

**BRITISH COLUMBIA  
MINISTRY OF FORESTS**

# **Tree Farm Licence 33**

Issued to Federated Co-operatives Limited

## **Rationale for Allowable Annual Cut Determination**

**effective July 1, 1996**

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Chief Forester**

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## Objective of this Document

This document is intended to provide an accounting of the factors considered and the rationale employed in making my determination, under Section 7 of the *Forest Act*, of the allowable annual cut (AAC) for Tree Farm Licence (TFL) 33. The document will also identify where more or better information is required for incorporation into future determinations.

## Description of the TFL

TFL 33, held by Federated Co-operatives Limited (FCL), is situated north of Sicamous, along the eastern shore of Shuswap Lake within the Kamloops Forest Region. It is surrounded by the Okanagan Timber Supply Area (TSA) and administered from the Salmon Arm Forest District Office in Salmon Arm.

The total land base for TFL 33 is 8365 hectares, with a productive forest land base of 7800 hectares and a net operable land base of 7270 hectares (i.e. 93.2 percent of the productive forest land or 86.9 percent of the total TFL area). It lies within two biogeoclimatic zones—the Interior Cedar Hemlock (ICH) and the Engelmann Spruce-Subalpine Fir (ESSF). Subzones include the Shuswap moist warm (ICHmw2), Thompson moist warm (ICHmw3), Wells Gray wet cool (ICHwk1), and the Northern Monashee wet cold (ESSFwc2) variants.

The elevation of the licence area ranges from 347 metres at lake level to approximately 1700 metres on Queest Mountain. Moving from the shoreline up Queest Mountain the landscape is characterized by flat to gentle slopes, progressing to steep slopes and then culminating in a plateau with milder slopes. Lying as it does along the eastern shore of Shuswap Lake, the viewshed of the licence area holds sensitive visual values for lake users, including local cottage-owners.

## History of Present AAC

In 1959, TFL 33, covering a total land base of 8697 hectares, was issued to Shuswap Timbers Limited. The initial AAC was 10 902 cubic metres. In 1965, the company was purchased by FCL although the official transfer of quota did not take place until 1970. Also in 1970, the AAC was increased substantially to 26 505 cubic metres due to the implementation of close utilization standards and to improved information from additional inventory sampling. During the late 1970's and early 1980's the AAC was determined as high as 29 000 cubic metres. The AAC for the last management plan was 27 500 cubic metres, which included 1450 cubic metres allocated for the Small Business Forest Enterprise Program (SBFEP). The AAC history for TFL 33 is shown below.

Management Plan	Period	Licensee AAC (m <sup>3</sup> )	SBFEP AAC (m <sup>3</sup> )	Comments

1	1959-64	10 902	--	TFL 33 assigned to Shuswap Timbers Limited
2	1965-69	12 884	--	Various inventory samplings completed. Shuswap Timbers Limited purchased by FCL
3	1970-74	26 505	--	TFL 33 formally transferred to FCL. Close utilization implemented
4	1975-82	28 473	--	
5	1983-87	29 000		Licensee granted a 25 year replaceable TFL in 1980 Inventory data completed 1981
6	1988-95	26 050	1450	Licensee granted another 25 year replaceable TFL in 1995

### **New AAC Determination**

Effective July 1, 1996, the new AAC for TFL 33 is 22 500 cubic metres, including volumes harvested through the SBFEP. This represents a reduction of 5 000 cubic metres from the current AAC and will remain in effect until a new AAC is determined, which must take place within five years of this determination.

The AAC determined is lower than the figure of 25 000 cubic metres indicated in the base case primarily because a supplementary analysis undertaken by BCFS staff indicated the higher level was incompatible with visual quality objectives for the Shuswap Lake viewshed. The constraints associated with these objectives proved less than expected, however, because of overlaps with new Forest Practices Code requirements such as those for wildlife habitat.

### **Information Sources Used in the AAC Determination**

Information considered in determining the AAC for TFL 33 includes the following:

- *Okanagan Timber Supply Area Integrated Resource Management Timber Harvesting Guidelines*, British Columbia Forest Service (BCFS), February 1992;
- "Statement of Management Objectives, Options and Procedures for Management and Working Plan #7 of Tree Farm Licence 33," dated September 15, 1992;
- *Okanagan TSA Timber Supply Analysis*, BCFS, November 1993;
- Information Package, dated February 1994, submitted by Timberline Forest Inventory Consultants on behalf of the licensee;
- Timber supply analysis, dated September 1994, submitted by Timberline Forest Inventory Consultants on behalf of the licensee;
- Letter to Federated Co-operatives Limited, dated November 10, 1994, from Shuswap Environmental Action Society;

- Salmon Arm Landscape Inventory and Analysis, 1994 (BCFS);
- Proposed "Management Plan No. 7 for Tree Farm Licence No 33," dated October 25, 1994, and revised May 17, 1995, to incorporate public input;
- BCFS supplementary timber supply analyses, dated June 1995;
- "20 year plan for TFL 33," dated March 1995 and revised June 1995;
- Forest inventory planning file maintained by licensee;
- Summary of Public Input to Proposed Management Plan No. 7, prepared by Resource Tenures and Engineering Branch, BCFS, dated June 1995;
- Letter from the Regional Manager to the Chief Forester, dated June 9, 1995, regarding Proposed Management Plan No. 7, TFL 33;
- Technical review and evaluation of current operating conditions on TFL 33 through comprehensive discussions with BCFS staff, notably at the AAC determination meeting held in Victoria on June 14, 1995.
- Letter to Federated Co-operatives Limited from Chief Forester, dated July 11, 1995, regarding 1994 BCFS landscape and recreation inventory;
- Letter and detailed response to Chief Forester from Federated Co-operatives Limited, dated August 14, 1995, regarding impact of 1994 landscape and recreation inventory;
- 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 with regard to visual resources;
- *Forest Practices Code of British Columbia Act*, July 1995;
- *Forest Practices Code of British Columbia Regulations*, April 1995; and
- *Forest Practices Code Timber Supply Analysis*, BCFS, February 1996.

## **Role and Limitations of the Technical Information Used**

The *Forest Act* requires me 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 formed the major body of technical information used in my AAC determination for TFL 33. The timber supply analysis is 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 variation 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 determinations. The

information does, however, provide valuable insight into potential impacts of different resource-use assumptions and actions, and thus forms an important component of the information I must consider in AAC determinations.

In making the AAC determination for TFL 33, I have considered known limitations of the technical information provided. I am satisfied that this information provides a suitable basis for my determination.

## **Statutory Framework**

Section 7 of the *Forest Act* requires the Chief Forester to consider various factors in determining AACs for TFLs. Section 7 is reproduced in full as Appendix 1.

## **Guiding Principles**

Rapid changes in social values and in our understanding and management of complex forest ecosystems mean there is always some uncertainty in the information used in AAC determinations. Two important ways of dealing with uncertainty are (i) minimizing risk, and (ii) redetermining AACs frequently to ensure they incorporate up-to-date information and knowledge. In respect of these: (i) 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 AACs from a range of possible harvest levels; and, (ii) the benefits of frequent decision making have been recognized in the legislated requirement to redetermine AACs every five years. This principle is central to many of the guiding principles that follow.

In considering the various factors that Section 7 of the *Forest Act* requires me to take into account in determining AACs, I attempt to reflect as closely as possible operability and forest management factors that are a reasonable extrapolation from current practices. It is not appropriate to base my decision on unsupported speculation with respect 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 impact of the Forest Practices Code on timber supply is a matter of considerable public concern. In determinations made before the Code was brought into force, no final standards or regulations were available at the time the timber supply analyses were conducted. Accordingly, the analyses were unable to assess the impacts of any new constraints on timber production which might be imposed under the Code. In those determinations I did not consider any more stringent restrictions or additional impacts upon timber supply beyond those anticipated to occur due to the application of guidelines current at the time of determination. However, I assumed

that the Code would at least entrench the standards exemplified by those guidelines as statutory requirements.

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. Studies in selected TSAs (*Forest Practices Code Timber Supply Analysis*, BCFS, February 1996) indicate that under the Code there will be some impacts on timber supply additional to those expected under previous guidelines. In AAC determinations made since the coming into force of the Code, I have viewed with some caution the timber supply projections in BCFS timber supply analyses that pre-date the Code, as is the case in TFL 33. At the same time, I am mindful that the full force of the Code may not be felt during the transition phase of its implementation, and that the impacts of specific factors on timber supply may not yet have been assessed on a local basis.

The impact on the timber supply of land use decisions resulting from planning processes such as the Commission on Resources and Environment (C.O.R.E.) process or the Land and Resource Management Planning (LRMP) process is a matter often raised in discussions of AAC determinations. In determining AACs it would be inappropriate for me to attempt to speculate on the impacts on timber supply that will result from land-use decisions that have not yet been taken by government. Thus I do not consider the possible impacts of existing or anticipated recommendations made by such planning processes, nor do I attempt to anticipate any action the government could take in response to such recommendations.

Moreover, even where government has made land-use decisions, it may not always be possible to analyze the 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. Until such implementation decisions are made, it is impossible to properly assess the impact of the land-use decision. However, the legislated requirement for five-year AAC reviews will ensure such decisions are addressed.

The Forest Renewal Plan will fund a number of intensive silviculture activities that have the potential to affect timber supply, particularly in the long term. In general, it is too early for me to assess the consequences of these activities, but wherever feasible I will take their effects into account. The next AAC determination will be better positioned to determine how the Plan may affect timber supply.

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 changing. Moreover, in the past, waiting for improved data has created the extensive delays that have resulted in the current urgency to redetermine many outdated AACs. In any case, the data and models available today are far superior to those available in the past, and will undoubtedly provide for more reliable determinations.



Others have suggested that, in view of data uncertainties, I should immediately reduce some AACs in the interests of caution. However, any AAC determination I make must be the result of applying my 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 the June 1993 Delgamuukw decision of the B.C. Court of Appeal regarding "unextinguished non-exclusive aboriginal rights." The AAC I determine should not in any way be construed as limiting the Crown's obligation under the Delgamuukw decision, and in this respect it should be noted that my determination does not prescribe a particular plan of harvesting activity within the TFL. It is also independent of any decision by the Minister of Forests with respect to subsequent allocation of the wood supply. Aboriginal rights will be taken into account as far as possible under Section 7(3)(a)(v) of the *Forest Act* and will be respected in the administration of the AAC determined.

Regarding future treaty decisions: as with other land-use decisions it would be inappropriate for me to attempt to speculate on the impacts on timber supply that will result from decisions that have not yet been taken by government.

Overall, in making AAC determinations, I am mindful of my obligation as steward of the forest land of British Columbia, of the mandate of the Ministry of Forests as set out in Section 4 of the *Ministry of Forests Act*, and of my responsibilities under the *Forest Practices Code of British Columbia Act*.

## **Consideration of Factors as Required by Section 7 of the *Forest Act***

### The role of the "base case"

In considering the factors required under Section 7 to be addressed in AAC determinations, I am assisted by timber supply forecasts provided to me through the work of the Timber Supply Review project for TSAs and, for TFLs, by the licensee. (For this TFL, timber supply projections were also provided by BCFS staff.) For each determination a timber supply analysis is carried out, using a data package of information from three categories: land base inventory, timber growth and yield, and management practices. Using this set of data and a computer simulation model, a series of timber supply forecasts is produced. Each forecast is based on the same set of data and reflects different decline rates, initial harvest levels, and trade-offs between short- and long-term harvest levels.

From this range of forecasts, one is chosen that attempts to avoid excessive changes from decade to decade and significant timber shortages in the future, while ensuring the long-term productivity of forest lands. This is known as the "base case" forecast, and forms the basis for comparison when assessing the effects of uncertainty on timber supply.

Because it represents only one in a number of theoretical forecasts, and because it incorporates information about which there may be some uncertainty, the base case forecast is not an AAC recommendation. Rather, it is one possible timber supply forecast, whose validity—as with all the other forecasts provided—depends on the validity of the data and assumptions incorporated into the computer simulation 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—particularly during the period leading up to, and now during, the implementation of the Forest Practices Code—may well have changed since the original data package was assembled.

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. But once an AAC has been determined that reflects appropriate assessment of all the factors required to be considered, no additional precision or validation may be gained by attempting a computer analysis of the combined considerations to confirm the exact AAC determined—it would be impossible for any such analysis to fully incorporate the subtleties of the judgement involved.

For TFL 33 a timber supply analysis was conducted by Timberline Forest Inventory Consultants (Timberline) on behalf of the licensee, FCL. The computer simulation model used by the analyst was TIMSIM (TIMberline SIMulation), based on a model originally developed at the University of British Columbia and later modified by Timberline. Their base case indicated the need for an immediate reduction to 18 500 cubic metres per year from the current AAC of 27 500 cubic metres, with a long-term harvest level of 13 900 cubic metres per year reached after six decades. No alternative harvest flow projections were provided.

It was subsequently realized that certain inputs—e.g. minimum harvestable ages and adjustments for forest cover requirements—were not used in a manner approved by the BCFS or were used inconsistently in the analysis. Consequently, the BCFS conducted its own analysis using the computer simulation model FSSIM (hereafter called the "model"). Timberline's data was used but numerous data adjustments were incorporated. Differences between the two analyses will be discussed in the appropriate sections of this document. For this determination, however, both FCL and I have accepted the BCFS harvest flow projection as a reliable point of reference; henceforth, the term "base case" will refer to that projection. It indicated a harvest level of 25 000 cubic metres per year could be sustained for one decade before beginning a decline to a long-term harvest level of 13 600 cubic metres per year.

Shortly before the AAC determination meeting a further sensitivity analysis was undertaken by BCFS staff to measure the impact of new visual quality objectives adopted in 1994 and not incorporated into either the Timberline or the earlier BCFS analysis. As will be explained below, under *Visually sensitive areas*, the 1994 objectives are considerably more constraining than those previously prescribed for the area. The sensitivity analysis indicated that an initial harvest level of 16 600 cubic metres per year—34 percent below the base case—could be maintained for one decade before dropping over the ensuing four decades to a new, slightly lower, long-term harvest level of 12 300 cubic metres per year. The implications of these results will be discussed in Reasons for decision.

## Section 7 (3)

**In determining an allowable annual cut under this section the chief forester, despite anything to the contrary in an agreement listed in section 10, shall 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.

*- Economic and physical operability*

The principal deduction from the productive land base was for low site/non-commercial stands. Other deductions were for existing and future roads trails and landings; environmentally sensitive areas; and streamside buffers. District staff evaluated the deductions as appropriate, with the exception of the deduction for existing roads, trails and landings, which will be discussed below, under *Roads, trails and landings*. I support their findings. The resulting long-term timber harvesting land base is 7270 hectares, approximately 87 percent of the entire TFL.

In its 20-Year Plan, FCL has proposed extensive helicopter harvesting in areas in the south end of the TFL along Shuswap Lake. I regard this proposal quite positively, as it acknowledges the sensitivity of the terrain and the inherent access difficulties. It should also facilitate operations that respect the visual sensitivity of the area. Given the recent increase in the use of heli-logging systems elsewhere in the province, I accept the licensee's assumptions for use in this determination.

*- Environmental sensitivity*

Deductions for reasons of environmental sensitivity were restricted to areas with sensitive soils—"Es1" lands in the analysis table. These amounted to 112 hectares, just over 1 percent of the productive land base. The inventory of environmentally sensitive areas was approved by district staff, and no evidence was presented to me that would question the accuracy of those deductions. Accordingly, I regard them as appropriate for use in this determination.

*- Low site/non-commercial*

FCL developed its own criteria for "low site"—which it defined as those stands unable to produce 150 cubic metres per hectare of coniferous volume by age 160—and deducted these areas from the timber harvesting land base. Included in this group were all deciduous stands. The deciduous component in all coniferous-leading stands was accounted for in the analysis by reducing yield curves by the percentage of the deciduous component.

These deductions were approved by BCFS staff, and I accept them as suitable for use in this determination.

*- Roads, trails and landings*

District staff noted that the deduction for existing roads, trails and landings was relatively low in comparison with the deduction for the surrounding Okanagan TSA. No evidence was presented, however, to indicate that the licensee's estimate was invalid. In the absence of better information, I accept it as representative of the current land base situation.

The deduction for future losses was more consistent with estimates in other management units, and I also accept as suitable for use in this determination.

Existing forest inventory

*- Age of inventory*

The last inventory was completed in 1981, photogramatically updated to 1990, and manually updated to 1992 for use in the timber supply analysis. To help assess the accuracy of the inventory an audit was conducted in the summer of 1995. The results are unavailable as yet, so I am proceeding with this determination on the basis that the inventory information used in the analysis represents the best available information.

*- Age class structure*

The TFL is characterized by a preponderance of mature stands, particularly in the partial retention and retention visual quality management zones. Within the modification and maximum modification zones there is a much larger proportion of immature timber, albeit still less than half the area. (See further discussion below, under *Visually sensitive areas*.)

*- Species profile*

The major groupings of commercial tree species in the TFL by area are mixed-species stands with a preponderance of Douglas-fir (30 percent); pure Douglas-fir stands (24 percent); mixed stands of western redcedar, western hemlock and spruce (25 percent); and balsam (21 percent). No profile was specified in the timber supply forecasts as all timber harvested is considered merchantable by the licensee.

*- Volume estimates for existing stands*

Volume estimates for all existing stands, including those recently reforested, were based on volume tables provided by Timberline and projected using the Variable Density Yield Prediction (VDYP) yield model. Sensitivity analysis indicated the initial harvest level is relatively sensitive to changes in existing volumes. A 10 percent decline, for instance, could require a 13 percent reduction in the initial harvest level from the base case. A 10 percent increase, in contrast, would allow the current AAC—which is 10 percent above the base case—to be maintained for the first decade. Neither change would affect the long-term harvest level.

I am aware of these sensitivities, but as no evidence was presented to question the accuracy of the existing volume estimates used in the analysis, I am satisfied that they are appropriate for use in this determination.

Expected rate of growth

*- Site productivity estimates*

FCL used non-standard ranges for the various site index categories; e.g. the site indexes associated with FCL's "low" category differed from those that would typically be termed "low" by BCFS. This, however, is simply a classification variable and has a negligible effect on yield estimates and timber supply. The licensee also used old site indexes for landbase classification rather than the new site indexes now available. (I note, however, that it did use the new site indexes for volume calculations.) There is no evidence that use of the new site indexes would significantly change the results; accordingly, after evaluation I accept the old indexes as suitable for use in this determination.

FCL compared cruise plots with calculated yields and concluded that, while the BCFS site indexes are probably accurate for stands older than 150 years, they likely underestimate the future volumes from stands currently between 30 and 150 years. District staff support this view, although no evidence was presented to quantify the impact.

The question of underestimated site indexes for regenerated stands is a provincial concern, and the BCFS is sponsoring paired-plot studies throughout the six regions to address it. By the time of the next AAC determination, the results of that work should either confirm the accuracy of the current site indexes or provide new ones that more closely reflect the growth potential of regenerated stands. I anticipate that there will be an unquantified upward pressure on timber supply in the medium and long terms.

Green-up ages are closely linked to site indexes in that they decrease with increasing site indexes. A sensitivity analysis (see discussion below, under *Forest cover requirements*

*and green-up ages*) indicated that a reduction in green-up ages—the most likely scenario in this case, given that site indexes are expected to either remain constant or increase—would have only a small effect on timber supply in the short term. A five-year decrease in green-up ages led to only about a 3 percent increase in the initial harvest level, relative to the base case. Accordingly, I conclude that there is little risk in accepting the current site indexes for this determination.

*- Volume estimates for regenerated stands*

Volume estimates for all future regenerated stands were developed by Timberline using the Table Interpolation Program for Stand Yields (TIPSY). These tables did not include existing managed stands older than 30 years, which were modelled using VDYP. Given that there appear to be a few hundred hectares of managed stands over 30 years, I anticipate these will provide more timber in the medium and long terms than currently estimated. A more specific area estimate is not available, but a sensitivity analysis indicated that even a 10 percent increase in yields would not affect timber supply in the short term. With this in mind, I conclude there is little risk to the base case in accepting the regenerated stand volume estimates as suitable for use in this determination.

*- Operational adjustment factors*

Standard BCFS operational adjustment factors (OAFs) were used for regenerated stands: 15 percent for OAF1 (non-productive areas within stands), and 5 percent for OAF2 (volume losses after stand establishment). There is some concern that the OAF2 used by the model may not account for losses to armillaria (*Armillaria ostoyae*) and laminated (*Phellinus weirii*) root diseases, which are particularly prevalent in young stands in some areas of the TFL. This issue will be discussed in further detail below, under Unsalvaged losses. Apart from this one factor, I accept that the OAFs used in the analysis accurately reflect the expected reductions.

*- Minimum harvestable ages*

Minimum harvestable ages used by FCL are based on the age at which a stand reaches an average volume of 160 cubic metres per hectare. For existing stands this ranged from 50 to 130 years, while for regenerated stands the range was 40 to 100 years. In its proposed management plan the licensee has committed to harvesting down to these ages. The volume criterion was provisionally approved by district staff, but the corresponding age ranges seem relatively low for that part of the province. For the next determination it would be useful to review performance in these younger stands.

The current concentration of harvesting in stands older than these ranges suggests the impact of any change to minimum harvestable ages would be confined largely to the medium and long terms. A sensitivity analysis revealed that an increase of 10 years throughout the range of minimum harvestable ages would lower the initial harvest level by approximately 700 cubic metres per year, or 2.8 percent from the base case. Given that my concerns are limited to the relatively few stands being harvested or planned for harvesting at ages 40 and 50, I regard the risk of such a change as acceptable. Accordingly, I accept the minimum harvestable ages assumed in the base case as suitable for this determination.

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

Regeneration delay

FCL currently plants 100 percent of all harvested areas within two years. Future operations in some areas with high wildlife and recreation values may be left to regenerate naturally; this could lead to longer regeneration delays, but the size of the area in question is not significant. Consequently, I am satisfied that the assumption of a two-year regeneration delay is appropriate for this unit.

Impediments to prompt regeneration

No major impediments to regeneration were identified.

*- Not-satisfactorily-restocked areas*

The licensee estimated that the TFL contains 96 hectares (1.2 percent of the productive forest) of not-satisfactorily-restocked areas. As this figure represents current operations only—there are no backlog areas—the model assumed contributions from all these areas in its calculation of the long-term timber harvesting land base. I am satisfied that this factor holds no potential to compromise the timber supply assumptions underlying the base case.



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

All harvesting is performed using clearcut systems that are ecologically appropriate for this region and terrain. In some areas under retention and partial retention visual quality objectives, small clearcuts are planned, and these may help the licensee achieve more volume than might otherwise be expected. However, I do not expect these practices to be sufficient to offset the general downward pressure on timber supply associated with the establishment of retention and partial retention visual quality objectives on approximately 60 percent of the timber harvesting land base. This issue will be discussed further, under *Visually sensitive areas* and Reasons for decision.

Incremental silviculture

Juvenile spacing and pruning have thus far been performed on 209 hectares, and FCL has applied for funding under the Forest Renewal Plan to carry out further treatments in the near future. These practices were not modelled in the timber supply analysis, but I expect their impact to be restricted to improvements in wood quality rather than quantity. For this determination, they are not a significant factor.

Rehabilitation programs

No plans regarding rehabilitation programs were presented.

Commercial thinning

Commercial thinning has not been undertaken to date, but FCL feels there is some opportunity and is considering some operations. Thinning was not modelled, but even if it is performed I expect it to have little impact on the overall stand volume production, although it could allow some harvesting in areas constrained by visual quality objectives. As the principal benefit of thinning is the flexibility it lends to harvest scheduling, this could serve to better integrate harvest objectives with managing visual sensitivity from an operational perspective if thinning proves to be an economically feasible option for this area. Should commercial thinning be undertaken and proposed for the future, this will be taken into account in the next AAC determination.

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

Utilization and compliance

Utilization requirements define the species, dimensions and quality of trees that must be removed from the site during harvesting operations. The normal Interior utilization levels were assumed in the analysis: i.e. the diameter of all trees must be at least 17.5 cm at breast height (12.5 for lodgepole pine) in order to be harvested, and, once felled, all wood up to a diameter of 10 cm must be removed from the site, leaving a stump no higher than 30 cm. In practice, however, the tops of cedar trees over 141 years are taken only to a 15-cm diameter; that is, the small portion of the tree between 10 and 15 cm that the analysis assumed would be used is left behind. This represents a small downward pressure on timber supply. The volume in question is not significant for this determination but should be monitored and reviewed in time for the next analysis.

Decay, waste and breakage

The decay, waste and breakage factors used in the timber supply analysis for existing stands were approved by BCFS staff. I accept their applicability 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 (IRM) objectives

The Ministry of Forests is required by the *Ministry of Forests Act* to manage, protect and conserve the forest and range resources of the Crown, having regard to the immediate and long-term economic and social benefits, and, in consultation and cooperation with other agencies, to plan, coordinate and integrate the use of a variety of forest-related resources. The extent to which integrated management objectives for various forest resources and values constrain the timber supply must be considered in AAC determinations.

- *Visually sensitive areas*

The information package submitted by FCL, and upon which the BCFS analysis was based, included visual quality objectives (VQOs) derived from a 1992 landscape inventory for the entire Salmon Arm Forest District, including TFL 33. As part of an ongoing district update this inventory was revised in 1994. This resulted in the assignment of new, more restrictive, VQOs to the TFL 33 land base and the surrounding TSA area. The assignment of these objectives has not been formally approved in a higher level plan, such as an LRMP, but has been accepted by the licensee in Management Plan 7 and its 20-Year Plan, and is being applied by the district.

The difference between the two sets of VQOs is significant. Although the visual quality inventory was not tied to the forest inventory, BCFS staff made reasonable assumptions about the magnitude of the area shift between VQO zones. Under the new inventory, the area within the maximum modification zone has decreased from 52 percent of the timber harvesting land base to 25 percent, while the modification zone has been reduced from 33 percent to 15 percent. The partial retention zone, in contrast, has expanded from 6 percent to 50 percent, with the retention zone covering the remaining 10 percent.

Despite this shift to a markedly more restrictive management regime, FCL maintains that the base case initial harvest level of 25 000 cubic metres per year is still appropriate. The licensee believes that the use of alternative harvesting systems in the south end of the licence area would compensate for the constraints imposed in the short term by the new VQOs. I note, too, that the visual disturbance levels inherent in the company's 20-Year Plan will be at the mid to high end of the allowable disturbance range within each new VQO.

District staff question the licensee's ability to meet the new VQOs on the cutblocks identified in the 20-Year Plan and still achieve the base case AAC. Evidence presented to me leads me to share those concerns. Although the new VQOs were not reflected in the BCFS analysis, a subsequent BCFS sensitivity analysis attempted to capture the impact of the new restrictions. Under the expectation that disturbance levels would be near the midpoint of the allowable ranges within each VQO zone, the sensitivity analysis projected an initial harvest level of 16 600 cubic metres per year, 34 percent below the base case. Following the first decade this would drop over four decades to a new, slightly lower, long-term harvest level of 12 300 cubic metres per year.

This projection is not inconsistent with what might be expected in a small management unit such as TFL 33. Within larger units a shift to more restrictive VQOs is often easier to absorb because of the greater operational flexibility inherent in a larger land base. Smaller units, in contrast, typically have fewer harvest scheduling options to fall back on. It is also important to note that the timber supply impacts of visual quality management are, in this case, at least partially attributable to the need to meet management objectives for wildlife habitat. (See further discussion below, under *Wildlife*.)

The need for a reduction of the magnitude indicated in the sensitivity analysis is offset somewhat by the fact that there was some imprecision regarding the locations of the new zones and, as FCL has pointed out, some operational flexibility within the allowable disturbance ranges. I have also taken guidance from the Minister's memorandum (see Appendix 4) expressing the provincial socio-economic objective of ensuring an appropriate balance between protecting visual resources and minimizing the impact of such protection measures on timber supply. Nonetheless, the sensitivity analysis is the only one available to me that attempts to model the impact of the new VQOs, and its findings cannot be easily discounted. I accept it as indicative of a significant downward pressure on timber supply, although perhaps not to the extent modelled, which I regard as an unnecessarily constraining scenario. The influence I have given this factor in my determination will be explained below, under Reasons for decision.

Other concerns were raised by the Shuswap Environmental Action Society in response to FCL's plans for further harvesting on slopes facing Shuswap Lake. The society contended that neither the 1992 nor the 1994 VQOs were being met on the hillsides and that, in any event, they did not adequately recognize the value of the visual landscapes in this area.

In response, I will say that FCL has incorporated the 1994 VQOs into its proposed Management Plan 7 and its 20-Year Plan; they were not a part of Management Plan 6 although district staff have applied those objectives since their adoption in 1994. Accordingly, current and future harvesting proposals will only be approved if district staff believe they meet whatever VQOs are established for a given area.

The adequacy of these VQOs will likely be addressed through the Land and Resource Management Planning process now underway in the Okanagan-Shuswap area. Should changes be approved that bear significant implications for timber supply I will address them in a future determination. For now, given the licensee's commitment in the management plan to manage the implementation of the 1994 VQOs as a component of current management, I accept them as suitable for use in this determination. It follows, therefore, that the timber supply implications of these VQOs must also be reflected in this determination.

*- Wildlife*

The principal wildlife issue in the licence area is the provision of deer winter range. FCL believes that the adherence to VQOs for the area—which will maintain numerous small, well scattered blocks of intact forest throughout the TFL—will also ensure winter range requirements are met. As the VQOs are more constraining on timber supply than those designed purely to maintain winter range, this strategy has been approved by BCFS staff and staff from the Ministry of Environment, Lands and Parks. It is therefore important to note that the timber supply impacts of managing the new VQOs are not attributable solely to that management objective, but are associated as well with providing suitable wildlife

habitat. I am satisfied that this issue is being adequately managed and that no further management measures—measures that could further constrain timber supply—are likely to be introduced.

*- Riparian areas*

Under the Operational Planning Regulation, brought into force on June 15, 1995, as part of the Forest Practices Code, stream classifications have changed, and the no-harvest buffers have increased for what were Class A and B streams. The new requirements were not modelled, but district staff currently estimate that these may remove at least a further 1 percent of the timber harvesting land base in the TFL from that modelled in the analysis. I have accounted for the timber supply implications of these more restrictive riparian requirements under Reasons for decision.

*- Water resources*

Given the high recreational use of Shuswap Lake and the fact that it is the source of water for local residents, there is considerable public sensitivity around harvesting and access road construction in the vicinity. FCL has committed to protecting water values through carefully managed operational practices to be outlined in development plans and silviculture prescriptions.

I concur with this strategy. Public concerns regarding those areas in the vicinity of the lake that remain in the timber harvesting land base should be addressed through sensitive, appropriate management.

*- Biodiversity*

At the time of the original analysis, FCL assumed, and district staff agreed, that all biodiversity requirements would be met by achieving forest cover requirements outlined in the *Okanagan Timber Supply Area Integrated Resource Management Timber Harvesting Guidelines*. Although the requirements of the Forest Practices Code, particularly as set out in the *Biodiversity Guidebook*, now take primacy, the exact impact of those changes on timber supply in this unit are not known at this time. Recent AAC determinations have generally accepted biodiversity requirements as a downward pressure on timber supply. In this unit, however, it is not obvious that this factor will result in further cumulative effects on timber supply beyond those already introduced through visual quality management. This matter is further discussed under Reasons for decision.

*- Recreation*

The Salmon Arm Forest District has completed a recreation inventory of the licence area as part of a similar undertaking for the surrounding TSA lands. Hunting and snowmobiling in the fall and winter and swimming, boating and other water sports in the spring and summer are the principal activities in the vicinity of the TFL. FCL has committed to maintaining opportunities for these sports and has also agreed to continue consulting with local cottage owners on development plans. No evidence was presented to me that would lead me to anticipate any impact on timber supply from these activities, beyond those already inherent in the analysis.

*- Forest cover requirements and green-up ages*

At the time of the original analysis, the *Okanagan Timber Supply Area Integrated Resource Management Timber Harvesting Guidelines* stipulated that 20 percent of the timber harvesting land base should be maintained in stands 20 metres or higher. The BCFS analysis modelled this requirement by maintaining 20 percent of the land base in stands older than 121 years, the average time estimated by the licensee for trees to reach 20 metres. The forest cover requirement has since been modified, and current practice is to maintain 10 percent of the harvesting land base in stands taller than 20 metres.

Kamloops Forest Region staff estimated the period required to reach 20 metres would be 141 years, on average, and this was modelled in a subsequent sensitivity analysis. The results indicated no difference in short-term timber supply between that projection and the BCFS base case. The impact was restricted to a 2 percent reduction in the inter-decadal rate of decline and a 8 percent increase in the long-term harvest level. Accordingly, I consider the discrepancy between the requirements modelled in the BCFS base case and the current requirements as insignificant in the short term. Over time, however, the modified requirements are less constraining and may lead to a more favourable timber supply outlook for the medium and long terms, depending, of course, on interactions with other factors affecting timber supply in those periods.

Data input errors regarding green-up ages in the licensee analysis were corrected in the BCFS analysis. The resulting base case proved highly sensitive to the extension of green-up periods. A sensitivity analysis indicated that an increase of five years could cause the initial harvest level to drop to just over 22 000 cubic metres per year, a reduction of approximately 11 percent from the base case. Conversely, a reduction of five years would allow the initial harvest level to rise by less than 3 percent. Earlier, in *Site productivity estimates*, I noted that site indexes—which are perhaps the most significant determinant of green-up periods—are anticipated to either remain constant or increase. On this basis I expect green-up ages will either remain constant or decrease and that the base case initial harvest level will not be compromised by this factor. Until better information is available, then, I conclude that there is little risk in accepting the modelled green-up ages for this determination. I have accounted for the likelihood of the site index impact on green-up in Reasons for decision.

(vi) any other information that, in his opinion, relates to the capability of the area to produce timber;

Deferred planning areas

No deferred planning areas were identified. As discussed under *Water resources* above, there is some public pressure to restrict harvesting and road construction around cottage areas on Shuswap Lake. In response, I emphasize that such an issue must be addressed in a forum or process other than an AAC determination.

Harvest profile

The BCFS analysis assumed oldest stands would be harvested first. In recent years, FCL has concentrated operations on decadent cedar-hemlock-spruce stands in accordance with direction from BCFS staff. In the draft Management Plan 7, the licensee has indicated its willingness to shift priorities, if necessary, and target stands suffering from insect infestations, fire damage, root rot, or blowdown. The age and species profile of these stands cannot be predicted, of course, so it is impossible to say whether the actual harvest priority in the field will compromise the base case assumption of "oldest first." However, this factor is not overly significant and is unlikely to introduce unacceptable risk to this determination. I therefore accept the assumption of the base case in this regard as suitable for use in this determination. Any implications arising from further shifts in the harvest profile will be addressed in future determinations.

- (b) **the short and long term implications to the Province of alternative rates of timber harvesting from the area;**

Harvest flow

The nature of the transition from harvesting old growth to harvesting second growth is a major consideration in determining AACs in management units that have a large mature forest component, such as TFL 33. In the short term, the presence of large volumes of older wood permits harvesting above the long-term harvest level without compromising future timber supplies. In keeping with the objectives of good forest stewardship, AACs for areas in which a falldown in timber supply is expected have been and continue to be determined so as to ensure that current and mid-term harvest rates will be compatible with a smooth and orderly transition toward the lower long-term harvest level. Thus, timber supplies should remain sufficiently stable that there will be no inordinately adverse impacts on current or future generations. To achieve this, the rate set must not be so high as to cause later disruptive shortfalls in supply, nor so low as to cause undue social and economic impacts now.

Sensitivity analyses examined the impacts of maintaining the current AAC (27 500 cubic metres) for another decade and of lowering the initial harvest level to 22 140 cubic metres per year. The first scenario would result in an unacceptably high 16 percent inter-decadal rate of decline beginning in 10 years, while the second would impose an immediate 19 percent reduction from the current AAC. Relative to the base case, neither is an attractive option. Yet, bearing in mind the earlier discussion, under *Visually sensitive areas*, and other factors mentioned elsewhere in this document, there is reason to question the merits of accepting the base case projection at this time.

In its submission of August 14, 1995, to the Chief Forester, FCL contended that the province's socio-economic objectives are best served by maintaining harvest levels as high as possible for as long as possible before beginning the decline to the long-term harvest level. I concur that unnecessary reductions are to be avoided. However, as is apparent from my discussion above, community stability at present and in the future is one of the primary criteria in my selection of harvest flow projections.

Difference between AAC and actual harvest

Due to the small harvest volume assigned to the TFL, FCL has historically had to coordinate operations there with harvesting in their much larger forest licence in the adjacent Okanagan TSA. Accordingly, TFL harvest volumes have fluctuated markedly. I regard this, however, as a licence management issue and not a reflection of the area's capacity to support a given harvest level. Accordingly, it is not a significant factor for this determination.



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

Timber processing facilities

The entire harvest volume from TFL 33 is processed at FCL's manufacturing facility (sawmill, veneer and plywood plant) in Canoe, northeast of Salmon Arm. The Salmon Arm-Sicamous area economy is significantly dependent on FCL activities, of which TFL 33 is a small component. The volume of logs harvested annually from the TFL represents approximately 7 percent of the Crown timber supply processed at the facility and is estimated to support 36 person-years of employment in the area. The balance of the mill's wood supply comes from FCL's forest licence in the Okanagan TSA, a timber licence and purchases from private suppliers.

- (d) **the economic and social objectives of the Crown, as expressed by the minister, for the area, for the general region and for the Province; and**

Minister's letter and memo

The Minister expressed the economic and social objectives of the Crown for the province 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 33. 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 continuity of employment.

The Minister stated in his letter 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. The latter would likely require the use of alternative harvesting systems, and to encourage this the Minister suggested consideration of partitioned AACs.

As discussed earlier, under *Commercial thinning*, FCL may pursue some thinning opportunities during the term of the proposed management plan. However, in light of the scale of this TFL, I do not expect this to have an effect on timber supply in the short term. Alternative harvesting systems are planned for certain areas subject to more constraining VQOs, but I do not expect these to affect timber supply. (See discussion under *Visually sensitive areas*.)

FCL has also indicated its intention to undertake helicopter logging in previously unharvested areas. I do not foresee this as an opportunity to raise the initial harvest level, however. In the event these operations prove successful, my commitment to facilitating a smooth and gradual transition to the long-term harvest level means any additional volumes gained through these operations will almost certainly be used to mitigate future declines.

The Minister's 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. As noted earlier, under *Visually sensitive areas*, this is a significant issue in this unit. Visual resource management represents the largest downward pressure on timber supply, and I have addressed that impact in light of the memorandum under Reasons for decision, below.

#### Local objectives

The Minister's letter and memorandum both encouraged the Chief Forester to consider important local social and economic objectives that may be derived from public input. I am aware of the significance of the TFL harvest to FCL's manufacturing facility in Canoe, and of that facility's importance to the local economy.

I am also cognizant of local sentiment regarding the maintenance of viewsapes along Shuswap Lake, a position formally expressed in a letter to FCL from the Shuswap Environmental Action Society. That letter conveyed additional reservations about FCL's plans for maintaining biodiversity and about the availability of timber in the short and medium terms. Moreover, it encouraged the company to adopt cable harvesting systems on "all the steep and even mildly steep slopes" in the licence area. With the exception of the cable harvesting proposal—which should be considered through licence management and cutting authority approvals—these issues are addressed in the appropriate sections of this document and below, under Reasons for decision.

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

### Unsalvaged losses

Unsalvaged losses above endemic levels were estimated by FCL to be almost 1500 cubic metres per year, approximately 5.4 percent of the current AAC. This percentage is comparable to the estimate in the adjacent Okanagan TSA, and I accept it as a reasonable figure for use in this determination.

Endemic losses are normally accounted for in existing stands by the application of decay and waste factors and in regenerated stands by the use of OAFs during the compilation of growth and yield tables. As discussed earlier, however, under *Operational adjustment factors*, district staff believe the standard OAF2 of 5 percent may be insufficient to capture anticipated losses to armillaria and laminated root diseases. Staff estimate that up to 75 percent of the stands in the Interior Cedar-Hemlock zone are prone to these root diseases. FCL intends to continue monitoring the incidence of root disease and treating it through stump removals or, where water quality is a concern, planting of alternative species such as larch. In any event, the impact of an underestimate of losses to root disease would be limited to the medium and long terms. A BCFS sensitivity analysis indicated that even a 10 percent reduction in regenerated stand volumes would not affect timber supply in the short term.

The only recovery programs undertaken in recent years have been to salvage blowdown, but harvesting for this purpose has averaged less than one hectare per year. Losses to bark beetles and defoliators are restricted to endemic levels, and no salvage programs are planned specifically for these pests.

## **AAC Determination**

### Reasons for decision

In reaching my decision on an AAC for TFL 33, I have considered all of the factors presented above and have reasoned as follows.

The current AAC is 27 500 cubic metres. The BCFS analysis indicated this level can only be maintained at the cost of a 16 percent decline following the first decade. An alternative projection by BCFS staff, which I have subsequently accepted as the base case, proposed an initial harvest level of 25 000 cubic metres per year followed by inter-decadal declines of 12 percent beginning after the first decade.

Three factors suggest timber supply may be greater than assumed in the base case:

1. a possible underestimate of site indexes;

2. the use of VDYP tables instead of higher-yielding TIPSYP tables for managed stands older than 30 years; and
3. the modelling of more restrictive forest cover constraints than actually required under the *Okanagan Timber Supply Area Integrated Resource Management Timber Harvesting Guidelines*.

The impact of higher site indexes will primarily be restricted to the medium and long terms. There may be some short-term addition to timber supply, to the extent that green-up periods are reduced, but this increment is unlikely to exceed 3 percent. Given that there is uncertainty associated with this factor, that harvest levels are projected to decline in the future, and that improved green-up ages are unproven and therefore speculative, it is my view that any additional volume that may be gained from this factor in the future should be used to offset the rate of decline, rather than increase the current AAC.

The use of higher-yielding TIPSYP tables, instead of VDYP, for projecting yields from managed stands over 30 years in age would likely generate additional volume in the medium and long terms only, according to a sensitivity analysis. For this determination, then, I do not regard it as a factor that would significantly affect the short-term timber supply.

The BCFS base case modelled forest cover requirements by maintaining 20 percent of the forest area in stands 121 years of age or older. A sensitivity analysis measured the impact of shifting to the more recent requirement by placing 10 percent of the forest area in stands older than 141 years. It found that while the rate of decline would diminish slightly and the long-term harvest level would rise by 8 percent, the base case initial harvest level would remain unchanged, subject to harvest flow constraints. Accordingly, I accept that while this change is less constraining in the long term it does not influence the initial harvest level I will be determining. This factor could, however, lead to a more favourable timber supply in the medium and long terms than was forecast in the base case.

Three factors suggest timber supply may be less than modelled in the BCFS base case:

1. armillaria and laminated root diseases are widespread, and there is a risk that they will reduce future stand yields to a greater extent than accounted for in the OAFs applied to the regenerated stand yield tables;
2. utilization levels for cedar in the field are less than modelled in the analysis;
3. the 1994 VQOs, which the licensee management plan commits to attaining, are more restrictive than those modelled in the analysis; and
4. Forest Practices Code requirements for riparian management and managing biodiversity, which are known to be restrictive of timber supply in most areas of the province, were not explicitly modelled.

The two root diseases cited target younger stands, which suggests that any timber supply impacts would be restricted to the medium and long terms. A BCFS sensitivity analysis indicated that the base case initial harvest level could be maintained even in the event of a 10 percent reduction in regenerated volumes. As a result this factor is not significant for this determination.

The practice of cutting cedar tops to a 15-cm diameter rather than the 10 cm modelled in the analysis results in a very small loss of volume. It is not significant for this determination but should be monitored during the term of MP 7 to ensure the volume in question does not become a source of concern.

The third factor is more consequential. As discussed above, under *Visually sensitive areas*, the BCFS base case did not incorporate the 1994 VQOs, which are now a part of current management and to which FCL has committed in its management plan and 20-Year Plan. A subsequent BCFS sensitivity analysis indicated the implementation of the updated VQOs could require a reduced initial harvest level of 16 600 cubic metres per year—34 percent below the base case and 40 percent below the current AAC.

The impact of the new VQOs is exacerbated by the fact that much of the timber that is available will need to be harvested using alternative silvicultural and harvesting systems. Under the base case assumptions only 15 percent of the timber harvesting land base lay in areas with retention or partial retention VQOs. Consequently, the licensee's ability to use small clearcuts and other alternative systems in these areas did not pose a significant risk to timber supply. Under the 1994 VQOs, however, 60 percent of the timber harvesting land base has become subject to retention or partial retention VQOs. Even allowing for the probability that this figure is somewhat overestimated (see discussion under point 2 below), it still remains a very large proportion of the land base on which to have to rely upon alternative silvicultural systems or upon expensive helicopter logging systems.

In light of this evidence I am persuaded that the AAC must be lowered. For several reasons, however, I am unwilling to impose an AAC reduction of the magnitude suggested in the sensitivity analysis.

- (a) The 40 percent reduction indicated in the sensitivity analysis would run counter to my preferred policy of facilitating a gradual transition to the long-term harvest level. Such a severe change should be considered only if it were absolutely clear that the biophysical health of the forest depended upon it. In this case there are enough uncertainties to lead me to be more cautious in implementing a reduction.
- (b) As discussed earlier, under *Visually sensitive areas*, there was some imprecision in the assumptions underlying the setting of the initial harvest level in the sensitivity analysis. Because specific inventory data locating the 1994 VQO zones was unavailable to the BCFS analyst, he drew reasoned assumptions about the area of land within each zone. It appears that the areas in question may have been overestimated.
- (c) To establish the potential range of impacts represented by the 1994 VQOs BCFS staff undertook a further sensitivity analysis to measure the impact of the *least* constraining application of the 1994 VQOs. Using the high ends of the allowable disturbance ranges, as opposed to the midpoints that were assumed in the base case, the analysis projected the initial harvest level at 22 500 cubic metres per year. Given the relatively conservative nature of the analyst's assumptions [see point (b) above] I am satisfied that an appropriate AAC should fall

closer to this upper end of the range rather than the 16 600 cubic metres per year indicated by the earlier analysis.

- (d) The 1994 VQOs have been accepted by FCL and are part of current management. However, I am conscious that they may be subject to further review by the LRMP process now underway, with the results likely to be available in time for the next timber supply analysis. The current determination, therefore, should seek some middle ground wherein either a confirmation or revision of the 1994 VQOs could be accommodated.
- (e) Finally, I have taken into consideration the Minister's memorandum of February 26, 1996, indicating the Crown's desire to carefully balance the economic impact on communities and industry arising from the implementation of VQOs.

With regard to the fourth factor, I previously noted that the Forest Practices Code requirements for riparian and biodiversity management are generally restrictive of timber supply. Given my awareness of the significant timber supply constraints imposed by the 1994 VQOs in this unit, however, I am not convinced that there are further cumulative impacts on timber supply due to riparian and biodiversity management, beyond those either inherent in the analysis—such as old-growth forest cover objectives—or those implicit in the acceptance of the new VQO requirements.

Furthermore, I have acknowledged that the VQO constraints would likely provide sufficient well-distributed forest cover to allow the maintenance of important wildlife habitat in the area. (See earlier discussion under *Wildlife*.) Therefore, what appears to be a significant reduction in timber supply due to VQOs should be understood as the cumulative interactions of VQOs and certain Forest Practices Code requirements such as those for wildlife habitat.

Any further refinement or assessment of either overlapping constraints, as noted above, or more discrete analysis of their cumulative interactions will form the basis of the next AAC determination for this unit.

With all of these factors in mind, I believe an appropriate balance between the 25 000 cubic metres per year projected in the base case and the 16 600 cubic metres per year indicated in the sensitivity analysis is achieved by an AAC of 22 500 cubic metres. This represents the upper limit that another sensitivity analysis indicated was feasible under the least constraining application of the 1994 VQOs, yet it still acknowledges the need for visual quality management in the licensee's operations.

I am unwilling to drop closer to a midpoint between the two sensitivity analyses primarily out of consideration of the socio-economic objectives expressed by the Minister. Although this determination will be far more acceptable to the communities, the company and the workers than the 40 percent reduction suggested in the first sensitivity analysis, the reality remains that the new harvest level is still 20 percent below the current AAC.

In other regards I believe this determination strikes a suitable balance. It acknowledges the use of outdated VQOs in the base case as well as the uncertainties inherent in the sensitivity analysis. It also provides an adequate safety margin to accommodate the decisions of the LRMP process when those become available. Should that process confirm the 1994 VQOs, I am satisfied that the impact of those constraints can be subsequently accommodated in a revised harvest flow projection without undue risk to visual values in the TFL. If the VQOs are made less restrictive, this will not change the inevitability of the falldown; it will simply mean that at 22 500 cubic metres per year the harvest level will be closer than previously anticipated to the long-term harvest level. This should allow ensuing reductions to be milder than projected in the base case.

### Determination

It is my determination that a timber harvest level that accommodates objectives for all forest resources during the next five years, that ensures longer-term IRM objectives can be met, that reflects current management practices, and that minimizes disruptive shortfalls in future wood supply, can best be achieved in this TFL at this time by establishment of an AAC of 22 500 cubic metres.

### Implementation

This determination comes into effect on July 1, 1996, and will remain in effect until a new AAC is determined, which must take place within five years of this determination. During the interim, and in preparation for the next AAC determination, district staff will:

1. review licensee harvesting performance in the lower age ranges to ensure that the minimum harvestable ages assumed in the analysis are realistic; and
2. monitor utilization levels for cedar.



Larry Pedersen  
Chief Forester

June 11, 1996

### **Appendix 1: Section 7 of the *Forest Act***

Section 7 of the *Forest Act* reads as follows:

#### **Allowable annual cut**

7. (1) The chief forester must determine an allowable annual cut before December 31, 1996, and after that determination 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 and woodlot licence areas, and
  - (b) each tree farm licence area.

- (1.1) If, after the coming into force of this subsection, the minister
  - (a) makes an order under section 6 (b) respecting a timber supply area, or
  - (b) amends or enters into a tree farm licence to accomplish the result set out under section 33.1 (1) (a) to (d),

then, with respect to that timber supply area or tree farm licence area, as the case may be, the chief forester is not required to make the determination under subsection (1) of this section before December 31, 1996, or within 5 years after the last determination, but is required to make the determination

- (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.

- (1.11) If
  - (a) the allowable annual cut for the tree farm licence is reduced under section 7.1 (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 7.1 (6).

(1.12) If the allowable annual cut for the tree farm licence area is reduced under section 7.1 (3), the chief forester is not required to make the determination under subsection (1) or (1.1) of this section at the times set out in subsection (1) or (1.1) (c) or (d), but must make that determination within one year after the chief forester determines that the holder is in compliance with section 7.1 (2).

(1.2) [Repealed 1994-39-2.]

(1.3) In determining an allowable annual cut under this section 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 Province, the federal government, or both.

(2) The regional manager or district manager shall determine a volume of timber to be harvested under a woodlot licence during each year or other period of its term, according to the licence.

(3) In determining an allowable annual cut under this section the chief forester, despite anything to the contrary in an agreement listed in section 10, shall 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) silvicultural treatments to be applied to the area;
  - (iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area;



- (v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production; and
- (vi) any other information that, in his opinion, relates to the capability of the area to produce timber;
- (b) the short and long term implications to the Province 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 Crown, as expressed by the minister, for the area, for the general region and for the Province; 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.

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