

**BRITISH COLUMBIA  
MINISTRY OF FORESTS**

# **Tree Farm Licence 35**

Issued to Weyerhaeuser Canada Limited

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

**effective November 1, 1996**

**Larry Pedersen  
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) 35. The document will also identify where new or better information is required for incorporation into future determinations.

## Description of the TFL

TFL 35, also known as the Jamieson Creek TFL, is located approximately 10 kilometres north of the city of Kamloops in the Kamloops Forest District. It lies to the west of Heffley Creek and is surrounded entirely by the Kamloops Timber Supply Area (TSA). The total area is 36 466 hectares, of which 31 665 hectares are considered to form the long-term timber harvesting land base.

The TFL contains numerous small waterways and lakes, including Jamieson Creek, which runs in a general northwest to southeast direction through the licence area. Topographically, it is characterized by mid-elevation plateaus and gently rolling slopes. The eastern half of the land base lies primarily within the Montane Spruce biogeoclimatic zone, with small patches of Interior Cedar-Hemlock and Interior Douglas-fir in the northeast and southeast corners. The western half is predominantly in the Engelmann Spruce-Subalpine Fir biogeoclimatic zone. The principal tree species are lodgepole pine, Engelmann spruce, subalpine fir and Interior Douglas-fir.

## History of Present AAC

TFL 35 was originally granted to B.C. Interior Sawmills Ltd. in 1959. The licence covered 41 708 hectares at that time and was assigned an AAC of 33 131 cubic metres under Management and Working Plan (now renamed "Management Plan") 1. By the beginning of 1965, the land base had been reduced slightly but the AAC was raised to 50 970 cubic metres. In March that year, the AAC was redetermined at 82 119 cubic metres in acknowledgement of improvements in milling efficiency whereby smaller stems could be processed. In 1969 the AAC was raised again, to 99 109 cubic metres, to reflect the shift from intermediate utilization to close utilization standards.

In 1970, Kamloops Pulp and Paper, a partner of Weyerhaeuser Company of Tacoma, Washington, purchased B.C. Interior Sawmills Ltd. In 1971, Weyerhaeuser acquired all the shares of Kamloops Pulp and Paper and renamed its former partner Weyerhaeuser Canada Ltd. TFL 35 was then assigned to the new company.

The AAC fluctuated between 99 109 and 83 600 cubic metres until 1992, when it was raised to 125 600 cubic metres in recognition of specific management commitments by Weyerhaeuser Canada (hereafter referred to simply as "Weyerhaeuser"). That level remains in effect today and

is applicable entirely to Schedule B Crown-owned licensee-operated lands. Weyerhaeuser elected not to accommodate harvesting under the Small Business Forest Enterprise Program; accordingly, 2653 hectares were removed from the land base in 1993 to reflect the end of the program in the TFL.

## **New AAC Determination**

Effective November 1, 1996, the AAC for TFL 35 will be 125 600 cubic metres, unchanged from the previous determination. This decision will remain in effect until a new AAC is determined, which must take place by October 31, 2001.

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

Information considered in determining the AAC for TFL 35 includes the following:

- "Statement of Management Objectives, Options and Procedures: Management Plan #8, Tree Farm Licence 35–Jamieson Creek" Weyerhaeuser Canada Ltd., August 30, 1994;
- "Tree Farm Licence 35: Jamieson Creek—Timber Supply Analysis" Weyerhaeuser Canada, December 22, 1995;
- "Tree Farm Licence 35: Jamieson Creek—Proposed Management Plan No. 8, January 1, 1995–December 31, 1999" Weyerhaeuser Canada, March 25, 1996;
- "Tree Farm Licence 35: Jamieson Creek—Recreation Plan" Weyerhaeuser Canada, March 1995;
- "Operational Harvesting & Reforestation Guidelines for the Overall Maintenance of Fish & Wildlife Habitat on TFL 35 & Adjacent Study Area" Weyerhaeuser Canada Ltd., December 1991;
- "Kamloops Regional Integrated Resource Management Timber Harvesting Guidelines," BCFS 1992;
- "T.F.L. 35—L.R.M.P. Overview Map" (20-Year Plan for harvest block layout), Weyerhaeuser Canada, March 25, 1996;
- "TFL 35 inventory audit" Resources Inventory Branch, 1996;
- *Kamloops Land and Resource Management Plan*, Province of British Columbia, July 1995 (with amendments dated March 31, 1996);
- 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;
- Technical review and evaluation of current operating conditions through comprehensive discussions with British Columbia Forest Service (BCFS) staff, notably at the AAC determination meeting held in Victoria on April 10, 1996;
- *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 and Ministry of Environment, Lands and Parks, 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 35. 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 35, 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 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 AACs from a range of possible harvest levels; and

(ii) redetermining AACs frequently, to ensure they incorporate up-to-date 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 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 timber supply analyses that pre-date the Code, or that are based on information packages that largely pre-date the Code (as is the case in TFL 35). 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 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.

In certain areas where land-use decisions have been made, government's 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 completely assess the impact of those portions of the land-use decision. However, the legislated requirement for five-year AAC reviews will ensure such decisions are addressed in the most timely manner possible. On the other hand, those elements of the plan that are clear—such as the designation of protected areas—must be fully accounted for and respected in any AAC determination.

TFL 35 falls within the purview of a land-use decision—the Kamloops LRMP—that has been made by government. Moreover, certain provisions of that LRMP have been declared a higher level plan under the *Forest Practices Code of British Columbia Act*. It is therefore required that this AAC determination consider and reflect that declaration.

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 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. Specific identified activities in traditional areas will be taken into account as far as possible under Section 7(3)(a) 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*.

## **Timber Supply Analysis**

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 licensees. For TFL 35 the timber supply analysis was conducted by Weyerhaeuser's Timberlands Strategic Planning Team in Tacoma, Washington. The computer simulation model used by the analyst was the Total Property Simulation forest management planning model (previously known as the "High Yield Forestry model," and referred to throughout this document as simply the "model"). While this model differs from the Forest Service simulation model (FSSIM) in several regards, it does incorporate similar processes of forest growth and harvesting under specified management regimes and provides an acceptable projection of timber supply.

Only one management option—the Status Quo option—was provided, the results of which indicate the current harvest level of 125 600 cubic metres per year could be maintained on a non-declining even-flow harvest projection for at least 225 years. No alternative harvest flow projections were provided though I am aware that the licensee has stated that a higher long-term harvest level is achievable. This steady-harvest-flow policy may project a more stable timber supply, but it also masks the maximum long-term potential and thus obscures the effects on long-term timber supply of changes in assumptions about forest management. While my determinations do focus on short-term timber supply, they give full regard to the maximum achievable long-term level and of the transition pattern in between. In my determination I have remained mindful of, and have made allowances for, this aspect of the licensee's harvest flow policy.

I am satisfied that the Status Quo option is an adequate reflection of short-term timber supply. Quite clearly, it avoids excessive changes from decade to decade and significant timber shortages in the future. On this basis, then, I accept it as the "base case" against which the effects of uncertainty on timber supply may be assessed.

## **The Role of the Base Case**

The base case forecast represents only one in a number of theoretical forecasts, and may incorporate information about which there is some uncertainty. Its 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.

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

### 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*

As part of the process to define the timber harvesting land base—i.e., the land base estimated to be economically and biologically available for harvesting—a series of area netdowns were made from the productive forest. These deductions took into account factors such as environmental sensitivity and presence of deciduous stands and riparian areas, which may render an area undesirable to harvest for economic or ecological reasons. In reviewing this process I am aware that some areas may have more than one classification; e.g., environmentally sensitive areas may also lie in riparian areas. Hence, the figure shown for a given category in the netdown table in the timber supply analysis or mentioned in the AAC rationale does not necessarily reflect the total area with that classification; much of it may have been deducted earlier for other reasons. If the deduction order were changed, the areas taken from the listed categories could also change.

TFL 35 is predominantly operable. The analysis netdown table indicated the long-term timber harvesting land base is 31 665 hectares, approximately 87 percent of the gross land base. This contrasts markedly with the surrounding Kamloops TSA, where the timber harvesting land base represents only 45 percent of the gross land base. The major netdowns in the TFL were for environmentally sensitive areas (1266 hectares), riparian areas (710 hectares) and existing roads (655 hectares). The vast majority of the timber harvesting land base is amenable to conventional ground-based harvesting systems, with only a few hundred hectares scheduled for non-conventional systems.

I am satisfied that the modelled land base is a realistic representation of what is economically and physically feasible to harvest. The possibility of an overestimate appears to pose little risk to the ability to achieve the short-term harvest level shown in the base case projection. A sensitivity analysis indicated the base case initial harvest level could still be maintained for two decades if the timber harvesting land base were reduced by 10 percent. Accordingly, I accept the modelled land base for use in this determination.

*- Kamloops Land and Resource Management Plan*

Weyerhaeuser has committed to managing TFL 35 in accordance with the direction provided in the Kamloops LRMP. No new protected areas were created in this unit by the LRMP, but its endorsement of mixed-species management—in critical deer winter range, for instance—appears at odds with the assumptions in the timber supply analysis. This issue will be discussed in more detail below, under *species profile*, Silvicultural systems and reforestation and *wildlife*. Other directives in the plan will be discussed, where applicable, throughout this document.

*- environmentally sensitive areas*

Area reductions for environmentally sensitive areas (ESAs) amounted to 1266 hectares, most of them on sites with sensitive soils. There were also smaller area reductions for recreation ESAs (97 hectares) and wildlife ESAs (3 hectares). The total of 1266 hectares represents a substantial increase over the estimates used in the analysis supporting Management and Working Plan 7. Beyond the small area reduction for wildlife ESAs, the management of wildlife habitat was addressed through the use of special management zones with appropriate forest cover requirements in the analysis. (See discussion below, under *wildlife*.)

ESA inventories for all three categories were accepted by regional staff in 1993. I am satisfied that they reflect the best available information and are reliable for use in this determination.

*- unmerchantable and marginally merchantable stands*

On TFL 35, those stands identified as marginally merchantable are predominantly small-pine stands, with some balsam-leading stands. In the analysis they were classified as follows:

- non-pine leading stands older than 100 years but shorter than 19.5 metres;
- pine-leading stands older than 80 years but shorter than 19.5 metres; and
- pine stands that are disturbed or have low stocking and/or small trees.

No reductions to the productive forest were made specifically for these stands in the analysis. The area in question is 2809 hectares, approximately 8.8 percent of the timber harvesting land base.

District staff commented that there has been very little harvesting in these stand types. The licensee ascribed this lack of historic performance to the priority given by the company to harvesting stands that are overmature and/or susceptible to infestation and disease. Weyerhaeuser submitted that it has some operational experience in these stand types, both on and off the TFL, and will continue to operate in them where they fit into

harvesting patterns. With regard to future plans, however, there was some inconsistency among the documents submitted. In the analysis, no substantive operations in these stands were modelled to occur for 30 to 40 years. The 20-Year Plan, in contrast, projected 12 percent of the total harvest volume to come from these stands.

A sensitivity analysis to test the impact of removing these stands from the timber harvesting land base indicated that the base case harvest level could still be maintained across the entire planning horizon. Normally the removal of area from the timber harvesting land base would be expected to lower the long-term harvest level. In this case, however, the licensee elected not to maximize the base case long-term harvest level. As a result, there may be additional timber supply inherent in the base case that could accommodate a land-base reduction without lowering the long-term harvest level.

In summary, I have some concerns about the lack of harvesting history and the uncertainty inherent in Weyerhaeuser's future plans for marginally merchantable stands. However, the base case projection for TFL 35—in contrast to many other units around the province—is sufficiently robust that it can withstand this uncertainty. For this determination I am satisfied that the assumption in the analysis (to make no reductions specifically for marginally merchantable stands) does not pose an unacceptable risk to timber supply. Over the period of Management Plan (MP) 8, however, I expect to see operations in reasonable balance across the inventory profile, with performance reports submitted as part of the licensee's annual reports to the district. This issue should be readdressed in preparation for the next determination.

*- deciduous stands*

Weyerhaeuser has historically not operated in deciduous stands and has no plans to do so in future. Accordingly, the timber supply analysis made a deduction from the productive forest of 278 hectares specifically for deciduous stands. I have no information that would lead me to question this figure, and I find the modelling assumption appropriate for use in this determination. I note, too, that it is consistent with the LRMP's directive to maintain deciduous stands for critical deer winter range.

*- roads, trails and landings*

Existing roads were fully deducted from the productive forest in the timber supply analysis, but no allowance was made for future roads. According to the licensee, the few roads that are planned will be deducted in future analyses as they are built. There was also no deduction made for existing and future trails within cutblocks. Finally, existing and future landings were modelled to return to 60 percent productivity following deactivation treatment.

District staff agree with Weyerhaeuser that, apart from the Bob Lake Plateau area, the TFL is nearly fully roaded. Nonetheless, the absence of any allowance for future roads is an unusual procedure, one that suggests the long-term timber harvesting land base has been overestimated to some extent in the timber supply analysis. And had the licensee modelled the maximum long-term harvest level, that, too, would likely have been optimistic. The failure to account for any losses, past or future, to cutblock trails represents further cause to believe timber supply has been overestimated, unless one accepts—and I do not—that all cutblock trails can and will be restored to full productivity.

The impact of these factors is difficult to quantify, particularly given the wide divergence in other units of estimated losses to roads and trails. However, in light of the sensitivity analysis indicating the base case could be maintained in the short term in the face of substantial changes in the land base, I am confident that whatever timber supply constraints materialize will be felt only in the medium and long terms. Over the five-year period of this determination, I am satisfied that these unknown losses will not pose an unacceptable risk to the base case harvest level. For the next determination, however, I expect that past and future losses to roads and trails will be fully incorporated into the timber supply analysis.

The estimated past losses and projected future losses for cutblock landings appear reasonable and have been approved by district staff. Accordingly, I accept them for use in this determination.

Existing forest inventory*- general comments*

The original inventory was based on aerial photography undertaken in 1978. It was updated to 1991 for disturbances and field checks and then further updated with harvest information from 1991 and 1992. Inventory attributes were projected to 1993.

An inventory audit was undertaken by Resources Inventory Branch in the summer of 1995 and released in February this year. It found no statistically significant difference between the average mature volume per hectare indicated in the inventory and that found

in the sample plots. On this basis, I am satisfied that the inventory is appropriate for use in this determination. As will be discussed below, under *label assignment in analysis*, however, some of the inventory labels were changed prior to incorporation into the analysis.

*- label assignment in analysis*

With a view to reflecting more closely the projected makeup of the stands at harvest time, Weyerhaeuser substituted silviculture labels for the standard inventory labels for stands on over 10 300 hectares, approximately one-third of the timber harvesting land base. More than 90 percent of these silviculture labels were assigned on the basis of regeneration surveys or inventory ground calls. This substitution presupposes a significant degree of species conversion, predominantly to lodgepole pine, through natural dynamics and extensive stand tending. The proposed future species profile is shown in the table in *species profile* below. In support of these expectations, the licensee has subsequently submitted documentation on past and projected stand tending activities.

Regional and district staff have expressed doubts over the accuracy of the silviculture labels and the feasibility of achieving the conditions implied by them. To resolve these concerns, I direct the licensee to work with BCFS staff to develop an appropriate verification strategy. The substitution of silviculture labels is an unusual modelling procedure, and it is my understanding that it was undertaken without prior approval by or even notification of BCFS staff. This is of concern to me, regardless of how plausible and logical the substitution may be. Changes of such a significant nature to the inventory ought to be formally reviewed and discussed before implementation. The lack of consultation in this instance needs to be addressed before the next determination to ensure any future changes are mutually agreed upon beforehand. The implications for timber supply are discussed below, under Silviculture treatments.

*- age-class structure*

Approximately 53 percent of the timber harvesting land base is currently over 100 years of age, and a significant component of that is over 200 years. About 25 percent of the area holds stands less than 21 years. Given its priority of harvesting older, decadent stands first, Weyerhaeuser projects that the age profile of the timber harvesting land base will shift downwards over the next century until the bulk of stands are less than 100 years and none more than 150 years. This projection will have to be reconciled with biodiversity plans and objectives for this area prior to the next analysis.

*- species profile*

Although MP 8 expressed a commitment to mixed species planting, the analysis portrayed an intention to convert most areas of spruce and fir to pine. (See further

discussion below, under Silvicultural systems and reforestation.) The leading-species distributions on the timber harvesting land base at the beginning and end of the analysis simulation period are shown below:

<b>Leading species</b>	<b>Area percentage at beginning of simulation</b>	<b>Area percentage at end of simulation</b>
Lodgepole pine	39 %	79 %
Spruce	33 %	12 %
Interior Douglas-fir	19 %	9 %
Balsam	9 %	0 %

Weyerhaeuser asserts that natural ingrowth will ensure balsam will continue to be represented on the timber harvesting land base as a secondary species. Elsewhere, (e.g., set-aside areas such as riparian areas) balsam-leading stands will be found either as part of the original stand structure or through natural succession.

Both the current and projected distributions reflect the use of silviculture labels, which is discussed above, under *label assignment in analysis*. Based on past and planned performance by the licensee, I accept these projections as reasonable for use in this determination. As noted in the earlier section, however, I expect the licensee to verify its assumptions in cooperation with BCFS staff over the next five-year period and to ensure that they are attainable and consistent with the LRMP.

*- volume estimates for existing stands*

Volume estimates for unmanaged existing stands were derived from two sources. For stands considered immature as of 1978, volume estimates were generated by the Variable Density Yield Prediction (VDYP) yield model. For stands considered mature as of 1978, cruise volume estimates were used and projected over time in a fixed ratio with VDYP volumes until harvest. This methodology was approved by Resources Inventory Branch staff.

Existing stands that were deemed managed, either because of their establishment date or on the basis of an assessment, were assigned to yield curves generated by the Table Interpolation Program for Stand Yields (TIPSY). The managed nature of these existing stands makes them suitable candidates for TIPSY, and the procedure was approved by Research Branch staff.

A sensitivity analysis indicated the base case harvest flow is largely insensitive to a reduction in existing mature volumes. Lowering existing volumes by 10 percent could lead to a brief compromise of forest cover objectives in approximately 100 years (if mid-term harvest levels were not decreased), but no short-term impact is projected. A sensitivity analysis tested the impact of a 10 percent increase in mature volumes and



indicated the transition to harvesting younger stands would be postponed, assuming no change is made to the initial harvest level.

As noted earlier, under *general comments*, a recent inventory audit statistically validated, for the TFL as a whole, volumes estimated using VDYP and existing inventory information. With this in mind, I accept the licensee's modelling methodology and assumptions as suitable for this determination.

### Expected rate of growth

#### *- site productivity estimates*

The productivity of a site largely determines how quickly trees will grow, and therefore affects expectations of timber volumes in regenerated stands. Estimates of site productivity (site indexes) are commonly expressed in terms of expected tree height 50 years after reaching 1.3 metres. Site indexes in most TSAs and TFLs in the province are generated by the BCFS "Freddie" program.

The most accurate measurements of site productivity come from stands between 30 and 150 years of age. Outside that range the estimates are believed to be less reliable due to a host of variables that affect growth: these include weather, stocking density, competition from other vegetation, and damage. It is now widely accepted that these old-growth-based site indexes underestimate the growth potential of regenerated, managed stands, which are generally less affected by over-stocking or competition with other vegetation.

This issue of uncertainty surrounding site index values for regenerating stands is a provincial concern. In an effort to obtain better information for use in estimating site productivity, the BCFS Site Productivity Working Group is overseeing a series of paired-plot studies in units throughout the six forest regions. Preliminary results indicate that for some species in some areas, current site indexes, determined using inventory information from existing unmanaged forests, underestimate the growth potential of some regenerated stands.

Despite the relative stability of the base case projection, the uncertainty regarding site productivity is of some consequence for TFL 35 as well. Current harvest projections indicate an abrupt transition in approximately 50 years from old growth to second-growth stands. According to a sensitivity analysis, forest cover objectives could be compromised in approximately 100 years if regenerated stand volumes were overestimated by 10 percent. Conversely, if regenerated volumes are underestimated, this would likely increase flexibility in achieving the base case harvest projection.

Site indexes for each forest polygon in TFL 35 were generated by the BCFS "Freddie" program. Area-weighted site index values for each growth type group and site class combination were then calculated from the polygon site index values. These new values

were subsequently applied to all existing and regenerating stands, with the exception of good and medium site class regenerating lodgepole pine in the Montane Spruce dry mild 2 (MSdm2) and Engelmann Spruce-Subalpine Fir dry cold 2 (ESSFdc2) biogeoclimatic subzones. A special site index assignment of 21.1 metres for those classes was made based on growth intercept studies undertaken by Weyerhaeuser. BCFS staff approved the methodology used to assign both the area-weighted and special site indexes.

A further reassignment that was not approved was the conversion of good site spruce and fir within the MSdm2 and ESSFdc2 subzones to good site pine following harvest. This is a plausible extrapolation, but I am concerned that it lacks scientific support and that the procedure was not approved by BCFS Research Branch. For this determination it is not a significant issue, as it affects timber supply only in the medium and long term; prior to its incorporation in future analyses, however, field measurements supporting this assumption should be documented and submitted to Research Branch for approval.

*- volume estimates for regenerated stands*

Volume estimates for regenerated stands were developed using the TIPSY growth and yield model. These yields were then reduced using Operational Adjustment Factors (OAFs). An OAF1 value of 10 percent was applied to reflect reduced yields due to non-productive areas such as swamps and rock outcrops that were too small to be reflected in the inventory. In most TSAs and TFLs OAF1 is estimated at 15 percent; for TFL 35 the licensee justified the lower level on the basis of more detailed mapping of non-productive areas (down to one hectare rather than the normal two-hectare limit mapped elsewhere). No OAF2 value was applied to account for natural losses to disease, insects, etc. Instead, decay, waste and breakage factors (discussed below, under Decay, waste and breakage) were applied by the model at the projected time of harvest. These procedures were approved by the BCFS Research Branch.

The analysis also assumed a 5 percent increase in volume at all ages for lodgepole pine stands planted after 1999. This incremental yield is based on the use of genetically improved seedlings from Weyerhaeuser's Grandview Nursery near Vernon. Again, this was approved by Research Branch.

As noted earlier, under *site productivity estimates*, a sensitivity analysis indicated a 10 percent decline in regenerated stand volumes could precipitate a temporary breach of forest cover constraints in about 100 years. No short-term impact was evident, though.

For this determination I accept the regenerated volume estimates used in the analysis. Should they prove to be optimistic I am satisfied there is no undue risk to timber supply in the short term and that there is ample time to implement any harvest-level adjustments necessary to accommodate the revised estimates.

*- minimum harvestable ages*

The Total Property Simulation model used in the analysis did not constrain harvesting by a minimum harvestable age or a minimum volume per hectare. Rather, target rotation ages were selected and used in the model to determine queuing for harvest. Those stands furthest (i.e., oldest) from the target age were given harvest priority.

The target rotation ages chosen closely approximate culmination ages. Regional staff have expressed some concern that the target ages are lower than the minimum harvestable ages used in the surrounding Kamloops TSA. It was also felt that for some analysis units, particularly those with pine-leading stands, the target ages are low.

I note that the projected average harvest age throughout the simulation is higher than the average target rotation age. Due to the licensee's focus on older stands the average harvest age now is more than 64 years above the average target rotation age. In 50 years this gap will drop to about five years—coinciding with the shift of operations to younger, regenerated stands—but will then increase thereafter.

In summary, the licensee's assumptions and procedures create a reasonable outcome in terms of projected age of actual harvest, notwithstanding differing professional estimates of minimum harvestable ages. The volumes projected for harvest at the target ages are realistic—only 90 hectares yield less than 150 cubic metres per hectare throughout the entire simulation—and, as noted above, actual volume/area ratios are likely to be higher, given that harvest ages in the field will almost always be higher than the target ages. For this determination, I accept the modelled harvest ages.

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

Regeneration delay

Silvicultural standards require establishment of fully-stocked stands by the end of a specified regeneration delay period. In TFL 35 regeneration is performed primarily through planting, with only a small component of naturally regenerated sites in dry-belt fir areas. A slight inconsistency appeared between the regeneration delay periods cited in MP 8 and those modelled in the analysis. In the former, a three-year delay period was assumed for plantations and six years for naturally regenerated areas. The analysis, however, modelled two and five years, respectively.

BCFS staff concur that the modelled time periods more closely reflect actual performance in the field. Regardless, for this determination the discrepancy is inconsequential. A sensitivity analysis indicated that changing the regeneration delay periods to three years for plantations and seven years for naturally regenerated stands would not affect the base case: the non-declining harvest flow projection could still be maintained across the simulation period.

In summary, I am satisfied that the modelled regeneration delay periods are appropriate and pose no risk to projected timber supply.

Impediments to prompt regeneration

No impediments to regeneration were assumed in the analysis. A 1993 letter from Weyerhaeuser indicated the possibility of plantability problems in some areas, but district staff agree that such areas would be small in size. For this determination, then, I regard the licensee's modelling assumption as appropriate.

Not-satisfactorily-restocked areas

At the time the information package was prepared (1993), 4 percent of the timber harvesting land base, 1342 hectares, was classified as not satisfactorily restocked (NSR). This total was divided between 552 hectares of current NSR and 790 hectares of backlog NSR. Consistent with the modelled regeneration delay periods (see discussion above, under Regeneration delay), current NSR represents approximately two years of harvesting history. Backlog NSR is projected to be restocked by the end of 1997 and was regenerated in the model to the applicable pre-existing analysis units, taking into account species conversion and site index adjustments where those are planned. (See earlier discussions under *species profile* and *site productivity estimates*.)

I find the NSR estimates reasonable and note that the backlog NSR is scheduled to be restocked in a timely manner. In summary, the base case has incorporated this factor suitably.

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

Silvicultural systems and reforestation

The predominant silvicultural system is clearcutting, except in the 736-hectare selection management zone in the southeast corner of the TFL, where partial cutting is used to harvest dry-belt fir. Reforestation will occur through planting on most sites, with the exception of the selection management zone, which is suited to natural regeneration.

MP 8 referred to a strategy to increase mixed-species plantations, but indicated that a lack of good volume information for mixed-species stands precluded modelling of this strategy in the analysis. The current analysis therefore assumed a widespread emphasis on management for pine. (See earlier discussion, under *species profile*.) Weyerhaeuser has committed to implementing the LRMP directives and stated that the next analysis will be better able to incorporate the company's shift to mixed-species plantations. Regional staff thus expect the reforestation operations during the term of MP 8 will involve somewhat more mixed planting than modelled, although pine will continue to be the principal species.

I note that the commitment in MP 8 to mixed-species planting is consistent with recent trends in forest management, as prescribed in the Forest Practices Code and the Kamloops LRMP. The implementation details of that commitment remain to be finalized, however, and there will undoubtedly be a transition period as the licensee works with BCFS staff to bring MP 8 into accord with the provisions of the LRMP.

For this determination I accept the modelled assumptions and the general commitment in MP 8 to the LRMP. By the time of the next analysis I expect the transition will be complete and sufficient information will be available to allow Weyerhaeuser to quantify and model its mixed-species reforestation strategy more precisely. Any impacts on timber supply will be assessed at that time.

Silviculture treatments

The licensee's ambitious program of species conversion and site productivity reclassification presupposes a significant degree of stand tending in the form of brushing and juvenile spacing. MP 8 indicated the need to tend 66 percent of plantations and 90 percent of naturally regenerated stands, or portions thereof, in order to achieve projected growth rates. BCFS staff in the region and district have expressed concern that the

projected growth rates may not be feasible, regardless of the level of silviculture treatment.

Silviculture treatments affect the rate at which regenerated stands become established and the quality and quantity of timber produced therein. For the near future, the success or failure of the silviculture program places timber supply at no undue risk. A sensitivity analysis indicated no impact in the short term from even a 10 percent reduction in regenerated volumes. By the next determination, however, the extent to which the silviculture program will facilitate the growth targets ought to be more evident, and the results should be incorporated into the analysis with greater clarity.

### Commercial thinning

Weyerhaeuser has expressed no intention to carry out commercial thinning and made no allowance for it in the analysis.

**(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

The normal Interior close utilization standards were assumed in the analysis: i.e. any trees with a diameter at breast height of 17.5 cm (12.5 cm for lodgepole pine) must be harvested, and, once felled, all wood up to a top diameter of 10 cm must be removed from the site, leaving a stump no higher than 30 cm. BCFS staff confirmed that these reflect current practice and have been accounted for within the natural and managed stand yield estimates.

### Decay, waste and breakage

Existing stand yields modelled on or parallel to VDYP curves included allowances for decay. The standard inventory-zone-based waste and breakage factors were then applied to these yield estimates by the model for lodgepole pine-leading stands less than 61 years and all other stands less than 121 years. For pine-leading stands 61 years and over and all other stands 121 years and over, the waste and breakage factors applied were based on 1978 cruise estimates.

The same strategy was adopted for regenerated stands modelled with TIPSYP, except that decay factors were included in the reductions applied by the model. As discussed earlier, under *volume estimates for regenerated stands*, the normal OAF 2 factor was not applied. These procedures were approved by BCFS Research Branch, and I accept their suitability for this analysis.

- (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 and to plan the use of these resources to ensure production and harvesting of timber and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated. Accordingly, the extent to which IRM objectives constrain timber supply must be considered in AAC determinations.

Data collection and the completion of the information package on which the analysis was based took place before the introduction of the Forest Practices Code and prior to the completion of the Kamloops LRMP. As a result, the management practices assumed in the analysis do not meet the new requirements in several instances.

*- visually sensitive areas*

At the time of completion of the timber supply analysis, a visual quality inventory was available only for the northwest portion of the TFL. Visually sensitive areas were assigned one of three visual quality objectives (VQOs)—retention (85 hectares), partial retention (148 hectares) or modification (35 hectares)—and modelled in the analysis as a separate management zone with a single maximum disturbance limit under which no more than 13.1 percent of the stands in the zone can be less than 4 metres tall at any one time. This modelling procedure was approved by district staff. Other visually sensitive areas associated with lakes were netted out of the productive forest as recreation ESAs.

Since the analysis, a landscape inventory for the entire licence area has been submitted that accords relatively closely with the LRMP. Very few additional areas have been assigned VQOs, however. Weyerhaeuser has affirmed that its visual management strategy during the term of MP 8 will take into account the new inventory information and the directives of the LRMP.

This more recent information does not significantly affect the assumptions underlying the base case. For the next determination, I expect the new landscape inventory to be incorporated into the analysis but am satisfied that its omission now poses no unacceptable risk to timber supply in the short term.

*- wildlife*

In 1991, Weyerhaeuser and staff from the Ministry of Environment, Lands and Parks prepared the "Operational Harvesting & Reforestation Guidelines for the Overall

Maintenance of Fish & Wildlife Habitat on TFL 35 & Adjacent Study Area." On the basis of that document, the licensee modelled 1062 hectares within the timber harvesting land base as critical mule deer winter range. As a proxy for reduced cutblock sizes (which the model was incapable of modelling directly), company analysts applied a cover objective to maintain a minimum 10 percent in a late seral stage: this was defined as 80 years in lodgepole pine and 110 years in fir and spruce stands. These modelling criteria were accepted by BCFS and Ministry of Environment, Lands and Parks staff.

Two small areas with high wildlife value were excluded totally from the productive forest in the analysis. A separate wildlife management area, covering 785 hectares adjacent to swamp complexes, was modelled with a requirement that 25 percent of the area be retained in late seral stage. The same seral-stage and harvest-age definitions were used as for the deer winter range.

The LRMP did not address the issue of moderate-value mule deer habitat, but did identify 765 hectares within the TFL, predominantly in the Interior Douglas-fir biogeoclimatic zone, as critical deer winter range. Within this range, at least 25 percent of the forested area must provide thermal cover at all times. Ministry of Environment, Lands and Parks staff estimate thermal cover is provided once a stand reaches 10 metres.

The area estimate of 765 hectares and the associated cover requirements are actually less constraining on timber supply than the licensee's current management strategy for deer winter habitat. It should be noted, however, that the LRMP's figure is a product of a strategic overview process for a much larger land base. As subsequent, more detailed, mapping is carried out over the next few years I fully expect further refinement and reconciliation of the plan to ensure it meets or exceeds current management strategies for deer habitat.

The aspect of the LRMP relevant to deer habitat management that may impose a downward pressure on timber supply at some point is its emphasis on management for mixed species. This issue has been discussed in more detail above, under Silvicultural systems and reforestation, where I concluded that the inevitability of a transition phase means the timber supply repercussions of the shift to mixed-species planting will not be fully identified until at least the next timber supply analysis.

A larger part of the licence area falls within the LRMP's critical moose winter range. In contrast with the identified deer winter range, however, the plan did not specify forest cover criteria or other management practices whose impact on timber supply can be quantified at this time. As a result, it is not clear whether the base case harvest projection can be achieved while accommodating the management procedures necessary to meet the general LRMP objectives for moose winter range. BCFS staff do not anticipate any impact on timber supply for at least the near future.

In summary, the LRMP's emphasis on mixed-species management for mule deer winter range may affect timber supply in the medium and/or long terms. I am assured by the



relatively small area in question and by the need for a transition phase that there should be no impact for at least the term of this determination. The prescriptions for moose winter range appear less restrictive than for deer, although it is possible they may also affect timber supply in the future. Succeeding AAC determinations will be better positioned to assess the long-term effects of moose management.

*- riparian areas*

At the time of the analysis, riparian management in TFL 35 was based upon the "Kamloops Timber Supply Area Riparian Management Area Guidelines." This document stipulated the following riparian management areas:

<b>Riparian Feature</b>	<b>Buffer Zones and Reserves</b>	<b>Reduction Factor Applied in Analysis</b>
lakes & swamps < 1 hectare	10-metre buffer	50%
lakes & swamps ≥ 1 hectare	10-metre reserve 20-metre buffer	100% 50%
creeks	15-metre buffer	50%

A land-base reduction of 50 percent was modelled in the analysis to approximate the harvest constraints within the buffer areas. No harvesting is permitted within the reserve areas; consequently they were completely netted out of the productive forest. In total, and following allowances for overlap, 1212 hectares of riparian management areas were identified. This resulted in a net reduction of 710 hectares, or 2 percent, from the productive forest land base. In addition, forest cover requirements associated with some wildlife management zones adjacent to swamp complexes (see above, under *wildlife*) were considered to be a surrogate for riparian area reductions.

Although consistent with the guidelines of the day, these management measures have been superseded by the more constraining requirements of the Forest Practices Code. The *Forest Practices Code Timber Supply Analysis* projected a 3 percent land-base reduction attributable to riparian requirements in the nearby Okanagan TSA. No specific analysis has been performed for this unit or the surrounding Kamloops TSA but, given my knowledge of the terrain in this unit, I regard it as likely that an overall reduction of a comparable magnitude will be necessary here to account for riparian management measures under the Code. This suggests that, relative to the timber supply analysis, approximately 1 percent more land base will need to be removed. A sensitivity analysis indicates the base case initial harvest level could be maintained for at least two decades in the event of a 10 percent land-base reduction. Accordingly, I am satisfied that the timber supply impact of riparian management measures will be restricted to the medium and

long terms. Riparian management implications should become clearer with further implementation of the Code.

*- recreation*

Hunting, fishing, snowmobiling, hiking and cross-country skiing are the principal recreational activities in the unit, with more than 11 000 user-days annually. The licensee completed a recreation inventory in 1986 and has subsequently digitized the information into a geographical information system (GIS) file. A recreation plan has been developed that identifies 12 recreation units, and this was incorporated into the analysis. This led to the deduction of 97 hectares of recreation ESAs, including visually sensitive areas associated with lakes, from the productive forest land base. A new recreation inventory is scheduled to be undertaken during the term of MP 8. I also note that the Kamloops LRMP did not identify any special Recreation and Tourism Resource Management zones in the licence area.

In summary, I am satisfied that the analysis has taken recreation concerns into account appropriately and have no reason to believe they will affect timber supply, relative to the base case, in the short term. The information gathered from the new recreation inventory will be utilized in the timber supply analysis supporting the next AAC determination.

*- areas of cultural or archaeological significance*

TFL 35 lies within the traditional territory of the Shuswap Nation Tribal Council. As part of the Kamloops LRMP process, an archaeological overview map was developed in 1994 by the Ministry of Small Business, Tourism and Culture. Land was classified as having a low, medium or high probability of containing archaeological sites. The licensee has committed to referring to this map and consulting with First Nations during development planning.

First Nations in the LRMP area are also actively compiling traditional and economic land-use data for their own use. Should that information become available to BCFS staff, any related impact on timber supply will be assessed in future determinations.

*- biodiversity and old growth*

Biological diversity, or biodiversity, is 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. The Code acknowledges the need to conserve biodiversity, and a supporting guidebook has been released that addresses stand- and landscape-level biodiversity needs for a variety of ecological units found within the province. A major consideration in managing for

biodiversity at the landscape level is leaving sufficient and appropriately located mature forests for species dependent on, or strongly associated with, old-growth forests. At the stand level, retention of wildlife tree patches and coarse woody debris are the major biodiversity concerns.

At the time of completion of the analysis, no landscape units had been designated by the District Manager. The LRMP identified 29 macro, or large-scale, units—which the District Manager will further refine—and recommended preliminary biodiversity emphases in each. The Jamieson/Skull unit, which contains nearly all of TFL 35, was assigned a low biodiversity emphasis.

At the stand level, the timber supply analysis assumed a deduction of 323 hectares—approximately 1 percent of the current timber harvesting land base—to account for future wildlife trees required under the Forest Practices Code. Although a reasonable estimate at the time, it now seems insufficient to meet stand-level biodiversity requirements under the Code.

As noted earlier, under Silvicultural systems and reforestation, the licensee expressed its intent in MP 8 to manage mixed-species plantations, but inadequate data constrained it to model the reforestation of most harvested areas to lodgepole pine. The management assumptions in the base case, therefore, are contrary to the intent of the LRMP and the Biodiversity Guidebook, both of which prescribe maintenance of the natural species distribution. As discussed in the earlier section, the impact on timber supply is unclear but can likely be accommodated during the transition period contemplated by the plan and the Forest Practices Code.

In summary, the biodiversity measures assumed in the analysis have been superseded by the Code and the LRMP. However, given the resiliency of the base case and the demonstrated insensitivity in the short term to even a 10 percent land-base reduction, I am satisfied that implementation of biodiversity requirements under the Code poses minimal risk to timber supply during the period of this determination. Over the ensuing decades it is probable that timber supply will be less than estimated in the current analysis. This issue will be further discussed in "Reasons for Decision" below.

*- green-up and forest cover requirements*

To account for the harvest restrictions imposed by maximum clearcut sizes and hydrological considerations a modelling constraint was applied across the entire timber harvesting land base whereby no more than 30 percent of the land base could be less than 4.8 metres tall at any time. (This was an area-weighted average of two requirements: no more than 40 percent of the total area could be less than the three-metre IRM green-up, and no more than 60 percent of the area in the snowpack zone could be less than the six-metre hydrological green-up.) Moreover, in keeping with the Kamloops Regional Integrated Resource Management Timber Harvesting Guidelines, the analyst also

assumed that at least 20 percent of the area must be taller than 20 metres at all times, a height corresponding to approximately 50 years for most lodgepole pine stands, according to BCFS staff. These requirements are supplemented by additional restrictions within the landscape, wildlife management and mule deer winter range special management areas. (See earlier discussions under *visually sensitive areas* and *wildlife*.)

I find these assumptions reasonable, and do not expect the Forest Practices Code to impose more stringent requirements that would constrain timber supply further than modelled.

- *watersheds and grazing*

A small portion of one community watershed extends into TFL 35 but requirements to safeguard the area in question are not expected to constrain harvesting operations. Similarly, the licensee and BCFS staff do not believe the issuance of grazing permits has affected or will affect timber supply.

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

#### Harvest profile

In the analysis, stands farthest from the target rotation age were given harvest preference (see earlier discussion under *minimum harvestable ages*). BCFS staff believe the profile modelled on this basis is consistent with current practices.

I accept the profile modelled as reflective of the best available information and appropriate for this determination.

#### Partitioned component of the harvest

There is currently no partition in this TFL. No information was submitted to indicate any segment of the forest profile would be suitable for a partition.

#### 20-Year Plan

The 20-Year Plan submitted by the licensee has been accepted by district staff. However, as noted earlier, under *unmerchantable and marginally merchantable stands*, the plan projects a larger proportion (12 percent) of the total harvest volume to come from marginally merchantable stands than was modelled in the analysis. While I do not view this inconsistency as a significant cause for concern—particularly in light of the sensitivity analysis indicating the base case harvest level could be maintained if these lands were excluded from the productive forest—I do expect to see performance in these areas during the term of this management plan.

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

#### Harvest flow

In MP 8 and the timber supply analysis, Weyerhaeuser is clearly committed to a non-declining harvest-flow policy. No attempt was made in its sensitivity analyses to raise the initial harvest level in response to factors that could be expected to improve timber supply in at least the short term. Nor did the company attempt to increase the long-term level. Moreover, no alternative harvest-flow projections were modelled, although MP 8 refers to a potential long-term harvest level of 137 000 cubic metres per year. Following conversations with Weyerhaeuser staff, however, BCFS staff have concluded that a higher harvest level could not be maintained in the short term without compromising forest cover objectives or medium-term harvest levels.

While I would have preferred to have seen alternative harvest flows, I accept the base case projection as a suitable point of reference for my determination. In the next timber supply analysis, however, I expect to see alternative harvest flows modelled.

Community dependence on forest industry

Weyerhaeuser's sawmill-pulpmill complex in Kamloops is one of the major employers in the area. The sawmill employs approximately 210 direct employees and contractors, while the pulpmill employs around 600. Although Kamloops enjoys a relatively diverse economy, I am conscious of the importance of the forest industry to the community.

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

Timber processing facilities

All of the timber harvested on TFL 35 is sent to the licensee's sawmill-pulpmill complex in Kamloops, where it represents about 25 percent of the sawmill's total fibre requirements. The balance stems from Weyerhaeuser's forest licence in the adjacent Kamloops TSA and from other sources. The pulpmill operates primarily on chips from the company's different sawmills, with additional fibre sourced through supply arrangements with other licensees.

- (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 memorandum

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 35. 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.

The principal benefit of commercial thinning is the flexibility it lends to harvest planning. In management units where timber supply shortfalls are predicted, commercial thinning can be used to maintain fibre flow during those "gaps." The non-declining harvest-flow projection for TFL 35 means there is little need for such a management tool, and, as noted above, under Commercial thinning, no thinning is planned. Nor is there evidence of a need or opportunity for a partition. (See earlier discussion under Partitioned component of the harvest.)

The Minister's memorandum addressed the effects of visual resource management on timber supply. It asked that constraints applied to timber supply in order to meet VQOs be re-examined in light of the beneficial effects of the Forest Practices Code when determining AACs in order to ensure they do not unreasonably restrict timber supply. As noted earlier, under *visually sensitive areas*, there are relatively few VQOs designated in this unit. Although future analyses will include a more comprehensive landscape inventory, I am satisfied that the base case is sufficiently robust that there is no reason at this time to expect timber supply to be constrained in the near future by additional visual resource management measures.

#### Local objectives

The Kamloops LRMP and the declaration of certain of its provisions as a higher level plan represent the culmination of three years of dedication and effort by a wide range of parties and interests in the region. Its status as the first government-approved LRMP in the province is a tribute to the participants and communities involved. I am aware of the direction it provides for forest management, both on the larger, regional scale and on a smaller scale specifically for TFL 35. Activities on the TFL must be consistent with this higher level plan. In this determination, I have reconciled the differences between the analysis and the plan and acknowledge the new obligations the plan creates for the licensee.

Weyerhaeuser solicited public input for MP 8 during February and March of this year, and also held two open houses in Kamloops and Barriere. No written comments were received from the public. Ministry of Environment, Lands and Parks staff exchanged letters with the licensee on wildlife, biodiversity, landscape and riparian management issues. Those concerns have been discussed in the appropriate sections of this document.

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

#### Unsalvaged losses

Unsalvaged losses to fire, insect infestations and wind damage were estimated in the analysis at 2 percent of harvest volumes. This falls within the acceptable provincial range and compares closely to the level of 1.8 percent estimated for the Kamloops TSA. Given that the TFL is well-roaded and salvage opportunities usually exist, 2 percent is a reasonable assumption. However, as in most other units in the province there is some uncertainty around this estimate. As I have no better information to rely upon, I accept it at this time, but I would like to see unsalvaged loss estimates identified with better data and greater methodological rigour in future determinations, both here and elsewhere in the province.

## Reasons for Decision

In reaching my decision on an AAC for TFL 35, I have considered all of the factors presented above and have reasoned as follows.

The timber supply analysis indicates the current AAC of 125 600 cubic metres could be maintained throughout the 225-year planning horizon. Although this forecast relies upon a number of assumptions that may be optimistic—e.g., site index reclassification, use of silviculture labels to project growth, extensive stand-tending—only four factors can be positively identified that cast doubt on the feasibility of the base case.

1. The riparian requirements of the Forest Practices Code are expected to constrain timber supply in the medium and long terms beyond that modelled in the analysis;
2. The biodiversity requirements of the Forest Practices Code are also expected to restrict timber supply in the medium and long terms;
3. No allowance was made for future losses to roads or to past and future losses to cutblock trails; and
4. The emphasis by the Kamloops LRMP on mixed-species management may prove more constraining on timber supply than the widespread conversion to plantation lodgepole pine stands modelled in the timber supply analysis.

As discussed above, under *riparian areas*, the Forest Practices Code is expected to impose more constraining requirements than those assumed in the timber supply analysis. The exact impact on timber supply is difficult to quantify, but it is probable the necessary practices will require some decrease in the projected harvest level in the medium and long terms. For the immediate future, however, the stability of the base case suggests there is little risk to timber supply.

A similar situation exists with regard to the biodiversity requirements of the Forest Practices Code. Although the land-base assumptions and reductions adopted in the timber supply analysis were reasonable at the time the analysis was initiated, they are likely inadequate to meet current requirements, particularly at the stand level. Both the Biodiversity Guidebook and the Kamloops LRMP also emphasize maintenance of the natural species distribution, in contrast to the management assumption in the base case that large areas of TFL 35 will be converted to lodgepole pine plantations following harvest. As there is likely to be some overlap between



riparian and biodiversity requirements, I am unwilling to speculate on the precise impact biodiversity management will have on timber supply. Given the stability of the base case, however, I am convinced that the necessary restrictions can be accommodated in the short term without affecting timber supply.

The absence of any allowance in the current analysis for future losses to roads and past and future losses to cutblock trails has undoubtedly led to an overestimation of the size of the long-term timber harvesting land base. It is difficult to estimate the area in question, as there is uncertainty throughout the province regarding the magnitude of these losses. As with the riparian and biodiversity concerns, however, the effect on timber supply should be restricted to the medium and long terms.

The timber supply implications of the LRMP requirements for tree species diversity are similarly difficult to estimate. In the short term, as Weyerhaeuser brings its reforestation strategy into line with the LRMP, there will clearly be no impact. It is possible the maintenance of other species in place of the lodgepole pine modelled in the timber supply analysis may result in longer green-up periods and higher minimum harvestable ages, but those effects will not be quantifiable for some time yet. And, in any event, they will change timber supply, if at all, only in the medium and long terms.

In summary, none of these factors is likely to affect timber supply during the period of this determination. The cumulative land-base impact of the four factors is unlikely to exceed 10 percent, a level that a sensitivity analysis indicated could be sustained without affecting the short-term harvest level. In the event of maximum probable downward pressures, the most likely outcome would be a mild future decline, as opposed to the flat line forecast in the base case. Both the Forest Practices Code and the LRMP allow for a transition period, at the end of which the true timber supply picture will be more evident.

No factors were identified that would suggest timber supply has been underestimated, at least in the short term. The licensee referred to a potential long-term harvest level of 137 000 cubic metres but did not model any harvest-flow projections to depict such a forecast.

In summary, I am satisfied that the base case is sufficiently resilient to withstand the downward pressures for at least the term of this determination.

## **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 the risk of disruptive shortfalls in future wood supply, can best be achieved in this TFL at this time by maintenance of the existing AAC of 125 600 cubic metres.

## Implementation

This determination comes into effect on November 1, 1996, and will remain in effect until a new AAC is determined, which must take place within five years of this determination. During that period and in time for the next AAC determination, the following will be provided or undertaken by the licensee:

1. Past and future projected losses to cutblock trails must be incorporated into the next timber supply analysis.
2. Losses to future roads must be incorporated into the next timber supply analysis.
3. Volumes harvested in marginally merchantable (problem-forest-type) stands must be monitored and reported.
4. The stands to which silviculture labels were applied for use in the analysis must be examined to verify the appropriateness of that substitution.
5. Field measurements supporting the conversion of good site spruce and fir within the MSdm2 and ESSFdc2 subzones to good site pine following harvest should be documented and submitted to Research Branch for approval.

A handwritten signature in black ink, appearing to read "L. Pedersen". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Larry Pedersen  
Chief Forester

October 1, 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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### **Documents attached:**

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

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