using local information derived from growth intercept studies. These studies suggested that the average site index for lodgepole pine stands on TFL 15 should be 19 metres, six metres higher than the average indicated by the inventory. Where stands were assumed to regenerate to species other than lodgepole pine upon regeneration, the licensee used accepted site index conversion equations published by BCFS Research Branch.

The licensee provided sensitivity analysis which showed that timber supply is sensitive to changes in estimated site index. Increasing and decreasing the estimated site index respectively increases and decreases long-term timber supply compared to the base case harvest forecast since site productivity directly influences the rate of stand growth. However, short-term timber supply was not impacted compared to the base case.

I have reviewed the site index assignments for TFL 15 and note that lodgepole pine site index estimates used in the base case may on average be somewhat higher than the results indicated by recent provincial OGSI studies. However, the site index estimates for pine represents the best available information and I accept it for use in this determination.

For stands over age 30 other than lodgepole pine, the findings of OGSI studies and the results of other site index investigations elsewhere in the province suggest that there is a high likelihood that future stand yields may be significantly underestimated in the long-term compared to the base case forecast. I have considered this below in my Reasons for decision.

I accept Weyerhaeuser's use of adjusted site index estimates for lodgepole pine stands and encourage the licensee to further refine site productivity estimates for lodgepole pine and other species before the next analysis.

- volume estimates for regenerated stands

Volume estimates for regenerated stands were derived using the Table Interpolation Program for Stand Yields (batch TIPSYS version 1.0) growth and yield model. This computer program was developed by the BCFS and is accepted in B.C. as an appropriate model for projecting yields from managed even-aged stands.

In the timber supply analysis, all existing stands less than 30 years old—except those with no history of silviculture treatments—are assumed to be managed. Future stands were assumed to regenerate to preferred species compositions assigned by the licensee. BCFS Research Branch staff reviewed and approved all managed stand yield tables used in the analysis.

Weyerhaeuser provided a sensitivity analysis to demonstrate the impact on timber supply of increasing and decreasing regenerated stand yields by ten percent. The results indicated that the base case harvest forecast is very sensitive in the medium-and long-terms to changes in regenerated stand yields. However, I have no further evidence that suggests these volumes may be over- or under-estimated beyond the uncertainty noted in the previous section on site productivity estimates.

Having reviewed the assumptions used in the base case as well as the associated sensitivity analysis, I am satisfied that the estimates of regenerated stand volumes appropriately represent past and likely future management. I therefore find them acceptable for use in this determination.

- aggregation procedures

For the timber supply analysis, the inventory for TFL 15 was aggregated into 35 analysis units based on inventory type group (leading species) and productivity. Weyerhaeuser developed area weighted site index values for each analysis unit based on the site index and species composition of individual polygons. Existing and managed stand yield tables were generated for each of these analysis units using standard procedures.

I have reviewed the approach used and consider the licensee's analysis unit definitions and aggregation procedures to effectively capture the productivity of this unit. I therefore find them acceptable for use in this determination.

- operational adjustment factors (OAFs)

To account for the loss of timber volume due to operational conditions, the licensee applied Operational Adjustment Factors (OAFs) to the yield projections for regenerated stands used in the timber supply analysis. Weyerhaeuser applied a ten percent OAF for

unmapped stand openings and espacement (OAF 1) and a five percent OAF to account for decay and other age-related losses such as waste and breakage during harvest (OAF2).

While the OAF 1 used is lower than values applied in other units, the licensee indicates that the reduction factor is appropriate because recent inventory work provides better resolution and mapping of non-productive areas. BCFS District staff advise that the OAF 1 used in the timber supply analysis may not adequately account for mistletoe damage in Douglas-fir, lodgepole pine and larch stands. BCFS Research Branch staff have also reviewed the licensee's OAFs and while they have approved them, suggest that they may somewhat underestimate the impact of operational conditions. However, no better information is currently available.

I have reviewed the OAFs applied in the analysis and agree that the precise impact of mistletoe infection on stand yields is uncertain and requires further investigation. I acknowledge Weyerhaeuser's commitment to develop a mistletoe management strategy and to conduct ongoing surveys of non-productive openings on TFL 15. I note that any new information from these studies will help further refine OAFs. However, in the absence of better available information, I accept the licensee's assumptions for the purposes of this determination.

- minimum harvestable ages

Minimum harvestable age is an estimate of the earliest age at which a stand has grown to a harvestable condition. Changing the minimum harvestable age generally affects when second growth stands will be available for harvest and, accordingly, how quickly existing stands may be harvested. 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 TFL 15 timber supply analysis the minimum harvestable ages of stands were based on minimum stand volume criteria which varied by analysis unit. Minimum harvestable age was assumed to occur when the age at which the VDYP- and TIPSYP-generated stand volume was equivalent to a minimum stand volume assigned by the licensee.

In the analysis Weyerhaeuser incorrectly used gross volume rather than merchantable stand volume as a basis for assessing minimum harvestable age. As a result, it is likely that some stands are harvested at less than the intended minimum harvestable age. However, the licensee provided information to confirm that none of the volumes harvested during the simulation were significantly below the intended minimum stand volumes.

I have reviewed the assumptions used in the analysis and acknowledge that predicting the age at which stands may be harvested in the future is difficult and subject to considerable uncertainty. I note that the licensee's sensitivity analysis showed that medium-term timber supply is very sensitive to minimum harvestable age. Increasing minimum harvest age has a negative impact on timber supply beginning in decade two compared to the base case because relatively few stands of sufficient age are available for harvest. By contrast, increasing minimum harvestable age showed only a small increase in timber supply compared to the base case projection.

Having considered the age and volume criteria which were applied in the analysis, I accept the minimum harvestable ages modelled in the base case as satisfactory for use in this determination. However, I remain mindful of the uncertainty regarding choice of minimum harvest age and the potential impact on medium-term timber supply should stands be harvested at ages other than those assumed in the analysis. I expect the licensee to continue to refine the assumptions governing minimum harvestable age and update or revise them in accordance with product objectives and operational experience.

Harvest profile

The licensee assumed stands would be harvested according to a specific species profile in the base case timber supply. In the model the oldest pine stands are harvested first followed by the oldest stands of other leading species. Following harvesting, stands within the 'Stocking Class 4 Zone' are converted to the 'General Management Zone'.

Having reviewed the assumptions applied in the analysis and having discussed them with BCFS Penticton District staff, I find that the method used to model the harvest profile adequately reflects current practices and is therefore acceptable for use in this determination. I note that the current AAC includes a partition to harvest 6000 cubic metres per year from the 'Stocking Class 4 Zone' and have discussed this further in my Reasons for Decision.

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

Regeneration delay

Regeneration delay is the period between harvesting and the time at which an area becomes occupied by a specified minimum number of acceptable, well-spaced seedlings. During timber supply analysis regeneration delays are normally accounted for within the timber supply model or applied directly to the regenerating stands yield tables but not both.

In the timber supply analysis the licensee intended to assign regeneration delays ranging from two to five years based on species, regeneration method and site type. These delays were applied in the licensee's timber supply model. BCFS District staff find that the intended regeneration delays adequately reflect current practice. However, Weyerhaeuser

inadvertently applied the regeneration delays in the derivation of managed stand yield tables, effectively doubling the intended regeneration delays.

The licensee provided a sensitivity analysis which showed that applying the regeneration delays to either the model or the yield tables (but not both) projects an increase in timber supply compared to the base case by a small amount. I have discussed this below in my Reasons for decision.

Not-satisfactorily-restocked areas

Not-satisfactorily-restocked (NSR) areas consist of productive forest land that has been denuded and has failed, partially or completely, to regenerate either naturally or by planting or seeding to the specified or desired “free growing” standards for the site. These areas consist of “backlog” NSR areas—areas in which harvesting or other disturbance occurred before 1987—and “current” NSR.

On TFL 15 there are approximately 2028 hectares of NSR area on the timber harvesting land base. About 128 hectares are presently classified as backlog NSR and the balance (1900 hectares) is considered current NSR. I note the area reported as current NSR is significantly larger than suggested by the current annual area harvested. The licensee maintains that the temporary increase in AAC during 1992-1994 due to the mountain pine beetle infestation has contributed to the wide variation in the annual area harvested. The licensee further suggests that some of these areas are in fact sufficiently regenerated but have not yet been surveyed to confirm it.

Having reviewed the information and in the absence of better information, I accept the licensee’s assumptions regarding NSR areas as modelled in the base case. I acknowledge the licensee’s commitment in MP No. 8 to survey and review the status of these areas. Before the next determination I request that the licensee review the modelling assumptions to provide a more accurate accounting of NSR areas. The results of these assessments can be incorporated into the next determination.

Impediments to prompt regeneration

Weyerhaeuser’s ESA inventory identified a total of 2762 hectares of areas where stand regeneration would be difficult to re-establish. In the timber supply analysis, the licensee excluded 100 percent of areas classified as having severe regeneration problems (Ep1) and 60 percent of areas classified as having moderate regeneration problems (Ep2) from the timber harvesting land base. BCFS Penticton Forest District staff agree with the assumptions used to exclude these areas. Having reviewed the ESA classification and the criteria used in the analysis, I accept that this factor has been accounted for appropriately.

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

The predominant silvicultural systems currently in use on TFL 15 are clearcutting and clearcutting with reserves. According to Weyerhaeuser, selection systems are rarely applied on TFL 15. Even-aged management was therefore appropriately assumed in the base case.

Having reviewed this with BCFS District and Regional staff, I am satisfied that the information as modelled adequately reflects current management on the TFL and find it suitable for this determination. I note that the licensee also accounted for wildlife tree patches in the analysis and I have discussed this below under stand-level biodiversity.

Basic silviculture

Basic silviculture on TFL 15 includes site preparation, planting of suitable species, and treatments to ensure that regenerated areas achieve free-growing status within a specified period. In the timber supply analysis, harvested areas are assumed to be regenerated with a mix of various coniferous species through planting and natural regeneration. Initial stocking densities were modelled at 1000 to 1600 stems per hectare for planted stands, 3000 or 10 000 stems per hectare for natural stands, and 4444 stems per hectare to simulate those planted stands with significant natural in fill. Having reviewed the regeneration assumptions employed by the licensee, I find they reasonably reflect current practice and therefore accept them for use in this determination.

Intensive silviculture

Intensive silviculture activities include commercial thinning, juvenile spacing, pruning, fertilization, and genetic improvement. I will discuss these treatments below under their appropriate sections.

- genetic improvement

The aim of tree improvement is to breed trees with increased growth rates, improved wood properties and greater resistance to insect pests and diseases. To account for the use of improved seed on TFL 15, Weyerhaeuser applied a five percent increase in yield to 90 percent of planted spruce and lodgepole pine stands beginning in the year 2000. BCFS Research Branch staff have reviewed the estimates and accept the volume gains applied in the analysis.

I acknowledge the licensee's use of genetically improved seed and am satisfied that the assumptions used in the timber supply analysis reasonably reflect current practice, and therefore accept them for use in this determination.

- fertilization

No areas of TFL 15 have yet been fertilized nor have specific areas been identified for future treatments. Therefore the licensee appropriately did not account for fertilization in the base case harvest forecast. If and when any fertilization treatments are planned and implemented operationally, I will consider the associated impacts in future AAC determinations.

- juvenile spacing

TFL 15 includes areas which typically regenerate to dense stands of lodgepole pine. In the timber supply analysis, Weyerhaeuser assumed that 6571 hectares these areas will be juvenile spaced to a target density of 2200 stems per hectares when the stands reach 12 years old. Current practice is to space these areas subject to funding availability. Weyerhaeuser and BCFS District staff confirm that this target density meets their forest product objectives such as wood quality.

While treatments may improve stand value, I note that as a general rule, juvenile spacing is unlikely to significantly impact stand volume across a wide range of stand densities. In addition, the licensee provided sensitivity analyses which showed that changing the juvenile spacing targets had no significant impact on the base harvest forecast.

Having reviewed the criteria and assumptions used in the timber supply analysis, I am satisfied that the spacing assumptions used in the model adequately reflect current practice. I therefore accept them for use in this determination and have made no further adjustments.

- commercial thinning

Commercial thinning is the harvesting, in a maturing stand, of trees large enough to be considered a commercial product. While I note that single-entry commercial thinning regimes do not generally increase the yield of specific stands, they can provide opportunities to harvest timber in areas where harvesting would otherwise be limited to meet a variety of other resource objectives.

I acknowledge that the licensee is investigating opportunities for commercial thinning in selected stands. However, no commercial thinning operations have been completed to date and there are currently no specific plans to initiate a program on TFL 15.

Commercial thinning was therefore appropriately not modelled in the timber supply analysis. I acknowledge that the timber supply analysis reflects current operational practice and thus have made no associated adjustment to the base case harvest projection for this determination.

- rehabilitation

Weyerhaeuser provided a management option to illustrate the impact on timber supply of rehabilitating 50 percent of all landings and 5 percent of all roads built before 1997. The licensee assumed that rehabilitation of roads and landings would regenerate to 100 percent of pre-construction productivity and occur in the most productive areas of the TFL. While no specific areas have been identified nor treated to date, I encourage the licensee to further investigate the feasibility of rehabilitating roads where feasible, noting that that this practice increases the productive land base of the TFL and augments the area available for timber production.

TFL 15 also includes approximately 2023 hectares of stocking class 4 lodgepole pine stands. These stands are currently over-stocked and will not realize their full timber production capability because of intense competition for nutrients, moisture and light. In the base case simulation 1436 ha of these over-stocked areas are assumed to be converted in approximately 45 years, consistent with the current average annual rate of harvest (55 hectares per year) in these stands. The licensee provided several sensitivity analyses to show that more rapid conversion of these stands increases timber supply in the medium term compared to the base case harvest flow. However, the licensee suggests that since the stocking class 4 areas are geographically concentrated, adjacency constraints may preclude increasing the rate of conversion of these stands.

Therefore for the purposes of this determination I accept the base case assumptions as modelled. If and when specific plans to rehabilitate roads and landings or accelerate conversion of overstocked stands are demonstrated operationally, I will consider the potential timber supply impacts in future determinations.

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

Utilization standards

Utilization standards define the species, dimensions and quality of trees that must be harvested and removed from an area during harvesting operations. These standards were incorporated into the timber supply analysis to estimate minimum merchantable stand volume for existing and regenerating stands.

In the TFL 15 timber supply analysis, current interior utilization standards were assumed for all species except for spruce, balsam and lodgepole pine. For these species a 25-centimetre stump height rather than a 30-centimetre height was used in the base case. To account for the reduced stump heights, the licensee applied a one percent increase in yield table volumes for these three species. This approach was approved by BCFS Research Branch.

Weyerhaeuser provided a survey of stump heights which suggests that average stump heights for spruce, balsam and lodgepole pine on TFL 15 are 20 centimetres, even lower than what was assumed in the base case. District staff confirm that the stump heights used in the analysis reasonably reflect current practice, except for spruce, balsam and lodgepole pine which may average 20 centimetres as suggested by the licensee.

The licensee provided a sensitivity analysis to demonstrate the impact on timber supply of varying stump height for lodgepole pine, spruce and balsam. The analysis showed that the medium- and long-term timber supply projected in the base case shows sensitivity to increased and decreased utilization of tree stumps.

I acknowledge that the utilization standards regarding the minimum diameters used in the timber supply analysis reasonably reflect current practice. Reducing stump heights increases the volume of timber recovered and increases the base case timber supply by a small amount in the medium and long term.

For this determination, I am prepared to accept that stump heights have been adequately modelled and suitable for use in this determination.

Decay, waste and breakage

To account for decay, waste and breakage, the licensee generated yield tables using loss factors for Forest Inventory Zone D. This approach was reviewed and accepted for use in the timber supply analysis by BCFS Resources Inventory Branch staff.

I consider the estimates for decay, waste and breakage used in the timber supply analysis to reflect the best available information and suitable for use in this determination.

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

Integrated resource management objectives

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

- non-timber resource inventories and assessments

From 1990 to 1997, inventories for environmentally sensitive areas (ESAs), recreation resources, landscape, range wildlife, riparian and archaeological resources, were conducted or updated. These inventories, reviewed and accepted by BCFS Kamloops Forest Region and Penticton District staff, were used to develop data assumptions for the timber supply analysis as further discussed below under the appropriate sections.

- sensitive soils

Environmentally sensitive soils identified on the TFL are classified as highly unstable or moderately unstable and sensitive to disturbance. Based on the licensee's 1990 soils ESA inventory, Weyerhaeuser identified 2076 hectares of areas with highly and moderately sensitive soils on the TFL. In the base case, 100 percent of each area classified with highly sensitive soils and 60 percent of each area classified with moderately sensitive soils were excluded from the timber harvesting land base. BCFS staff accept the licensee's assumptions and accounting for sensitive soils.

Having reviewed the information and discussed the assumptions with BCFS Penticton District staff, I find that the assumptions used to account for sensitive soils suitably reflect current practices and are appropriate for this determination.

- archaeological sites

An Archaeological Overview Assessment was completed in March 1997. To date no areas within the productive forest have been identified as requiring protection for cultural heritage or archaeological resources.

I acknowledge Weyerhaeuser's commitment in MP No. 8 to work with First Nations groups to identify and protect heritage resources on TFL 15. At this time I have no information to suggest whether, or to what extent, the timber supply in TFL 15 may be affected by archaeological or historical values. However, additional assessments may be completed before the next timber supply analysis. If the results of these assessments indicate a need to exclude areas from the timber harvesting land base, the impact on timber supply will be considered in future AAC determinations.

- recreation

Recreation use on TFL 15 involves primarily boating and fishing on Solko Lake as well as winter use of designated logging roads as cross country ski trails. The licensee's ESA inventory identifies 13 hectares of areas classified highly sensitive to recreation along the shore of Solko Lake. However the majority of this area overlaps with lakeshore riparian reserves which are also excluded from the timber harvesting land base; therefore no additional deduction was made for recreation concerns. For the purposes of this determination I am satisfied that the licensee has used the best available information and has adequately accounted for recreation use on the TFL.

- *wildlife habitat*

Areas within TFL 15 support large mammal species including mule deer, bighorn sheep and elk as well as various birds, reptiles, amphibians and invertebrate species. Areas with particular importance to wildlife are identified in the licensee's current ESA inventory. The inventory identifies approximately 4510 hectares as having moderate wildlife values (Ew2).

However, none of these areas was removed from the timber harvesting land base to specifically account for wildlife values. Instead, the licensee modelled a 'Wildlife Management Zone' covering 11 989 hectares of TFL 15. The zone approximates the areas within TFL 15 identified as mule deer winter range as proposed in the draft *Okanagan/Shuswap Land and Resource Management Plan* (LRMP). In the analysis, the habitat requirements of other large mammals including bighorn sheep and elk are assumed to be addressed through the seral stage distribution and management practices described below under landscape-level biodiversity.

Consistent with the Forest Practices Code *Operational Planning Regulation*, the BCFS Penticton District Manager and the designated environment official have established management objectives for the ungulate winter range areas on TFL 15. The specific areas and the associated ungulate management guidelines are provided in the *Okanagan Integrated Resource Management Timber Harvesting Guidelines* (OKTHG). The 'Wildlife Management Zone' closely follows these areas and for the purposes of the analysis provides an adequate representation of the ungulate winter range areas on TFL 15.

In the base case the licensee applied a single forest cover constraint intended to simulate basic thermal cover requirements. In the model, no more than 30 percent of the 'Wildlife Management Zone' was permitted to be less than three metres in height at any given time. Detailed examination of analysis results showed that in the base case harvest forecast, thermal cover requirements were easily met throughout the planning horizon.

The OKTHG recommend that harvesting within winter range areas be conducted in small patches less than five hectares in size. While limitations in the model did not permit explicit simulation of cutblock size, examination of analysis results showed that the number and size of areas harvested during the forecast period are reasonably consistent with the guidelines.

The guidelines also suggest that a minimum of 40 percent of ungulate winter range areas should be covered with stands over 20 metres tall. In the timber supply analysis, Weyerhaeuser did not apply this forest cover requirement to the 'Wildlife Management Zone' in the base case. However, the licensee did include this constraint in an alternative harvest option, and despite more relaxed seral stage requirements, this option projected significantly higher short- and medium-term timber supply compared to the base case. Weyerhaeuser therefore reasoned that the ungulate winter range forest cover requirements

should also be attainable in the base case harvest forecast without impacting timber supply.

Having reviewed the criteria and method used in the analysis, I accept the information regarding ungulate winter range as modelled and have made no adjustments on this account. I acknowledge Weyerhaeuser's stated commitment to manage sheep habitat and mule deer winter range on TFL 15 including development of an access management strategy for sheep habitat areas. I also note that in conjunction with BCFS and BC Environment staff, the licensee will be reviewing and updating ungulate winter range areas by October 15, 2003, as required by the *Operational Planning Regulation* of the Forest Practices Code. Any new information can be incorporated into subsequent timber supply analyses.

TFL 15 also provides habitat to rare and endangered wildlife species including numerous birds and reptiles. The Province's *Identified Wildlife Management Strategy* (IWMS) contains provisions to manage for these species including the establishment of *Wildlife Habitat Areas*. The IWMS sets an overall provincial limit of one percent on the allowable impact on the short-term timber harvest level from implementing measures for identified wildlife. For administrative purposes this impact will be measured in terms of the associated change in net land base, which will be limited to a one percent reduction provincially.

While I am currently uncertain about the extent of habitat areas that will be required within the TFL 15 timber harvesting land base to implement the IWMS, I am nevertheless mindful that a significant number of the referenced species inhabit the TFL. Since the analysis made no explicit provision for the IWMS, the medium-and long-term harvest levels may be lower than projected in the base case. I have considered this below in my Reasons for decision.

As the Province implements the IWMS for the management of species at risk, I expect the specific implications to be reflected in future timber supply analyses for TFL 15 and these will be taken into account in future AAC determinations. I note the BC Environment Interior/Okanagan regional rare and endangered species specialist is currently preparing an implementation plan for identified wildlife including the area encompassing TFL 15. I encourage the licensee to refine the inventory and mapping of critical wildlife in cooperation with BC Environment specialists. Such information will reduce the uncertainty in the management of identified wildlife species and allow an assessment of the implications of wildlife management in future timber supply analyses.

- *riparian habitat*

Riparian habitats occur along streams and around lakes and wetlands. The *Forest Practices Code* requires the establishment of riparian reserve zones (RRZs) that exclude timber harvesting, and riparian management zones (RMZs) that restrict timber harvesting in order to protect riparian and aquatic habitats. Stream riparian classes are classified S1 to S6 depending on the presence of fish, stream channel width, and presence of community watersheds.

Most of TFL 15 is covered by a comprehensive stream inventory. For streams not classified in the licensee's inventory, Weyerhaeuser assigned stream classes based on local knowledge. Using GIS-based techniques and the widths specified in the *Riparian Management Area Guidebook*, the licensee mapped riparian reserve zones adjacent to the streams, lakes and wetlands to approximate the area in RRZs on TFL 15. These areas, totalling approximately 600 hectares for streams and 56 hectares for lakes and wetlands were excluded from the timber harvesting land base.

To account for harvesting within stream RMZs, the licensee assumed harvesting would result in an average 25 percent volume retention for all stream classes except for S6 streams where a five percent retention was assumed. Using this method an equivalent area of 322 hectares was deducted from the timber harvesting land base to account for stream RMZs. Weyerhaeuser suggests—and BCFS Penticton District staff confirm—that in practice however, almost all merchantable timber is removed from the stands within the stream RMZ during harvesting.

For lake and wetland RMZs the licensee applied the appropriate widths and percent retention detailed in the *Riparian Management Area Guidebook* and *Lake Classification and Lakeshore Management Guidebook, Kamloops Forest Region*. An additional 175 hectares of productive forest were removed to account for lake and wetland RMZ's.

I have reviewed and considered the modelling assumptions used to represent riparian areas on TFL 15. I acknowledge the licensee's inventory of riparian areas represents the best information available and I accept the deductions made for lakes and wetlands.

For streams, I note that current practice is to harvest most of the volume within the RMZ while in the model, significant volume was retained adjacent to S2, S3, and S5 streams. I recognize that this introduces some uncertainty to the base case harvest forecast. However, the Forest Practices Code does promote retention of trees within RMZs and the licensee's assumptions reasonably reflect this objective. I therefore accept the procedure used for the purposes of this determination, but encourage the licensee to investigate and refine their management objectives for RMZs before the next analysis. Any new information can be incorporated into the next determination. I note that regardless of the assumptions made in the analysis, the licensee is required to meet the standards of the *Forest Practices Code* during operations in riparian areas.

- green-up and adjacency

Green-up time refers to the period following harvesting necessary for a regenerating stand to attain a specified condition, here expressed in terms of stand height and stocking. Current harvesting practices limit the size and shape of cutblocks, and establish minimum green-up conditions as a means of moderating the effect of additional harvesting in adjacent stands. Adjacency and green-up requirements provide for a distribution of harvested areas and retention of forest cover in a variety of age classes across the landscape.

In the TFL 15 base case, the licensee used a green-up height of three metres in the 'General Management', 'Stocking Class 4' and 'Wildlife Management' zones. The licensee assumed that at any time, no more than 30 percent of the productive land base may consist of stands of trees less than three metres tall. Although the constraint was applied to the productive land base rather than the timber harvesting land base, the methodology used is typical of many timber supply analyses. BCFS District staff indicate that the assumptions applied reflect current practice on the TFL. Detailed examination of analysis results showed that throughout the planning horizon, disturbance levels in the 'General Management' and 'Stocking Class 4' zones fall within the maximum permitted disturbance.

Weyerhaeuser provided a sensitivity analysis which demonstrated that timber supply on TFL 15 is highly sensitive to changes in the maximum permitted percent disturbance. The results showed that reducing the permitted disturbance in the 'General Management', 'Stocking Class 4' and 'Wildlife Management' zones by five percent significantly reduces short- and medium-term timber supply compared to the base case harvest forecast. By contrast, relaxing the permitted disturbance increases short- and medium-term timber supply.

I have reviewed the data and related sensitivity analysis and discussed the implications with BCFS staff. I find the licensee's assumptions regarding adjacency and green-up reflect current practice and are reasonable for use in this analysis. While I accept the licensee's base case projection for this determination, as discussed below under Twenty-year plan, I note that the existing distribution of harvested areas on the TFL limits the flexibility of future harvesting opportunities in the short- and medium-terms.

- watershed considerations

No community watersheds exist within TFL 15 and Weyerhaeuser did not provide any explicit accounting for water resources. In the timber supply analysis, management of watersheds is broadly accounted for within the adjacency and green-up considerations.

I acknowledge the licensee's commitment to conduct where necessary appropriate resource inventories and assessments to protect water resources. The results of any assessments can be incorporated into future analyses. For this determination, I accept the assumptions applied in the base case as adequately reflecting current practice. I note that that regardless of this analysis, the licensee is required to meet the requirements of the *Forest Practices Code* with regard to the management of water resources.

- *visually sensitive areas*

Careful management of scenic areas near recreational sites, highways and lakes is an important IRM objective and is part of the BCFS mandate to manage the recreation resource. "Recreation resource" is defined in the *Forest Practices Code* to include a "scenic or wilderness feature or setting that has recreational significance or value." In order to manage such scenic features, visual landscape foresters in British Columbia, in collaboration with specialists in other parts of the world, have developed procedures for identifying and managing visually sensitive areas. These procedures incorporate both biophysical (e.g., slope, topography) and social factors to provide recommended visual quality objectives (VQOs) that specify an acceptable amount of visible disturbance in a given area.

To meet these objectives, constraints must be placed on timber harvesting, road building and other forest practices in the sensitive areas. The constraints are based on research and experience and on public preferences and acceptance of degrees of alteration of visual landscapes. The constraints are normally expressed in terms of forest cover requirements that relate to the maximum allowable percentage of a viewshed that can be harvested at any one time, and to "visually effective green-up"—that is, the stage at which regeneration has been shown to be visually acceptable to the public.

For TFL 15, a forest landscape inventory identified 5008 hectares of the timber harvesting land base as visually sensitive. This assessment included 1946 hectares within a 'Landscape Management Zone' as well as 3062 hectares in the 'Wildlife Management Zone' (as discussed above under *wildlife habitat*). In the base case, the licensee used BCFS procedures to determine the proportion of allowable disturbance for each of three VQOs (modification, partial retention and preservation) in the 'Landscape Management Zone'. Visually effective green-up was assumed to occur when stands achieve a height of 4.5-metres. A sensitivity analysis showed that increasing the green-up height in the Landscape Management Zone from 4.5 to six metres had no impact on the base case harvest flow.

For the 'Wildlife Management Zone' the licensee assumed that the criteria applied in the analysis to account for wildlife would also accommodate VQOs. The analysis showed that throughout the simulation period, within the 'Wildlife Management Zone' the percent denudation remained significantly below the maximum permissible level in the area encompassing the modification VQO, but somewhat above the permissible level in the area covered by the partial retention VQO. However, the licensee contends that both constraints could in fact be achieved by slightly increasing the proportion of harvesting in

the modification VQO and decreasing it in the partial retention VQO. BCFS Timber Supply Branch staff agree with this assessment.

I acknowledge that VQOs have been established for TFL 15. While the licensee did not explicitly account for these objectives in the 'Wildlife Management Zone', having reviewed the approach used as well as outputs from harvest simulations, I conclude that visually sensitive areas were adequately accounted for in the timber supply analysis. I therefore consider the information appropriate for use in this determination. I also recognize that management of visually sensitive areas may be further refined through the eventual completion and implementation of the Okanagan Shuswap LRMP. Any new information can be applied in subsequent analyses.

- *biodiversity*

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 and ecosystems, and the evolutionary and functional processes that link them. Under the *Forest Practices Code*, biodiversity in a given management unit is assessed and managed at the stand and landscape levels. In the timber supply analysis for TFL 15, areas both within and outside of the timber harvesting land base were assumed to contribute to meeting biodiversity requirements.

- *stand-level biodiversity*

Stand-level biodiversity is managed by retaining reserves of mature timber, or wildlife tree patches, within cutblocks and in adjacent inoperable and other retained areas to provide structural diversity and wildlife habitat.

In the timber supply analysis for TFL 15, Weyerhaeuser applied accepted procedures from the *Biodiversity Guidebook* to estimate the area required for wildlife tree patches. The licensee determined the area required by biogeoclimatic subzone and assumed that up to 50 percent of wildlife tree patch requirements would be met in riparian management areas and other constrained areas. Using this approach the licensee deducted a total of 1495 hectares from contributing to the timber harvesting land base to account for stand-level biodiversity.

I note the licensee's assumptions are consistent with the provisions of the *Biodiversity Guidebook*. Weyerhaeuser used an appropriate methodology and I therefore accept the information as modelled and suitable for use in this determination.

- *landscape-level biodiversity*

Landscape-level biodiversity objectives involve maintaining forests with a variety of patch sizes, seral stages, and forest stand attributes and structures across a variety of ecosystems and landscapes. The *Biodiversity Guidebook* is based in part on the principle that maintaining such attributes and structures, together with connectivity of ecosystems and the maintenance of forested areas of sufficient size to maintain forest interior habitat conditions, will provide for the habitat needs of most forest and range organisms.

A major consideration in managing for biodiversity at the landscape level is leaving sufficient and appropriately located patches of old-growth forests for species dependent on, or strongly associated with, old-growth forests. Although some general forest management practices can broadly accommodate the needs of most species, more often a variety of practices is needed to represent the different natural disturbance patterns under which specific ecosystems have evolved. Natural disturbance patterns vary from frequent wildfires in the dry interior regions to rare stand disturbance events in the wetter coastal regions.

The delineation and formal designation of “landscape units” is a key component of a sub-regional biodiversity management strategy. A range of biodiversity emphasis options may be employed when establishing biodiversity management objectives for a landscape unit. The *Biodiversity Guidebook* outlines three biodiversity emphasis options—lower, intermediate and higher. If a reasonable distribution of options is maintained across the land base, it is generally considered that biodiversity can be maintained in conjunction with harvesting options.

For areas where landscape units have not been formally established, or an emphasis option has not been assigned for a landscape unit, in accordance with the *Biodiversity Guidebook*, the lower biodiversity emphasis option is used as a default to guide operations pending establishment of landscape units and objectives. Current government policy, intended to balance social and economic impacts against the risk to biodiversity, stipulates that the eventual distribution of emphasis options within a sub-regional planning unit should include approximately 45 percent of the area within the lower, 45 percent in the intermediate, and ten percent within the higher biodiversity emphasis options.

For certain landscape units where old seral forests are in short supply but the economic and social consequences are deemed unacceptable, the *Biodiversity Guidebook* allows additional harvesting flexibility. In these cases a minimum of one third of the old seral forest retention objective in lower emphasis areas described in the guidebook must be retained and the shortfall recruited over time so that the intended old seral forest retention objective is in place within three rotations.

Landscape units and their corresponding biodiversity emphasis options have not yet been established in the Penticton Forest District. However a draft landscape unit encompassing TFL 15 has been proposed. In the timber supply analysis, Weyerhaeuser therefore assumed a distribution of 45 percent lower, 45 percent intermediate and ten percent higher biodiversity emphasis—consistent with current government policy. For the proportion of lower biodiversity emphasis areas, in the analysis Weyerhaeuser applied the old seral constraint at an initial level of one third the requirement, increasing to the full requirement by the end of the third rotation.

In the base case the licensee demonstrated that in the NDT3 subzone variants, old seral requirements were easily met throughout the planning horizon. These areas comprise 56 percent of the productive forest land base of TFL 15. For NDT4 areas, old seral requirements were not met initially, but were readily achieved within the first 80 years of the simulation.

Weyerhaeuser also provided several sensitivity analyses to demonstrate the impact of varying landscape-level biodiversity requirements. The analyses showed that if the old seral forest retention objective is not reduced to one third of the requirement in lower biodiversity emphasis areas, the medium- to long-term timber supply is significantly reduced compared to the base case harvest forecast. When intermediate biodiversity emphasis was assumed, timber supply was severely impacted throughout the planning horizon compared to the base case. The licensee also provided a sensitivity analysis which assumed the lower biodiversity emphasis applied to the entire TFL rather than the 45 percent lower, 45 percent intermediate and 10 percent higher distribution. It demonstrated that short- and medium-term timber supply increased from a high of 62 000 cubic metres per year in the base case to approximately 86 000 cubic metres per year in the lower biodiversity emphasis sensitivity.

Because there is a reasonable probability that lower biodiversity emphasis will eventually be assigned on the entire TFL, I also requested that Weyerhaeuser provide an additional sensitivity analysis to assess the impact of this assumption combined with a possible 18 percent underestimation of existing stand volumes (discussed previously under *inventory audit*). Compared to the base case harvest forecast, timber supply declined by over 10 percent in the first decade and an additional 40 percent by decade three.

Having reviewed the assumptions regarding landscape-level biodiversity and the associated sensitivity analyses, I conclude that timber supply is highly sensitive throughout the harvest forecast to different biodiversity emphasis options. I am aware that should lower biodiversity emphasis be assigned to the TFL, short- and medium-term timber supply would increase dramatically compared to the base case harvest forecast. However, landscape units and biodiversity emphasis options have not yet been formally established on TFL 15. As a result, I accept the landscape-level biodiversity assumptions applied in the base case as consistent with provincial and suitable for this determination

Nevertheless, I acknowledge that the biodiversity emphasis option(s) that will eventually be applied to the TFL could be less constraining to timber supply than depicted in the base case and have discussed this further in my Reasons for decision.

While landscape units have not yet been established on TFL 15, I note that operationally the licensee will be obliged to develop plans and strategies consistent with the ongoing and eventual management of landscape units. Once the landscape units and biodiversity options are formally established, the potential timber supply impacts will be incorporated into future timber supply analyses.

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

Okanagan/Shuswap Land and Resources Management Plan

In addition to the *Ministry of Forests Act* and the *Forest Practices Code of B.C. Act*, the *Okanagan/Shuswap Land and Resources Management Plan* (LRMP) will provide sub-regional planning guidance to the management of forest and range resources in the region. The approved LRMP will establish goals, objectives and strategies for managing the land and resources within the planning area. The LRMP will also recommend landscape unit boundaries and biodiversity emphasis options within these landscape units. When approved by Cabinet, the plan can be considered for designation as a "higher level plan," as defined by the *Forest Practices Code of British Columbia Act* and regulations.

Consistent with the chief forester's Guiding Principles, I cannot speculate on the potential impact on timber supply of eventual approved management practices within specific resource management zones or new protected areas that may be created within the TFL 15 area. I acknowledge that completion and implementation of the LRMP may in future impact the timber supply of TFL 15 and am mindful that subsequent determinations for TFL 15 will reflect the ongoing implementation of the LRMP.

Twenty-year plan

The purpose of the 20-year plan is to show if the harvest volume projected in the base case over the next 20 years can be appropriately configured in specific areas on the landscape.

The 20-year plan for TFL 15 has been conditionally accepted by the BCFS Penticton District Manager. The licensee assumed a harvest level of 86 000 cubic metres per year—8000 cubic metres greater than the current level and 16 000 cubic metres per year more than the initial harvest level assumed in the base case forecast. The plan was based on the assumptions that lower emphasis biodiversity will be assigned to the entire TFL and that old seral stage requirements will be met by the end of three rotations.

The District Manager raised concerns that the latter assumption may not be consistent with the recently released *Identified Wildlife Strategy*, given the potential number of rare and endangered species residing within the TFL. Concerns were also expressed regarding cutblock size and configuration within the ‘Landscape Management Zone’ and the ‘Wildlife Management Zone’. I also acknowledge that, as discussed above under *landscape-level biodiversity*, landscape units and biodiversity emphasis options have not yet been formally established on TFL 15.

In summary, I recognize that it may be difficult for the licensee to distribute the proposed harvest exactly as configured in the 20-year plan. I am also mindful that the 20-year plan is not an operational plan and recognize that it provides just one alternative distribution of the proposed harvest over time. I am satisfied that for at least the first five-year period, the initial harvest level in the base case can be achieved and therefore find the 20-year plan acceptable for use in this determination.

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

Alternative harvest flows

Weyerhaeuser did not provide alternative harvest flows using base case assumptions. However, the licensee did provide several alternative harvest flows based on different modelling assumptions than applied in the base case.

One alternative—discussed previously under *landscape-level biodiversity*—assumed that a lower biodiversity emphasis option would be assigned to the entire TFL. In this forecast a non-declining harvest level of 86 000 cubic metres per year could be maintained for four decades before rising to medium- and long-term harvest levels that were similar to those projected in the base case.

Another alternative tested the harvest level that could be attained by applying the Okanagan IRM Timber Harvesting Guidelines. These guidelines require that 10 percent of the productive forest be maintained in an old growth condition. In this alternative a non-declining harvest level of 86 000 cubic metres per year could again be maintained for approximately four decades before rising to a long-term harvest projection of over 120 000 cubic metres per year.

These harvest projections and earlier sensitivity analyses demonstrate that old seral stage requirements significantly limit flexibility in the magnitude and duration of the initial harvest level on TFL 15. I have been mindful of this and the general timber supply dynamics of the unit in making my determination.

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

Timber processing facilities

Logs harvested from TFL 15 contribute to the fibre requirements of all of the licensee's four B.C. sawmills as well as its roundwood chipping facility in Okanagan Falls. Depending on size and species requirements, material is transferred to the appropriate facility or traded with other operators for other species or sizes. TFL 15 also supplies material to independent contractors in Bridesville and Okanagan Falls.

I note the contribution of the TFL 15 timber harvest is important to the licensee's B.C. operations and several smaller contractors in the area, and have considered this in my determination.

- (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**

Minister's letters and memorandum

The Minister has expressed the economic and social objectives of the Crown in two documents to the chief forester—a letter dated July 28, 1994, (attached as Appendix 3) and a memorandum dated February 26, 1996, (attached as Appendix 4). I understand both documents to apply to TFL 15. They are consistent with the objectives stated in the Forest Renewal Plan and include forest stewardship, a stable timber supply, and allowance of time for communities to adjust to harvest-level changes in a managed transition from old-growth to second-growth forests, so as to provide for community stability.

The Minister stated in his letter of July 28, 1994, that “any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability.” He placed particular emphasis on the importance of long-term community stability and the continued availability of good forest jobs. To this end, he asked that the chief forester consider the potential impacts on timber supply of commercial thinning and harvesting in previously uneconomical areas. To encourage this, the Minister suggested consideration of partitioned AACs. I have reviewed the opportunities for commercial thinning, and as discussed under *commercial thinning* the licensee currently has no specific plans to include this in its operations in the near future.

The Minister's February 26, 1999 memorandum addressed the effects of visual resource management on timber supply. It asked that pre-Code constraints applied to timber supply in order to meet VQOs be re-examined when determining AACs in order to ensure they do not unreasonably restrict timber supply. I have discussed this above under “*visually sensitive areas*,” where I considered the VQOs on TFL 15. I note that scenic areas have been established on TFL 15 by the Penticton District Manager, and in

accordance with the Forest Practices Code, the licensee is required to consider these areas during operational planning to ensure that scenic areas are adequately protected.

Local objectives

The Minister's letter of July 28, 1994, states that the chief forester should consider important social and economic objectives that may be derived from the public input in the timber supply review where these are consistent with government's broader objectives.

The licensee took a number of steps to provide opportunities for public review of statement of management objectives, options, and procedures (SMOOP), draft MP No. 8; and the timber supply analysis by advertising in local newspapers, holding open houses, and making the documents available for public viewing.

Five members of the public provided comments on the SMOOP. In addition, one written request and eight telephone inquiries were received by the licensee on the contents of draft MP. Comments included a request to investigate small scale harvesting opportunities, concern regarding public access near bighorn sheep range, as well as interest in road deactivation on the TFL. I have taken these concerns into account and have considered the general employment and community stability implications of TFL 15 in my AAC determination.

First Nations

The area of TFL 15 lies within the traditional territory of the Okanagan First Nation. I note that some harvesting activities on TFL 15 are contracted to the Osoyoos Indian Band. I acknowledge that Weyerhaeuser has committed to reviewing and managing the TFL in full cooperation with First Nations groups. No specific concerns affecting timber supply such as significant cultural sites have been raised to date. Should specific areas be identified, any impacts can be reflected in future determinations to the extent that they may affect timber supply.

- (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 natural causes such as fire and disease, but not recovered through salvage operations.

In the base case, the licensee applied the same estimates used in the previous timber supply analysis by deducting 2500 cubic metres annually. Weyerhaeuser estimates that net losses from insects, diseases, windthrow and fire amount to 1500, 400, 500 and 100 cubic metres per year respectively. Mountain pine beetle attacks currently account for the majority of unsalvaged losses on TFL 15 with infestations occurring on an 80 to 100 year cycle.

BCFS staff have reviewed the approach and assumptions used in the base case and suggest that the licensee's estimates may underestimate the amount of unsalvaged losses. While I agree considerable uncertainty in the estimates exists, I note that no better information is currently available. I acknowledge that the licensee's commitment to complete forest health surveys and note the results may provide more site specific information on unsalvaged losses on TFL 15.

I will consider these and any other new findings in future analyses. For this determination, in the absence of better information, I accept the accounting for unsalvaged losses as modelled.

Reasons for decision

In reaching my decision on an AAC for TFL 15, I have considered all of the factors presented above and have reasoned as follows.

For the reasons stated in “Timber supply analysis”, and from reviewing the considerations as recorded above, I accept the licensee’s ‘base case B’ as an adequate basis from which to assess timber supply for this AAC determination.

In determining this AAC, I have identified factors which, considered separately, indicate that the timber supply may be either greater or less than that projected in the base case. Generally some of these factors can be quantified and their impacts assessed with some reliability. Others may influence timber supply by adding an element of risk or uncertainty to the decision but cannot be reliably quantified at the time of the determination. These latter factors are accounted for in determinations in more general terms.

In the determination for TFL 15, I identified the following factors as possible indications of underestimation in the projected timber supply, although none are certain nor quantified:

- *site productivity estimates*: the licensee provided local site index adjustments averaging six metres to lodgepole pine leading stands. No adjustments were applied to stands composed predominantly of species other than lodgepole pine. Based on provincial Old Growth Site Index (OGSI) studies, as well as the results of sensitivity analyses for TFL 15 and other management units in the province, I concluded that future yields of stands other than lodgepole pine may be underestimated in the long term compared to the base case.
- *regeneration delay*: the licensee inadvertently included the intended regeneration delay in both the timber supply model and in the yield table computations. I concluded that timber supply may be slightly underestimated in the long-term when compared to the base case harvest projection.

Of the foregoing factors, I note that both the potential underestimates of site productivity as well as the overestimate in regeneration delay affect primarily regenerating stands and consequently influence the medium- and long-term timber supply. While not insignificant, the potential impact on timber supply occurs well beyond the duration of this AAC.

The following two factors were identified as possible indications of overestimation in the projected timber supply, although neither is certain nor quantified:

- *inventory audit*: the results of the inventory audit suggested that existing mature stand volumes may be overestimated by an average of 18 percent. Acknowledging that there is uncertainty in the audit estimate and taking guidance from several sensitivity analyses, I concluded that short- and medium-term timber supply may be severely overestimated compared to the base case forecast if the audit estimate is accurate.
- *identified wildlife*: in the timber supply analysis there was no explicit accounting of the potential impacts of identified wildlife habitat in the base case harvest projection. A number of rare and endangered species are known to occur within the boundaries of TFL 15 and I concluded that their habitat requirements may be inadequately addressed. Current provincial policy on identified wildlife limits provincial impacts to one percent. Accordingly, and in the absence of information specific to TFL 15, I concluded that the corresponding impact on the TFL is up to one percent over the forecast horizon.

Reviewing the two unquantifiable factors described above, I have considered as follows:

The statistical analysis and interpretation of the audit results were intended to broadly assess the accuracy of the new inventory and I am mindful of the limitations and methods used. I acknowledge that I am unable to quantify the precise degree to which the existing volumes are overestimated. Nevertheless, the information before me strongly suggests a prevailing trend which I cannot discount.

In the base case the initial harvest level of 62 000 cubic metres demonstrated significant instability in the harvest flow beginning as early as the second decade. For perspective, I also requested an additional sensitivity analysis which showed that even if a lower biodiversity emphasis were assigned on TFL 15, it would not offset a potential 18 percent overestimation in existing stand volumes. The sensitivity analysis showed that the current AAC of 78 000 cubic metres per year was not achievable for the first five-year period. It also showed that timber supply declined to less than 40 000 cubic metres per year by the second decade, which when compared to the current AAC, represents an average decline of over 20 percent per decade.

However, due to the uncertainty in the eventual biodiversity emphasis that will be established on the TFL, and in combination with the uncertainty in the inventory audit, it would be imprudent for me to immediately reduce the AAC by this amount. Taking guidance from the social and economic objectives of the Crown, I have considered that until I have better information, a less severe reduction than indicated by the sensitivity analysis would be more appropriate for this determination.

As discussed earlier under wildlife habitat, I noted that identified wildlife habitat requirements were not explicitly modelled in the timber supply analysis. While there may be significant overlap with other resource considerations such as riparian areas and

wildlife tree patches, I acknowledge that additional areas may be identified as inventories are improved in the future. I have also considered the government's commitment to limit impacts from identified wildlife to one percent of the provincial timber supply. However in view of the range of possible outcomes of a more accurate inventory information, the potential impacts of accounting for identified wildlife are comparatively small and I have considered them to be accounted for in my overall decision to apply caution to the harvest level given the results of the inventory audit.

Having considered and reviewed all the factors documented above and taking into account the risk and uncertainty associated with the information provided, it is my conclusion that a harvest level of 70 000 cubic metres per year—a reduction of approximately ten percent from the current AAC—represents a suitable harvest level for TFL 15 for the next five year period.

Determination

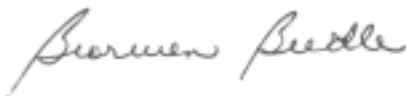
It is my determination that a timber harvest level that accommodates objectives for all forest resources during the next five years, that reflects the socio-economic objectives of the Crown for the area, that ensures longer-term IRM objectives can be met, that reflects current management practices, can best be achieved on TFL 15 at this time by establishing an AAC of 70 000 cubic metres.

This AAC does not include a partition. My determination includes the volume to be harvested in the 'Stocking Class 4 Zone' and acknowledges Weyerhaeuser's harvesting performance and commitment to continue operations in these areas during this determination period.

Implementation

This determination comes into effect on July 29, 1999 and will remain in effect until a new AAC is determined, which must take place within five years of the effective date of this determination.

In the period following this determination and leading to the subsequent determination, I strongly encourage the licensee to complete the Phase II Vegetation Resource Inventory for TFL 15.



Bronwen Beedle
Deputy Chief Forester

July 28, 1999

Appendix 1: Section 8 of the *Forest Act*

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

8. Allowable annual cut

8. (1) The chief forester must determine an allowable annual cut at least once every 5 years after the date of the last determination, for
- (a) the Crown land in each timber supply area, excluding tree farm licence areas, community forest agreement areas and woodlot licence areas, and
 - (b) each tree farm licence area.
- (2) If the minister
- (a) makes an order under section 7 (b) respecting a timber supply area, or
 - (b) amends or enters into a tree farm licence to accomplish a result set out under section 39 (1) (a) to (d),

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).

- (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,
 - (b) different types of timber and terrain in different parts of private land within a tree farm licence area, and
 - (c) gains in timber production on Crown land that are attributable to silviculture treatments funded by the government of British Columbia, the federal government, or both.
- (6) The regional manager or district manager must determine a volume of timber to be harvested from each woodlot licence area during each year or other period of the term of the woodlot licence, according to the licence.
- (7) The regional manager or the regional manager's designate must determine a volume of timber to be harvested from each community forest agreement area during each year or other period, 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 stand 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) the nature, production capabilities and timber requirements of established and proposed timber processing facilities,
- (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 *Ministry of Forests Act*

Section 4 of the *Ministry of Forests Act* (consolidated 1988) reads as follows:

Purposes and functions of ministry

- 4. The purposes and functions of the ministry are, under the direction of the minister, to
 - (a) encourage maximum productivity of the forest and range resources in the Province;
 - (b) manage, protect and conserve the forest and range resources of the Crown, having regard to the immediate and long term economic and social benefits they may confer on the Province;
 - (c) plan the use of the forest and range resources of the Crown, 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 Crown and with the private sector;
 - (d) encourage a vigorous, efficient and world competitive timber processing industry in the Province; and
 - (e) assert the financial interest of the Crown in its forest and range resources in a systematic and equitable manner.

Documents attached:

Appendix 3: Minister of Forests' letter of July 28, 1994

Appendix 4: Minister of Forests' memo of February 26, 1996



File: 10100-01

JUL 28 1994

John Cuthbert
Chief Forester
Ministry of Forests
595 Pandora Avenue
Victoria, British Columbia
V8W 3E7

Dear John Cuthbert:

Re: Economic and Social Objectives of the Crown

The *Forest Act* gives you the clear responsibility for determining Allowable Annual Cuts, decisions with far-reaching implications for the province's economy. The *Forest Act* provides that you consider the social and economic objectives of the Crown, as expressed by me, in making these determinations. The purpose of this letter is to provide this information to you.

The social and economic objectives expressed below should be considered in conjunction with environmental considerations as reflected in the Forest Practices Code, which requires recognition and better protection of non-timber values such as biodiversity, wildlife and water quality.

The government's general social and economic objectives for the forest sector are made clear in the goals of the Forest Renewal Program. In relation to the Allowable Annual Cut determinations you must make, I would emphasize the particular importance the government attaches to the continued availability of good forest jobs and to the long-term stability of communities that rely on forests.

Through the Forest Renewal Plan, the government is taking the steps necessary to facilitate the transition to more value-based management in the forest and the forest sector. We feel that adjustment costs should be minimized wherever possible, and to this end, any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability.

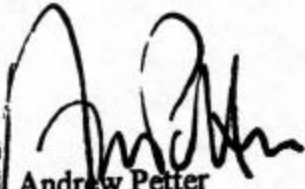
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John Cuthbert
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In addition to the provincial perspective, you should also consider important local social and economic objectives that may be derived from the public input on the Timber Supply Review discussion papers where these are consistent with the government's broader objectives.

Finally, I would note that improving economic conditions may make it possible to harvest timber which has typically not been used in the past. For example, use of wood from commercial thinnings and previously uneconomic areas may assist in maintaining harvests without violating forest practices constraints. I urge you to consider all available vehicles, such as partitioned cuts, which could provide the forest industry with the opportunity and incentive to demonstrate their ability to utilize such timber resources.

Yours truly,



Andrew Petter
Minister



File: 16290-01

February 26, 1996

To: Larry Pedersen
Chief Forester

From: The Honourable Andrew Petter
Minister of Forests

Re: The Crown's Economic And Social Objectives Regarding Visual Resources

Further to my letter of July 29, 1994, to your predecessor, wherein I expressed the economic and social objectives of the Crown in accordance with Section 7 of the *Forest Act*, I would like to elaborate upon these objectives as they relate to visual resources.

British Columbia's scenic landscapes are a part of its heritage and a resource base underlying much of its tourism industry. They also provide timber supplies that are of significant economic and social importance to forest industry dependent communities.

Accordingly, one of the Crown's objectives is to ensure an appropriate balance within timber supply areas and tree farm licence areas between protecting visual resources and minimizing the impact of such protection measures on timber supplies.


As you know, I have directed that the policy on management of scenic landscapes should be modified in light of the beneficial effects of the Forest Practices Code. In general, the new policy should ensure that establishment and administration of visual quality objectives is less restrictive on timber harvesting. This change is possible because alternative harvesting approaches as well as overall improvement in forest practices will result in reduced detrimental impacts on visually sensitive areas. Also, I anticipate that the Forest Practices Code will lead to a greater public awareness that forest harvesting is being conducted in a responsible, environmentally sound manner, and therefore to a decreased public reaction to its visible effects on the landscape. In relation to the Allowable Annual Cuts determinations that you make, please consider the effects that the new policy will have in each Timber Supply Area and Tree Farm Licence.

.../2

Larry Pedersen
Page 2

In keeping with my earlier letter, I would re-emphasize the Crown's objectives to ensure community stability and minimize adjustment costs as the forest sector moves to more value-based management. I believe that the appropriate balance between timber and visual resources will be achieved if decisions are made consistent with the ministry's February 1996 report *The Forest Practices Code: Timber Supply Analysis*.

Finally, in my previous letter I had asked that local economic and social objectives be considered. Please ensure that local views on the balance between timber and visual resources are taken into account within the context of government's broader objectives.



Andrew Petter
Minister of Forests